

Northeast Aquatic Connectivity

1

GLOSSARY & METRIC DESCRIPTIONS

This glossary was developed to support the interpretation of
the North Atlantic Aquatic Connectivity Collaborative's Northeast Aquatic Connectivity web map & tool

Tiered Results (5% bins)

2

- Analysis results grouped into 20 bins where each bin has 5% of the barriers in the analysis area.
- The “Consensus” results are the average of five analysis runs, or iterations. Each analysis run includes barriers of different severities. The runs are named based on the least severe class of barriers. Thus, the “Moderate” run includes barriers that are “Moderate”, “Significant”, and “Severe”. See Section 3.3.2 of the NE Aquatic Connectivity report for more detail.
- Individual iteration tiers are available within the web map and downloadable data. These are based on the metrics calculated for the given set of barriers included in the analysis.
- These are the results that should be used for barrier assessments

Sequential Rank

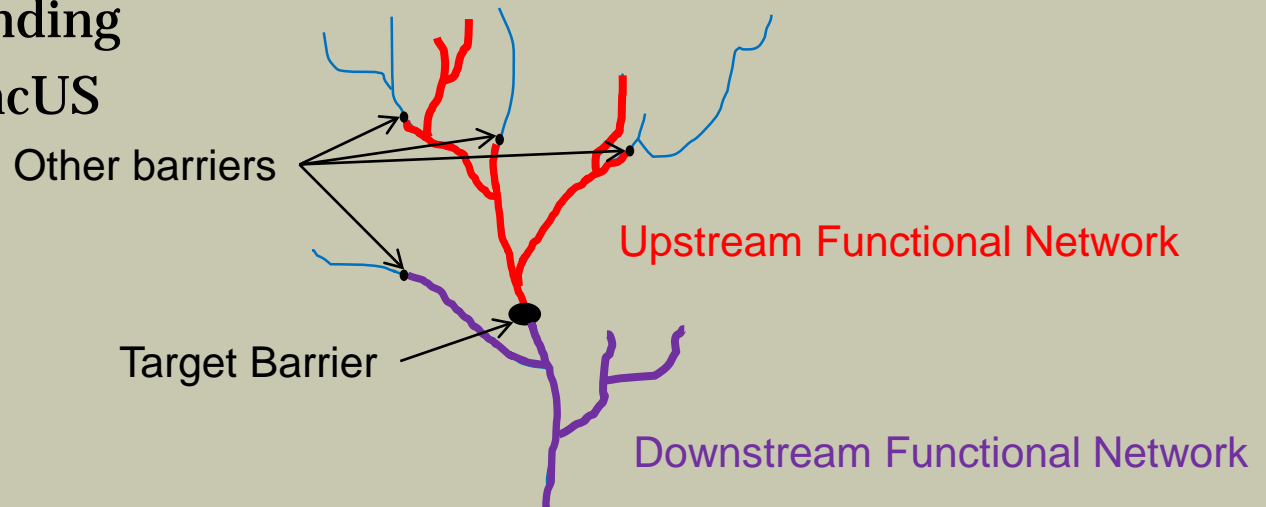
3

- The sequential list of barriers produced by the analysis.
- This list should be used with extreme caution: the precision with which GIS can calculate metrics and rank barriers is not necessarily indicative of ecological differences
- The Tiered Results (5% bins) should be used to assess barriers for their potential ecological benefit

