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

**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**Publication Date:** Unpublished material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/](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_BoundingCoordinate: -125.00000
East_BoundingCoordinate: -67.00000
North_BoundingCoordinate: 48.00000
South_BoundingCoordinate: 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:
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:
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:
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

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_Description: No process steps have been described for this data set
Process_Date: Unknown

Entity_and_Attribute_Information:
Detailed_Description:
Entity_Type:
Entity_Type_Label: Species Identifiers
Entity_Type_Description: Identification information for each species.
Entity_Type_Description_Source:

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_Description_Source:
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:*

*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:*

*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:*

*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:*

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

*Attribute Definition Source:*
Anticipated publication date is 2009.

*Attribute Domain Values:*
*Unrepresentable Domain: See definition for naming convention.*

*Attribute: COMMONNAME*
*Attribute Definition: Common name recognized by the AFS (Nelson et al. 2004).*
*Attribute Definition Source:*
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: OTHERNAMES*
*Attribute Definition: Other common names encountered in accounts of the species.*
*Attribute Definition Source:*
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: NATIVE*
*Attribute Definition:*
Native status, as determined from the online database of non-indigenous species (Nico and Fuller 1999).
*Attribute Definition Source:*
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:
Attribute_Domain_Values:
Unrepresentable_Domain: See definition for naming convention.

Attribute:
Attribute_Label: ITISTSN
Attribute_Definition:
Attribute_Definition_Source:
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:

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:

Attribute:
Attribute_Label: NONFEED
Attribute_Definition: Adults do not feed.
Attribute Definition Source:

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:  

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:  

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:  
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: MACVASCU
Attribute Label: Any part of macrophytes and vascular plants.
Attribute Definition Source:

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: DETRITUS
Attribute Label: Detritus or unidentifiable vegetative matter.
Attribute Definition Source:

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: INVLVFSH
Attribute Label: Aquatic and terrestrial invertebrates including zooplankton, insects, microcrustaceans, annelids, mollusks, etc. Also includes larval fish.
Attribute Definition Source:

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: FSHCRCRB
**Attribute Definition:** Larger fish, crayfish, crabs, frogs, etc.

**Attribute Definition Source:**
Anticipated publication date is 2009.

**Enumerted Domain Values:**

**Attribute:** BLOOD
**Attribute Definition:** For parasitic lampreys that feed mainly on blood.

**Attribute Definition Source:**
Anticipated publication date is 2009.

**Enumerted Domain Values:**

**Attribute:** EGGS
**Attribute Definition:** Eggs of fish, frogs, etc.

**Attribute Definition Source:**
Anticipated publication date is 2009.

**Enumerted Domain Values:**

**Attribute:** OTHER
**Attribute Definition:** Other diet components distinct from the preceding classes.

**Attribute Definition Source:**
Anticipated publication date is 2009.
**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:**


**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:**


**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:**


**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:

Attribute Domain Values:

Enumerated Domain: Continuous
Enumerated Domain Value Definition: Uninterrupted in time, sequence, substance, or extent.
Enumerated Domain Value Definition Source: N/A

Attribute: FECUNDITY
Attribute Definition: Maximum reported fecundity.
Attribute Definition Source:

Attribute Domain Values:

Enumerated Domain: Count
Enumerated Domain Value Definition: Total observed number.
Enumerated Domain Value Definition Source: N/A

Attribute: 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:

Attribute Domain Values:

Enumerated Domain: 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: 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:**

**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:** SEASON
**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:**

**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:** REPSTATE
**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:**

**Attribute Domain Values:**
Enumerated Domain:
**Enumerated Domain Value:** Categorical
Attributes:

**A_1_1**

*Attribute Definition:* Nonguarders; Open substratum spawners; Pelagophils.

**A_1_2**

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

**A_1_3A**

*Attribute Definition:* Nonguarders; Open substratum spawners; Lithophils (rock-gravel).
Nonguarders; Open substratum spawners; Lithophils (gravel-sand).

_Frимпоng, Е. А., 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:** 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).

_Frимпоng, Е. А., 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:** 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.

_Frимпоng, Е. А., 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:** 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.

