

# Fish Traits Database, USGS/VA Tech

Metadata also available as - [[Questions & Answers](#)] - [[Parseable text](#)] - [[XML](#)]

## Metadata:

- [Identification Information](#)
- [Data Quality Information](#)
- [Entity and Attribute Information](#)
- [Distribution Information](#)
- [Metadata Reference Information](#)

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### *Identification\_Information:*

*Citation:*

*Citation\_Information:*

*Originator:* Emmanuel A. Frimpong and Paul L. Angermeier

*Publication\_Date:* Unpublished material

*Title:* Fish Traits Database, USGS/VA Tech

*Geospatial\_Data\_Presentation\_Form:* Maps and Data

*Online\_Linkage:* <<http://www.cnr.vt.edu/fisheries/fishtraits/database/>>

*Description:*

*Abstract:*

The need for integrated and widely accessible sources of species traits data to facilitate studies of ecology, conservation, and management has motivated development of traits databases for various taxa. In spite of the increasing number of traits-based analyses of freshwater fishes in the United States, no consolidated database of traits of this group exists publicly, and much useful information on these species is documented only in obscure sources. The largely inaccessible and unconsolidated traits information makes large-scale analysis involving many fishes and/or traits particularly challenging. We have compiled a database of >100 traits for 809 (731 native and 78 nonnative) fish species found in freshwaters of the conterminous United States, including 37 native families and 145 native genera. The database, named FishTraits, contains information on four major categories of traits: (1) trophic ecology, (2) body size and reproductive ecology (including life history), (3) habitat preferences, and (4) salinity and temperature tolerances. Information on geographic distribution and conservation status is also compiled. The database enhances many opportunities for conducting research on fish species traits and constitutes the first step toward establishing a central repository for a continually expanding set of traits of North American fishes.

*Purpose:*

Data were originally compiled as part of a project developing stream assessment fish metrics for the conterminous United States. Expansion of the data set to its current state was necessitated by the widespread need to conduct large-scale analyses of freshwater fishes to address other basic and applied issues such as understanding species-habitat

relationships and community organization and developing fish management and conservation strategies for non-native fish invasions, climate change, habitat modifications, and extinctions and extirpations.

*Time\_Period\_of\_Content:*

*Time\_Period\_Information:*

*Range\_of\_Dates/Times:*

*Beginning\_Date:* 200508

*Ending\_Date:* 200811

*Currentness\_Reference:* publication date

*Status:*

*Progress:* Complete

*Maintenance\_and\_Update\_Frequency:* As needed

*Spatial\_Domain:*

*Description\_of\_Geographic\_Extent:* Conterminous United States

*Bounding\_Coordinates:*

*West\_Bounding\_Coordinate:* -125.00000

*East\_Bounding\_Coordinate:* -67.00000

*North\_Bounding\_Coordinate:* 48.00000

*South\_Bounding\_Coordinate:* 25.00000

*Keywords:*

*Theme:*

*Theme\_Keyword\_Thesaurus:* ISO Topic Category

*Theme\_Keyword:* Biota

*Theme:*

*Theme\_Keyword\_Thesaurus:* GCMD

*Theme\_Keyword:* BIOLOGICAL

CLASSIFICATION>ANIMALS/VERTEBRATES>FISH

*Theme:*

*Theme\_Keyword\_Thesaurus:* None

*Theme\_Keyword:* Traits

*Theme\_Keyword:* Freshwater

*Place:*

*Place\_Keyword\_Thesaurus:* GCMD

*Place\_Keyword:* CONTINENT>NORTH AMERICA>UNITED STATES OF AMERICA

*Taxonomy:*

*Keywords/Taxon:*

*Taxonomic\_Keyword\_Thesaurus:* None

*Taxonomic\_Keywords:* multiple species

*Taxonomic\_Keywords:* animals

*Taxonomic\_Keywords:* vertebrates

*Taxonomic\_Keywords:* fish

*Taxonomic\_System:*

*Classification\_System/Authority:*

*Classification\_System\_Citation:*

*Citation\_Information:*

*Originator:*

Nelson, J. S., E. J. Grossman, H. Espinosa-Perez, L. T. Findley, C. R. Gilbert, R. N. Lea, and J. D. Williams