Upstream Functional Network Length

4

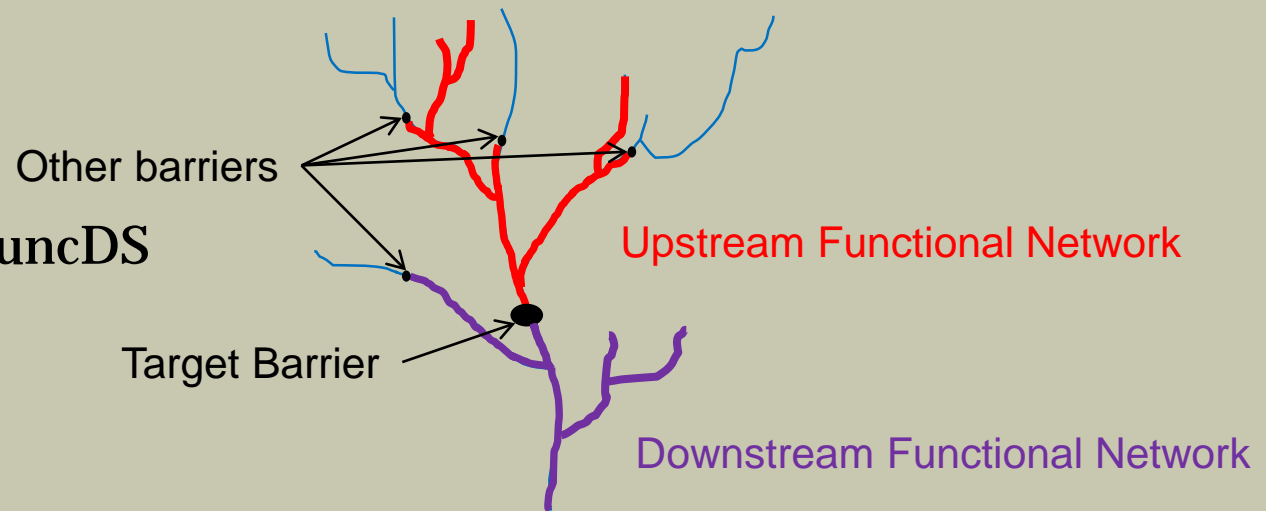
- Category: Network
- Length of the functional network upstream of a barrier. The functional network is defined by those sections of river that a fish could theoretically access from any other point within that functional network. Its terminal ends are barriers, headwaters, and/or the river mouth.
- Unit: meters
- Sort Order: Descending
- GIS Name: batFuncUS



Downstream Functional Network Length

5

- Category: Connectivity Improvement
- Length of the functional network downstream of a barrier. The functional network is defined by those sections of river that a fish could theoretically access from any other point within that functional network. Its terminal ends are barriers, headwaters, and/or the river mouth.
- Unit: meters
- GIS Name: batFuncDS



Downstream Barrier Count

6

- **Category: Network**
- **The number of barriers downstream of a given barrier**
- **Includes natural waterfalls, which are included in network generation**
- **Does not include barriers excluded from network generation**
- **Unit: #**
- **Sort Order: Ascending**
- **GIS Name: batCountDS**

Downstream Natural Barrier Count

7

- **Category: Network**
- **The number of natural barriers (e.g. waterfalls) downstream of a given barrier**
- **Unit: #**
- **Sort Order: Ascending**
- **GIS Name: DSFalls**

Downstream Hydropower Facility Count

8

- **Category: Network**
- **The number of hydropower facilities downstream of a given barrier.**
- **Includes all dams which include hydropower as one of the listed dam purpose in the source dam data**
- **Unit: #**
- **Sort Order: Ascending**
- **GIS Name: DSHydro**

Product of all downstream barrier passability scores

9

- Category: Network
- Each barrier is assigned a passability score from 0 (no passage) to 1 (full passage). Dams are assigned a score of 0. Crossings which have been surveyed are assigned a score based on the [NAACC's numeric scoring system](#). Crossings which have not been surveyed are assigned an estimated score as part of the UMass [Critical Linkages](#) project.
- This metric is the product of the passability scores of all downstream barriers. It is a measure of the difficulty an aquatic species would have to reach the base of the barrier in question.
- Unit: unitless score
- Sort Order: Descending
- GIS Name: dsPassabilityProduct