_Frимпоng, Е. А., 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:
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:
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:
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:

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:
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:
Attribute Label: B_1_3A
Attribute Definition: Guarders; Substratum choosers; Lithophils.
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: Guarders; Substratum choosers; Phytophils.
Attribute Definition Source:
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: Guarders; Nest spawners; Polyphils.
Attribute Definition Source:
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: Guarders; Nest spawners; Lithophils (rock-gravel).
Attribute Definition Source:
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:** Guarders; Nest spawners; Lithophils (gravel-sand).

**Attribute Definition Source:**

**Enumerated Domain Values:**

**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:** Guarders; Nest spawners; Ariadnophils.

**Attribute Definition Source:**

**Enumerated Domain Values:**

**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:** Guarders; Nest spawners; Phytophils.

**Attribute Definition Source:**

**Enumerated Domain Values:**

**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:** Guarders; Nest spawners; Speleophils (rock cavity/roof).

**Attribute Definition Source:**

**Enumerated Domain Values:**

**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
**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**:

**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**:

**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**:

**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:

Attribute:
Attribute Label: MUCK
Attribute Definition: Muck substrate.
Attribute Definition Source:
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:
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:
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:
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:
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:
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:
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:**

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:**

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:**

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 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 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 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:**

**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:**


**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:**


**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:**

**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**:
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**:
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**:
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_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Binary
Enumerated_Domain_Value_Name: Values expressed in powers of two by using two digits, 0 and 1.
Enumerated_Domain_Value_Name_Source: N/A
(attribute: MONTANE
(Attribute_Definition: Mountainous physiography.
(Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Binary
Enumerated_Domain_Value_Name: Values expressed in powers of two by using two digits, 0 and 1.
Enumerated_Domain_Value_Name_Source: N/A
(attribute: SLOWCURR
(Attribute_Definition: Slow current.
(Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Binary
Enumerated_Domain_Value_Name: Values expressed in powers of two by using two digits, 0 and 1.
Enumerated_Domain_Value_Name_Source: N/A
(attribute: MODCURR
(Attribute_Definition: Moderate current.
(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:** FASTCURR
**Attribute_Definition:** Fast current.

**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:** Salinity and Temperature Tolerances
**Entity_Type_Definition:** Salinity and temperature tolerance ranges for each species.

**Attribute:**
**Attribute_Label:** EURYHALINE
**Attribute_Definition:** Species with wide salinity tolerance; mostly obtained from species zoogeographic summaries in Hocutt and Wiley (1986).

**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:** 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:**

**Attribute Domain Values:**

- **Enumerated Domain:** Continuous
- **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:**

**Attribute Domain Values:**

- **Enumerated Domain:** 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:** Geographic Distribution
**Entity Type Definition:** Native geographic distribution information for each species

**Entity Type Definition Source:**

**Attribute:**
**Attribute Label:** AREA
**Attribute Definition:** Range area in square kilometers.

**Attribute Definition Source:**

**Attribute Domain Values:**

- **Enumerated Domain:** 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:**

**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:**

**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:**

**Attribute_Domain_Values:**

**Enumerated_Domain:**

**Enumerated_Domain_Value:** Continuous

**Enumerated_Domain_Value_Definition:** Uninterrupted in time, sequence, substance, or extent.
**Attribute:**
**Attribute Label:** LONRANGE
**Attribute Definition:** Longitudinal range of species in kilometers.
**Attribute Definition Source:**

**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:** LONGCENTROID
**Attribute Definition:** Longitude at range centroid in decimal degrees.
**Attribute Definition Source:**

**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:** LATCENTROID
**Attribute Definition:** Latitude at range centroid in decimal degrees.
**Attribute Definition Source:**

**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:

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

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:

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.
Contact Person Primary: 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:
Digital Transfer Information:
Format Name: XLS
File Decompression Technique: No compression applied
Digital Transfer Option:
Online Option:
Computer Contact Information:
Network Address:
Network Resource Name: <http://www.cnr.vt.edu/fisheries/fishtraits/database/>
Fees: None

Metadata Reference Information:
Metadata Date: 20081022
Metadata Contact:
Contact Information:
Contact Person Primary:
Contact Person: Alicia Aleman
Contact Organization: NASA's Global Change Master Directory
Contact Address:
Address Type: mailing and physical
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