*Publication\_Date:* 2004

*Title:*

Common and scientific names of fishes from the United States, Canada, and Mexico

*Geospatial\_Data\_Presentation\_Form:* Publication

*Series\_Information:*

*Series\_Name:* Special Publication

*Issue\_Identification:* 29

*Publication\_Information:*

*Publication\_Place:* Bethesda, MD

*Publisher:* American Fisheries Society

*Taxonomic\_Procedures:* Not Available

*Taxonomic\_Classification:*

*Taxon\_Rank\_Name:* Empire

*Taxon\_Rank\_Value:* Biovitae

*Applicable\_Common\_Name:* Carbon-based lifeforms

*Taxonomic\_Classification:*

*Taxon\_Rank\_Name:* Kingdom

*Taxon\_Rank\_Value:* Animalia

*Taxonomic\_Classification:*

*Taxon\_Rank\_Name:* Phylum

*Taxon\_Rank\_Value:* Chordata

*Taxonomic\_Classification:*

*Taxon\_Rank\_Name:* Subphylum

*Taxon\_Rank\_Value:* Vertebrata

*Taxonomic\_Classification:*

*Taxon\_Rank\_Name:* Superclass

*Taxon\_Rank\_Value:* Osteichthyes

*Access\_Constraints:* None

*Use\_Constraints:* None

*Point\_of\_Contact:*

*Contact\_Information:*

*Contact\_Person\_Primary:*

*Contact\_Person:* Michael R. Meador

*Contact\_Address:*

*Address\_Type:* mailing and physical

*Address:* U.S. Geological Survey

*Address:* 12201 Sunrise Valley Drive

*Address:* MS 413

*City:* Reston

*State\_or\_Province:* VA

*Postal\_Code:* 20192

*Country:* USA

*Contact\_Voice\_Telephone:* 703-648-5620

*Contact\_Electronic\_Mail\_Address:* mrmeador@usgs.gov

*Data\_Set\_Credit:*

US Geological Survey National Aquatic Gap Analysis Program provided funding for compilation of most of the data.

*Native\_Data\_Set\_Environment:* My SQL and PHP

*Cross\_Reference:*

*Citation\_Information:*

*Originator:* Frimpong, E. A., and P. L. Angermeier

*Publication\_Date:* 2009

*Title:*

FishTraits: A database of ecological and life-history traits of fishes of the United States

*Geospatial\_Data\_Presentation\_Form:* Publication

*Series\_Information:*

*Series\_Name:* Fisheries

*Issue\_Identification:* Unknown

*Publication\_Information:*

*Publication\_Place:* Bethesda, MD

*Publisher:* American Fisheries Society

*Other\_Citation\_Details:* (In review)

*Cross\_Reference:*

*Citation\_Information:*

*Originator:* Frimpong, E. A., and P. L. Angermeier

*Publication\_Date:* 2009

*Title:* Traits-based approaches in stream fish community analysis

*Geospatial\_Data\_Presentation\_Form:* Publication

*Series\_Information:*

*Series\_Name:* American Fisheries Society Symposium

*Issue\_Identification:* Unknown

*Other\_Citation\_Details:* Book chapter in review. Anticipated publication date is 2009.

*Analytical\_Tool:*

*Analytical\_Tool\_Description:*

ArcGIS 9.1; ArcView 3.2a: These readily available ESRI software were used to calculate range size and related metric presented in the species geographic distribution attributes.

*Tool\_Access\_Information:*

*Tool\_Access\_Instructions:* N/A

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*Data\_Quality\_Information:*

*Attribute\_Accuracy:*

*Attribute\_Accuracy\_Report:*

The primary sources of information for most species are state and regional fish accounts. Because species distributions cross state and regional boundaries, numerous species are listed in multiple accounts. This was useful for validating information, although citations of other summarized accounts rather than citations of original sources were very common. The most current or comprehensive accounts were used more heavily for species appearing in numerous sources. In addition to the regional accounts, numerous specialized texts, peer-reviewed articles, technical reports such as species recovery plans,

online catalogs (e.g., FishBase, NatureServe), and state and federal agency websites were also consulted. In all, >150 texts and web pages were used as traits references. All species accounts and other sources that were consulted are listed under the traits references section of the manuscript accompanying the database.

The correctness of the attribute values primarily depends on the accuracy of the species accounts. Spot checking of data entered previously showed greater than 99% accuracy, but this only measures accuracy of data entry. Users should understand that attributes are averaged over a species' entire range and may not always closely match the traits of local populations.