Absolute Gain

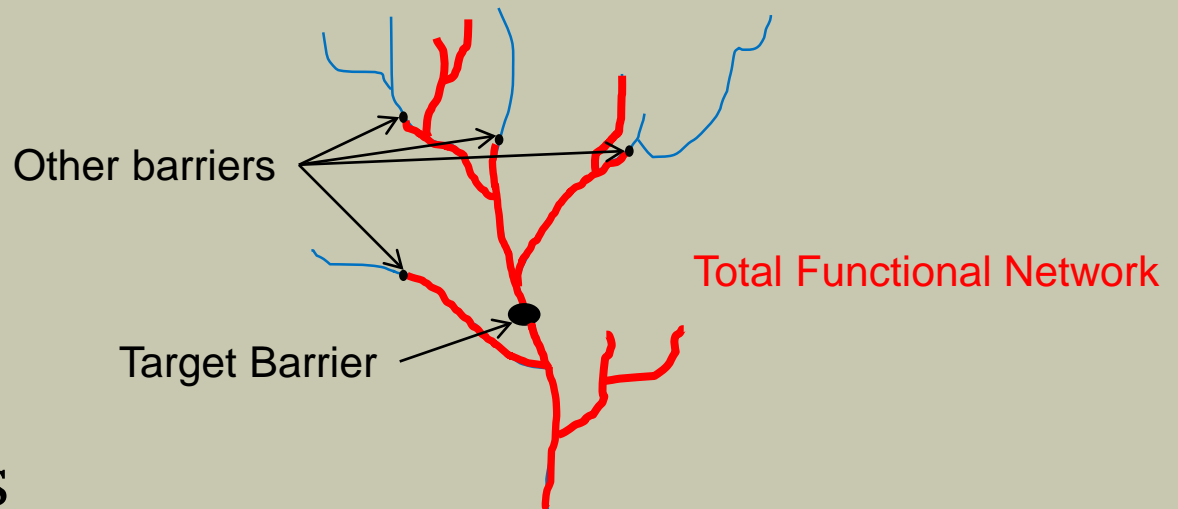
10

- Category: Network
- This metric is the minimum of the two functional networks of a barrier. For example if the upstream functional network was 10 kilometers and downstream functional network was 5 kilometers, then the Absolute Gain will be 5 kilometers.
- Unit: meters
- Sort Order: Descending
- GIS Name: batAbs

Total Functional Network Length

11

- Category: Connectivity Improvement
- Summed length of the upstream and downstream functional networks of a barrier. The functional network is defined by those sections of river that a fish could theoretically access from any other point within that functional network. Its terminal ends are barriers, headwaters, and/or the river mouth.

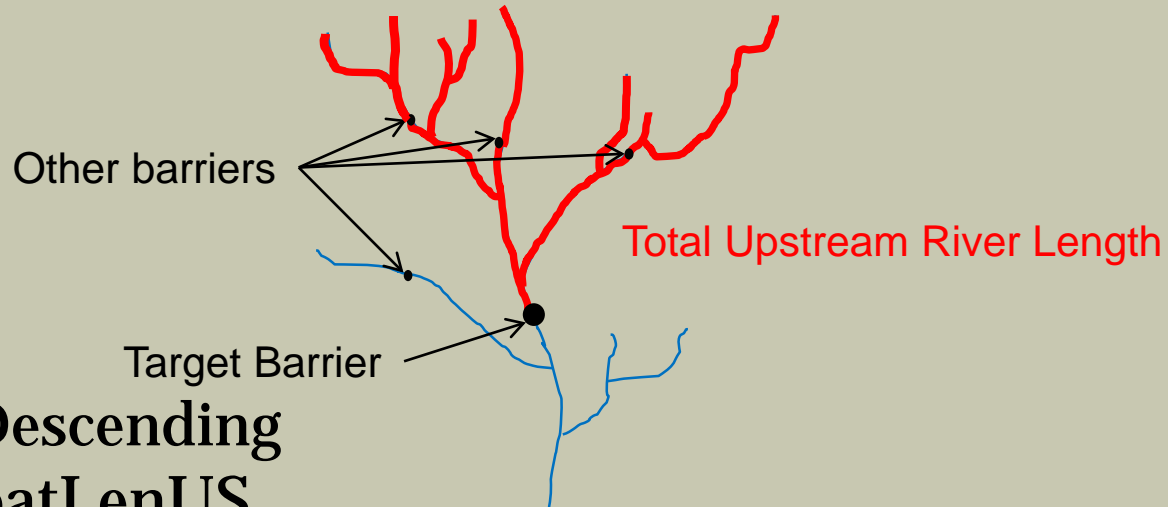


- Unit: meters
- Sort Order: Descending
- GIS Name: batTotUSDS

Total Upstream River Length

12

- Category: Network
- Total length of river network upstream of a given barrier, regardless of any upstream barriers.
- Unit: meters



- Sort Order: Descending
- GIS Name: batLenUS

% Forested LC in Contributing Watershed

13

- Category: Watershed & Local Condition
- % forested landcover in entire upstream watershed. Calculated 2011 National Land Cover Database.
- Forested landcover aggregated from the following classes: deciduous forest, evergreen forest, mixed forest
- Unit: %
- Sort Order: Descending
- GIS Name: DA_PercFor

% Natural LC in Contributing Watershed

14

- Category: Watershed & Local Condition
- % natural landcover in entire upstream watershed. Calculated 2011 National Land Cover Database.
- Natural landcover aggregated from the following classes: open water, barren land, deciduous forest, evergreen forest, mixed forest, scrub/shrub, grassland/herbaceous, woody wetlands, emergent wetlands
- Unit: %
- Sort Order: Descending
- GIS Name: DA_PercNat

% Agricultural LC in Contributing Watershed

15

- Category: Watershed & Local Condition
- % agricultural landcover in entire upstream watershed. Calculated 2011 National Land Cover Database.
- Forested landcover aggregated from the following classes: cultivate crops, pasture/hay
- Unit: %
- Sort Order: Ascending
- GIS Name: DA_PercAg

% Impervious Surface in Contributing Watershed

16

- Category: Watershed & Local Condition
- % Impervious surface in entire upstream (contributing) watershed. Calculated 2011 National Landcover Database percent developed imperviousness.
- Unit: %
- Sort Order: Ascending
- GIS Name: DA_PercImp

% Forested in ARA of Upstream Functional Network

17

- Category: Watershed & Local Condition
- % forested landcover within Active River Area of the upstream functional river network.
- National Landcover Database 2011 data. Includes the following classes: deciduous, evergreen & mixed forest
- Unit: %
- Sort Order: Descending
- GIS Name: usForARA

% Forested in ARA of Downstream Functional Network

18

- Category: Watershed & Local Condition
- % forested landcover within Active River Area of the downstream functional river network.
- National Landcover Database 2011 data. Includes the following classes: deciduous, evergreen & mixed forest
- Unit: %
- Sort Order: Descending
- GIS Name: dsForARA

% Natural LC in ARA of Upstream Functional Network

19

- Category: Watershed & Local Condition
- % natural landcover within Active River Area of the upstream functional river network.
- National Landcover Database 2011 data. Includes the following classes: open water, barren land, deciduous forest, evergreen forest, mixed forest, scrub/shrub, grassland/herbaceous, woody wetlands, emergent wetlands
- Unit: %
- Sort Order: Descending
- GIS Name: usNatARA

% Natural LC in ARA of Downstream Functional Network

20

- Category: Watershed & Local Condition
- % natural landcover within Active River Area of the downstream functional river network.
- National Landcover Database 2011 data. Includes the following classes: open water, barren land, deciduous forest, evergreen forest, mixed forest, scrub/shrub, grassland/herbaceous, woody wetlands, emergent wetlands
- Unit: %
- Sort Order: Descending
- GIS Name: dsNatARA

% Agricultural LC in ARA of Upstream Functional Network

21

- Category: Watershed & Local Condition
- % agricultural landcover within Active River Area of the upstream functional river network.
- National Landcover Database 2011 data. Includes the following classes: cultivated crops, pasture/hay
- Unit: %
- Sort Order: Ascending
- GIS Name: usAgARA

% Agricultural LC in ARA of Downstream Functional Network

22

- Category: Watershed & Local Condition
- % agricultural landcover within Active River Area of the downstream functional river network.
- National Landcover Database 2011 data. Includes the following classes: cultivated crops, pasture/hay
- Unit: %
- Sort Order: Ascending
- GIS Name: dsAgARA

% Impervious Surface in ARA of Upstream Functional Network

23

- Category: Watershed & Local Condition
- % impervious landcover within Active River Area of the upstream functional river network.
- National Landcover Database 2011 data
- Unit: %
- Sort Order: Ascending
- GIS Name: usImpARA

% Impervious Surface in ARA of Downstream Functional Network

24

- Category: Watershed & Local Condition
- % impervious landcover within Active River Area of the downstream functional river network.
- National Landcover Database 2011 data
- Unit: %
- Sort Order: Ascending
- GIS Name: dsImpARA

Barrier is located on Conservation Land

25

- Category: Watershed & Local Condition
- Barrier is located on conservation land
- Based on TNC's 2014 Eastern Division secured areas database
- Includes conserved lands in GAP Status 1, 2, & 3 that do not have parcel-level restrictions on data distribution
- Unit: Boolean
- GIS Name: onConsLand