*Logical\_Consistency\_Report:* Not Applicable

*Completeness\_Report:*

Data does not include variation of traits over a species' geographic range. Only typical values (modalities) are presented.

*Lineage:*

*Process\_Step:*

*Process\_Description:* No process steps have been described for this data set

*Process\_Date:* Unknown

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*Entity\_and\_Attribute\_Information:*

*Detailed\_Description:*

*Entity\_Type:*

*Entity\_Type\_Label:* Species Identifiers

*Entity\_Type\_Definition:* Identification information for each species.

*Entity\_Type\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

*Attribute:*

*Attribute\_Label:* SID

*Attribute\_Definition:*

A unique identification for the species. We concatenated the first letter of the generic name and the first seven letters of the specific name or the first two letters of the generic name and the first six letters of the specific name. A blank SID means the species was not found in the current AFS list of species (Nelson et al. 2004).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Unrepresentable\_Domain:* See definition for naming convention.

*Attribute:*

*Attribute\_Label:* ALTSID

*Attribute\_Definition:*

Alternate species identification. This is mostly the same as SID. However, some species identifications were created from scientific names or other names used in the literature

prior to our final checking of species names with the AFS list (Nelson et al. 2004). This identification is also unique and available for all species.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Unrepresentable\_Domain:* See definition for naming convention.

*Attribute:*

*Attribute\_Label:* FID

*Attribute\_Definition:*

Family identification formed from the first eight letters of the family name (Nelson et al. 2004).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Unrepresentable\_Domain:* See definition for naming convention.

*Attribute:*

*Attribute\_Label:* GENUS

*Attribute\_Definition:* Genus name recognized by the AFS (Nelson et al. 2004).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Genus Name

*Enumerated\_Domain\_Value\_Definition:* Scientific Name: Genus

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* SPECIES

*Attribute\_Definition:* Species name recognized by the AFS (Nelson et al. 2004).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Species Name

*Enumerated\_Domain\_Value\_Definition:* Scientific Name: Species

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* GID

*Attribute\_Definition:*

Genus identification formed from the first eight letters of the genus name.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Unrepresentable\_Domain:* See definition for naming convention.

*Attribute:*

*Attribute\_Label:* COMMONNAME

*Attribute\_Definition:* Common name recognized by the AFS (Nelson et al. 2004).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Common Name

*Enumerated\_Domain\_Value\_Definition:* Accepted common name for each species.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* OTHERNAMES

*Attribute\_Definition:* Other common names encountered in accounts of the species.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Other Common Name

*Enumerated\_Domain\_Value\_Definition:* Alternative common name for each species.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* NATIVE

*Attribute\_Definition:*

Native status, as determined from the online database of non-indigenous species (Nico and Fuller 1999).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* NOTES

*Attribute\_Definition:* A unique species number for footnotes and annotations.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Unrepresentable\_Domain:* See definition for naming convention.

*Attribute:*

*Attribute\_Label:* ITISTSN

*Attribute\_Definition:*

Unique Taxonomic Serial Number (TSN) based on the Integrated Taxonomic Information System <<http://www.itis.gov/>> .

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Unrepresentable\_Domain:* See definition for naming convention.

*Attribute:*

*Attribute\_Label:* FAMILYNUMBER

*Attribute\_Definition:*

This ordinal number is unique to families and serves more than as an identifier. It also indicates phylogenetic position of the family relative to other families (Nelson 2006). Smaller numbers are associated with older fishes on evolutionary scale. Because of phylogenetic constraints on traits data, it is often necessary to deal with phylogeny in traits-based analyses. These numbers are useful under such circumstances. Statistical methods for incorporating phylogenetic information in models are discussed elsewhere.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Detailed\_Description:*

*Entity\_Type:*

*Entity\_Type\_Label:* Trophic Ecology Traits

*Entity\_Type\_Definition:*

Feeding ecology traits include whether adults feed at all, the typical feeding location(s) in the water column, and diet components as reported for any time over the species' entire range.

*Entity\_Type\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

*Attribute:*

*Attribute\_Label:* NONFEED

*Attribute\_Definition:* Adults do not feed.