NFHP Risk of Degradation Score

26

- Category - Watershed & Local Condition
- Relative risk of habitat degradation based on the mapped level of disturbance to fish habitats
- Based on [National Fish Habitat Partnership data](#)
- Scores are passed to each barrier from the [NHD Plus](#) catchment it is located within, where:
 - 1.0 – 1.5 = Very High Relative Risk of Habitat Degradation
 - 1.6 – 2.5 = High Relative Risk of Habitat Degradation
 - 2.6 – 3.4 = Moderate Relative Risk of Habitat Degradation
 - 3.5 – 4.2 = Low Relative Risk of Habitat Degradation
 - 4.3 – 5.0 = Very Low Relative Risk of Habitat Degradation
- Barriers located in catchments that were not scored (No Data) are given a Moderate value to minimize the impact of the lack of data on the relative barrier prioritization
- GIS Name: CumDisInd (numerical score)
- GIS Name: CumDistTXT (text description)

Presence of 1 or more Anadromous Species in Downstream Network

27

- Category: Ecological - Anadromous
- Presence of habitat for 1 or more of the 7 anadromous species included in this analysis based on the data and methods described for each species:
 - alewife, blueback herring, American shad, hickory shad, striped bass, Atlantic sturgeon, Atlantic salmon
- Habitat for each species is coded as “Current”, “Historical”, or “None Documented”
- If current and historical habitat are documented in the downstream functional network for different species, the current habitat trumps the historical habitat. So if alewife habitat is “Current”, American shad habitat is “Historical” this metric will be “Current”, indicating that habitat for 1 or more anadromous species is currently documented in the Barriers downstream network (based on the methods described for each species).
- Unit: presence / absence
- Sort Order: Ascending
- GIS Name: QDSANAD