*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* BENTHIC

*Attribute\_Definition:* Benthic feeder.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* SURWCOL

*Attribute\_Definition:* Surface or water column feeder.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* ALGPHYTO

*Attribute\_Definition:* Algae or phytoplankton, including filamentous algae.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* MACVASCU

*Attribute\_Definition:* Any part of macrophytes and vascular plants.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* DETRITUS

*Attribute\_Definition:* Detritus or unidentifiable vegetative matter.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* INVLVFSH

*Attribute\_Definition:*

Aquatic and terrestrial invertebrates including zooplankton, insects, microcrustaceans, annelids, mollusks, etc. Also includes larval fish.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* FSHCRCRB

*Attribute\_Definition:* Larger fish, crayfish, crabs, frogs, etc.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* BLOOD

*Attribute\_Definition:* For parasitic lampreys that feed mainly on blood.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* EGGS

*Attribute\_Definition:* Eggs of fish, frogs, etc.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* OTHER

*Attribute\_Definition:* Other diet components distinct from the preceding classes.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Detailed\_Description:*

*Entity\_Type:*

*Entity\_Type\_Label:* Body Size and Reproductive Ecology Traits

*Entity\_Type\_Definition:* Body size and life history information for each species.

*Entity\_Type\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

*Attribute:*

*Attribute\_Label:* MAXTL

*Attribute\_Definition:*

Maximum total length in centimeters. Some records may estimate asymptotic length. We assumed that the difference between maximum observed length and asymptotic length is negligible.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Continuous

*Enumerated\_Domain\_Value\_Definition:* Uninterrupted in time, sequence, substance, or extent.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* MATUAGE

*Attribute\_Definition:*

Mean, median, or modal age at maturity in years for females. Where different ages at maturity were obtained for distinct populations, the clearly supported records were averaged. Male maturity age was accepted where female data were not available.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Continuous

*Enumerated\_Domain\_Value\_Definition:* Uninterrupted in time, sequence, substance, or extent.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* LONGEVITY

*Attribute\_Definition:*

Longevity in years based on life in the wild wherever available. Where not indicated, the record was assumed to be from the wild. If wild records were not known, a record from captivity was accepted.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Continuous

*Enumerated\_Domain\_Value\_Definition:* Uninterrupted in time, sequence, substance, or extent.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* FECUNDITY

*Attribute\_Definition:* Maximum reported fecundity.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Count

*Enumerated\_Domain\_Value\_Definition:* Total observed number.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* SERIAL

*Attribute\_Definition:*

Serial or batch spawner, as inferred from evidence in any part of the species range.

Accepted evidence included observations that multiple clutches of eggs are released over the spawning season by an individual female or that distinct batches of eggs at different stages of maturation are in the ovaries.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* JAN-DEC

*Attribute\_Definition:*

The proportion of the month in the species' spawning season, following the convention of Menhinick (1991). Data were converted from weeks to proportion of the month, yielding precision of 0.25. See also SEASON and REPSTATE.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Continuous

*Enumerated\_Domain\_Value\_Definition:* Uninterrupted in time, sequence, substance, or extent.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* SEASON

*Attribute\_Definition:*

The sum of the proportions of each month in which spawning occurs; approximates length of the spawning season.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Continuous

*Enumerated\_Domain\_Value\_Definition:* Uninterrupted in time, sequence, substance, or extent.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* REPSTATE

*Attribute\_Definition:*

Representative state (or region) whose account was used to record spawning season.

When the account specified the source of the spawning season information, we placed the record as close as possible to its true geographic origin. Like many traits, spawning season length is correlated with temperature, so some reference to geographic location is useful. The codes are the two-letter state abbreviations. Unconventional codes included CAN (Canada), MEX (Mexico), NES (North Eastern States), Great Lakes, L. Huron (Lake Huron), and L. Superior (Lake Superior).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Categorical

*Enumerated\_Domain\_Value\_Definition:* Absolute values based on established categories.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* A\_1\_1

*Attribute\_Definition:* Nonguarders; Open substratum spawners; Pelagophils.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* A\_1\_2

*Attribute\_Definition:* Nonguarders; Open substratum spawners; Litho-pelagophils.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* A\_1\_3A

*Attribute\_Definition:*

Nonguarders; Open substratum spawners; Lithophils (rock-gravel).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* A\_1\_3B

*Attribute\_Definition:*

Nonguarders; Open substratum spawners; Lithophils (gravel-sand).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* A\_1\_3C

*Attribute\_Definition:* Nonguarders; Open substratum spawners; Lithophils (silt-mud).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* A\_1\_4

*Attribute\_Definition:* Nonguarders; Open substratum spawners; Phyto-lithophils .

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* A\_1\_5

*Attribute\_Definition:* Nonguarders; Open substratum spawners; Phytophils.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*



*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* A\_1\_6

*Attribute\_Definition:* Nonguarders; Open substratum spawners; Psammophils.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* A\_2\_3A

*Attribute\_Definition:* Nonguarders; Brood hiders; Lithophils (rock-gravel).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* A\_2\_3B

*Attribute\_Definition:* Nonguarders; Brood hiders; Lithophils (gravel-sand).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* A\_2\_3C

*Attribute\_Definition:* Nonguarders; Brood hiders; Lithophils (mud).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* A\_2\_4A

*Attribute\_Definition:* Nonguarders; Brood hiders; Speleophils (rock cavity).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* A\_2\_4C

*Attribute\_Definition:*

Nonguarders; Brood hiders; Speleophils (cavity generalist: rocks crevices, but also under log bark, openings in vegetation, metal cans, etc.).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* B\_1\_3A

*Attribute\_Definition:* Guarders; Substratum choosers; Lithophils.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* B\_1\_4

*Attribute\_Definition:* Guardians; Substratum choosers; Phytophils.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* B\_2\_2

*Attribute\_Definition:* Guardians; Nest spawners; Polyphils.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* B\_2\_3A

*Attribute\_Definition:* Guardians; Nest spawners; Lithophils (rock-gravel).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* B\_2\_3B

*Attribute\_Definition:* Guardians; Nest spawners; Lithophils (gravel-sand).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* B\_2\_4

*Attribute\_Definition:* Guardians; Nest spawners; Ariadnophils.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* B\_2\_5

*Attribute\_Definition:* Guardians; Nest spawners; Phytophils.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* B\_2\_7A

*Attribute\_Definition:* Guardians; Nest spawners; Speleophils (rock cavity/roof).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* B\_2\_7B

*Attribute\_Definition:*

Guarders; Nest spawners; Speleophils (bottom burrows or natural holes associated with structure or bank).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* B\_2\_7C

*Attribute\_Definition:* Guarders; Nest spawners; Speleophils (cavity generalist).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* C1\_3\_4\_C2\_4

*Attribute\_Definition:*

A lumping of all bearers. may also be regarded as substrate-indifferent.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Detailed\_Description:*

*Entity\_Type:*

*Entity\_Type\_Label:* Habitat Preference Traits

*Entity\_Type\_Definition:*

Trait sub-categories describing species associations with substrate type, lentic versus lotic system, stream size (for lotic species), current speed, and elevation.

*Entity\_Type\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

*Attribute:*

*Attribute\_Label:* MUCK

*Attribute\_Definition:* Muck substrate.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* CLAYSILT

*Attribute\_Definition:* Clay or silt substrate.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* SAND

*Attribute\_Definition:* Sand substrate.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* GRAVEL

*Attribute\_Definition:* Gravel substrate.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* COBBLE

*Attribute\_Definition:* Cobble or pebble substrate.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* BOULDER

*Attribute\_Definition:* Boulder substrate.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* BEDROCK

*Attribute\_Definition:* Bedrock substrate.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries. Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* VEGETAT

*Attribute\_Definition:* Aquatic vegetation.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* DEBRDETR

*Attribute\_Definition:* Organic debris or detrital substrate.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* LWD

*Attribute\_Definition:* Large woody debris.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary



*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* PELAGIC

*Attribute\_Definition:* Open water.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* PREFLOT

*Attribute\_Definition:* Lotic and lentic systems but more often in lotic.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* PREFLEN

*Attribute\_Definition:* Lotic and lentic systems but more often in lentic.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* LARGERIV

*Attribute\_Definition:* Medium to large river.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries. Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* SMALLRIV

*Attribute\_Definition:* Stream to small river.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* CREEK

*Attribute\_Definition:* Creek.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* SPRGSUBT

*Attribute\_Definition:* Spring or subterranean water.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* LACUSTRINE

*Attribute\_Definition:* Lentic systems.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* POTANADR

*Attribute\_Definition:*

Potamodromous or anadromous. Species that exhibit significant movement related to spawning. We concentrated on movements between marine and freshwater or within freshwater from large river, reservoirs, or lakes to tributary streams.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* LOWLAND

*Attribute\_Definition:* Lowland elevation.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* UPLAND

*Attribute\_Definition:* Highland elevation.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* MONTANE

*Attribute\_Definition:* Mountainous physiography.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* SLOWCURR

*Attribute\_Definition:* Slow current.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

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*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* MODCURR

*Attribute\_Definition:* Moderate current.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

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*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* FASTCURRE

*Attribute\_Definition:* Fast current.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

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*Detailed\_Description:*

*Entity\_Type:*

*Entity\_Type\_Label:* Salinity and Temperature Tolerances

*Entity\_Type\_Definition:* Salinity and temperature tolerance ranges for each species.

*Entity\_Type\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

*Attribute:*

*Attribute\_Label:* EURYHALINE

*Attribute\_Definition:*

Species with wide salinity tolerance; mostly obtained from species zoogeographic summaries in Hocutt and Wiley (1986).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

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*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* MINTEMP

*Attribute\_Definition:*

The 30-year average minimum January temperature at range centroid in degrees Celsius. Range centroids were used to extract values from 400-m resolution temperature grids

obtained from Climate Source, Inc., Oregon. This information is not available for species whose ranges are centered outside the contiguous United States.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

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*Enumerated\_Domain\_Value\_Definition:* Uninterrupted in time, sequence, substance, or extent.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* MAXTEMP

*Attribute\_Definition:*

30-year average maximum July temperature at range centroid in degrees Celsius. Range centroids were used to extract values from 400-m resolution temperature grids obtained from Climate Source, Inc., Oregon. This information is not available for species whose ranges are centered outside the contiguous United States.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

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*Enumerated\_Domain\_Value:* Continuous

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*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Detailed\_Description:*

*Entity\_Type:*

*Entity\_Type\_Label:* Geographic Distribution

*Entity\_Type\_Definition:* Native geographic distribution information for each species

*Entity\_Type\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

*Attribute:*

*Attribute\_Label:* AREA

*Attribute\_Definition:* Range area in square kilometers.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

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*Enumerated\_Domain\_Value:* Continuous

*Enumerated\_Domain\_Value\_Definition:* Uninterrupted in time, sequence, substance, or extent.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* PERIMETER

*Attribute\_Definition:* Range perimeter in kilometers.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Continuous

*Enumerated\_Domain\_Value\_Definition:* Uninterrupted in time, sequence, substance, or extent.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* PATCHES

*Attribute\_Definition:*

Number of separate patches in the distribution map. This metric is sensitive to map resolution but we assumed that the relative patchiness of species ranges is preserved when maps are compared at the same resolution. This assumption has not been rigorously verified.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Count

*Enumerated\_Domain\_Value\_Definition:* Total observed number.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* LATRANGE

*Attribute\_Definition:*

Latitudinal range of species in kilometers. This metric may have utility in conjunction with temperatures at range centroids in estimating species temperature tolerances.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Continuous

*Enumerated\_Domain\_Value\_Definition:* Uninterrupted in time, sequence, substance, or extent.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* LONRANGE

*Attribute\_Definition:* Longitudinal range of species in kilometers.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

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*Enumerated\_Domain\_Value\_Definition:* Uninterrupted in time, sequence, substance, or extent.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* LONGCENTROID

*Attribute\_Definition:* Longitude at range centroid in decimal degrees.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

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*Enumerated\_Domain\_Value:* Continuous

*Enumerated\_Domain\_Value\_Definition:* Uninterrupted in time, sequence, substance, or extent.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* LATCENTROID

*Attribute\_Definition:* Latitude at range centroid in decimal degrees.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Continuous

*Enumerated\_Domain\_Value\_Definition:* Uninterrupted in time, sequence, substance, or extent.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Detailed\_Description:*

*Entity\_Type:*

*Entity\_Type\_Label:* Conservation Status

*Entity\_Type\_Definition:*

Conservation status, as reported by the AFS (Williams et al. 1989), and the accompanying threat(s) to the species indicated by LIST1-LIST5.



*Entity\_Type\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

*Attribute:*

*Attribute\_Label:* LISTED

*Attribute\_Definition:*

Listed as endangered, threatened, of special concern, or a subspecies is listed as any one of these categories.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

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*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* REASON

*Attribute\_Definition:*

Endangered (E), Threatened (T), Special Concern (SC), or subspecies listed as any of these categories (SUB).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Categorical

*Enumerated\_Domain\_Value\_Definition:* Absolute values based on established categories.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* LIST1

*Attribute\_Definition:*

Present or threatened destruction, modification, or curtailment of habitat or range.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* LIST2

*Attribute\_Definition:*

Overuse for commercial, recreational, scientific, or educational purposes.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* LIST3

*Attribute\_Definition:* Disease.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* LIST4

*Attribute\_Definition:*

Other natural or anthropogenic factors affecting persistence (hybridization, exotic or transplanted species, predation, competition)

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* LIST5

*Attribute\_Definition:* Small range.

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Binary

*Enumerated\_Domain\_Value\_Definition:* Values expressed in powers of two by using two digits, 0 and 1.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Attribute:*

*Attribute\_Label:* EXTINCT

*Attribute\_Definition:*

Classified as extinct under one of the extinction categories in Harrison and Stiassny (1999). The following categories are represented: Resolved Extinction —1500-1948 (A), Unresolved Extinction —Extinctions since 1948 but No Other Ambiguity (C), Taxonomy Substantiated but Effective Extinction Date Unsubstantiated by Sampling (D2), Poorly Defined Extinctions with Taxonomy Substantiated but Effective Extinction Date Unsubstantiated by Population Decline or Environmental Threat (D3), and Species extinction status unclassified but there is reason to further investigate possible extinction (U).

*Attribute\_Definition\_Source:*

Frimpong, E. A., and P. L. Angermeier. In review. FishTraits: A database of ecological and life-history traits of fishes of the United States. Fisheries.

Anticipated publication date is 2009.

*Attribute\_Domain\_Values:*

*Enumerated\_Domain:*

*Enumerated\_Domain\_Value:* Categorical

*Enumerated\_Domain\_Value\_Definition:* Absolute values based on established categories.

*Enumerated\_Domain\_Value\_Definition\_Source:* N/A

*Overview\_Description:*

*Entity\_and\_Attribute\_Overview:*

Information on four major categories of traits: (1) trophic ecology, (2) body size and reproductive ecology (including life history), (3) habitat preferences, and (4) salinity and temperature tolerances. Information on geographic distribution and conservation status is also compiled.

*Entity\_and\_Attribute\_Detail\_Citation:*

Elements of species profiles are explained in the order they appear in the database and are grouped under the appropriate category of traits or other information. For each element we describe its type of scale (binary, categorical, continuous, or count) and recorded information.

---

*Distribution\_Information:*

*Distributor:*

*Contact\_Information:*

*Contact\_Person\_Primary:*  
*Contact\_Person:* Emmanuel A. Frimpong  
*Contact\_Address:*  
*Address\_Type:* mailing and physical  
*Address:* Department of Fisheries & Wildlife Sciences  
*Address:* Virginia Polytechnic Institute & State University  
*City:* Blacksburg  
*State\_or\_Province:* VA  
*Postal\_Code:* 24061-0321  
*Country:* USA  
*Contact\_Voice\_Telephone:* 540-231-6880  
*Contact\_Electronic\_Mail\_Address:* frimp@vt.edu  
*Distribution\_Liability:* None  
*Standard\_Order\_Process:*  
*Digital\_Form:*  
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*Format\_Name:* XLS  
*File-Decompression\_Technique:* No compression applied  
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*Online\_Option:*  
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*Network\_Address:*  
*Network\_Resource\_Name:* <<http://www.cnr.vt.edu/fisheries/fishtraits/database/>>  
*Fees:* None

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*Metadata\_Reference\_Information:*  
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*Contact\_Information:*  
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*Address:* Goddard Space Flight Center  
*Address:* Code 610.2  
*City:* Greenbelt  
*State\_or\_Province:* MD  
*Postal\_Code:* 20771  
*Country:* USA  
*Contact\_Voice\_Telephone:* 301.614.6163  
*Contact\_Electronic\_Mail\_Address:* alicia.m.aleman@nasa.gov  
*Metadata\_Standard\_Name:*  
FGDC Biological Data Profile of the Content Standard for Digital Geospatial Metadata  
*Metadata\_Standard\_Version:* FGDC-STD-001.1-1999

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