Number of Anadromous Species

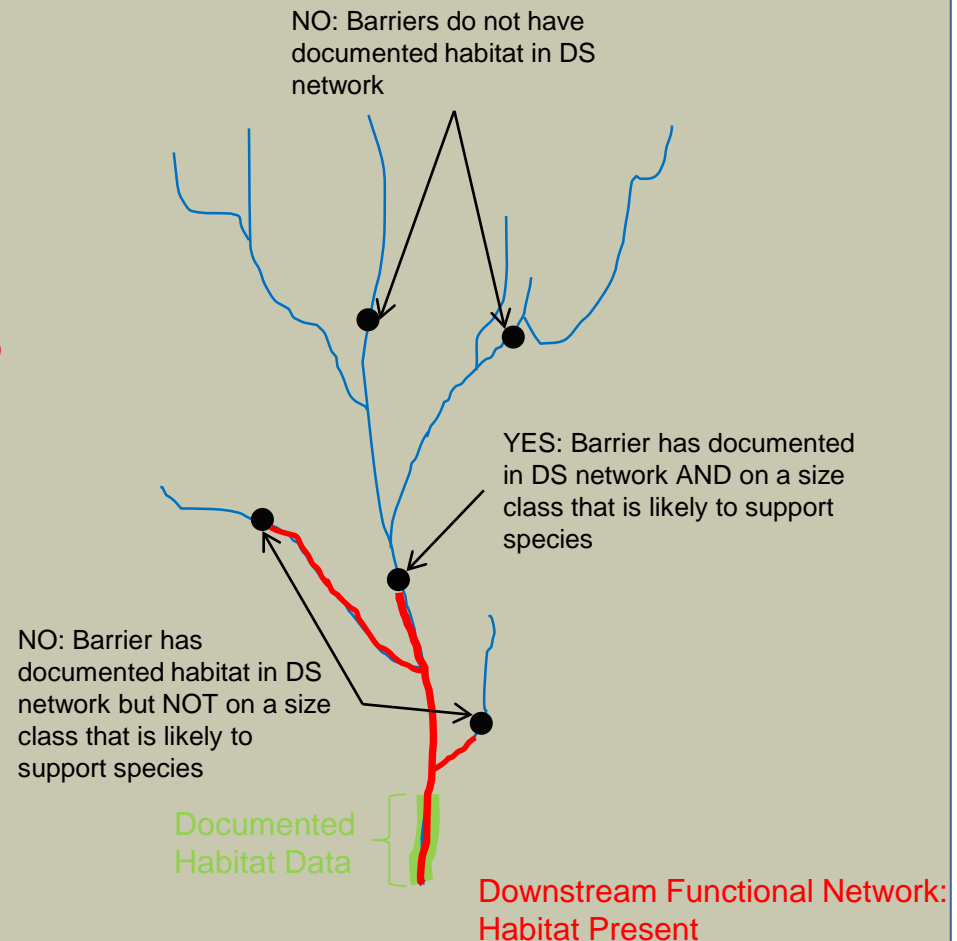
28

- Category: Ecological - Anadromous
- The number of anadromous species with documented *current* habitat in the downstream functional network of each barrier based on the data and methods described for each species:
 - alewife, blueback herring, American shad, hickory shad, striped bass, shortnose sturgeon, Atlantic sturgeon, Atlantic salmon
- Unit: #
- Sort Order: Descending
- GIS Name: QDSNUMANAD

Alewife habitat in Downstream Functional Network

29

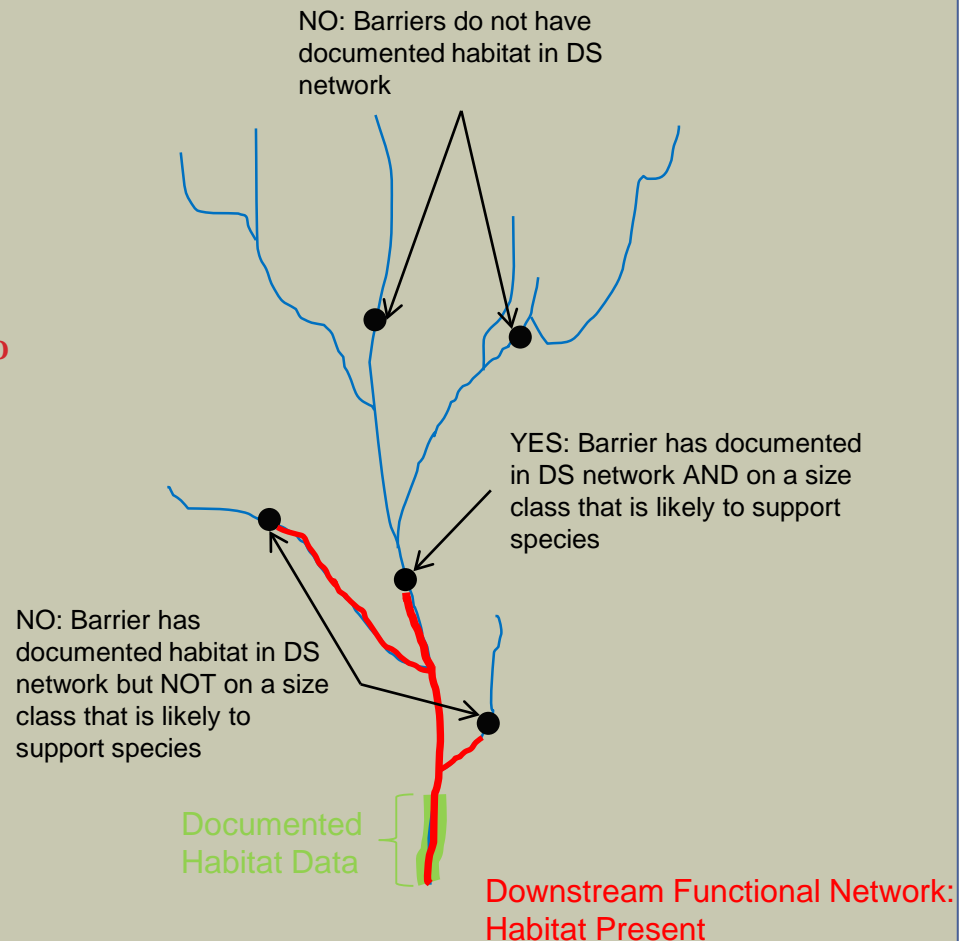
- Category: Ecological
- Presence of alewife downstream of Barrier. Based on:
 1. Documented habitat in some portion of the Barrier's downstream functional network
 2. **AND** Barrier is on a stream that is likely to support that species based on stream size
 1. Size 1a+
- Fish habitat data from multiple sources. See the Map Layer descriptions for more details.
- Unit: Unitless Classes: “Current”, “Historical”, “None Documented”
- GIS Name: DSALWWIFE



Blueback Herring habitat in Downstream Functional Network

30

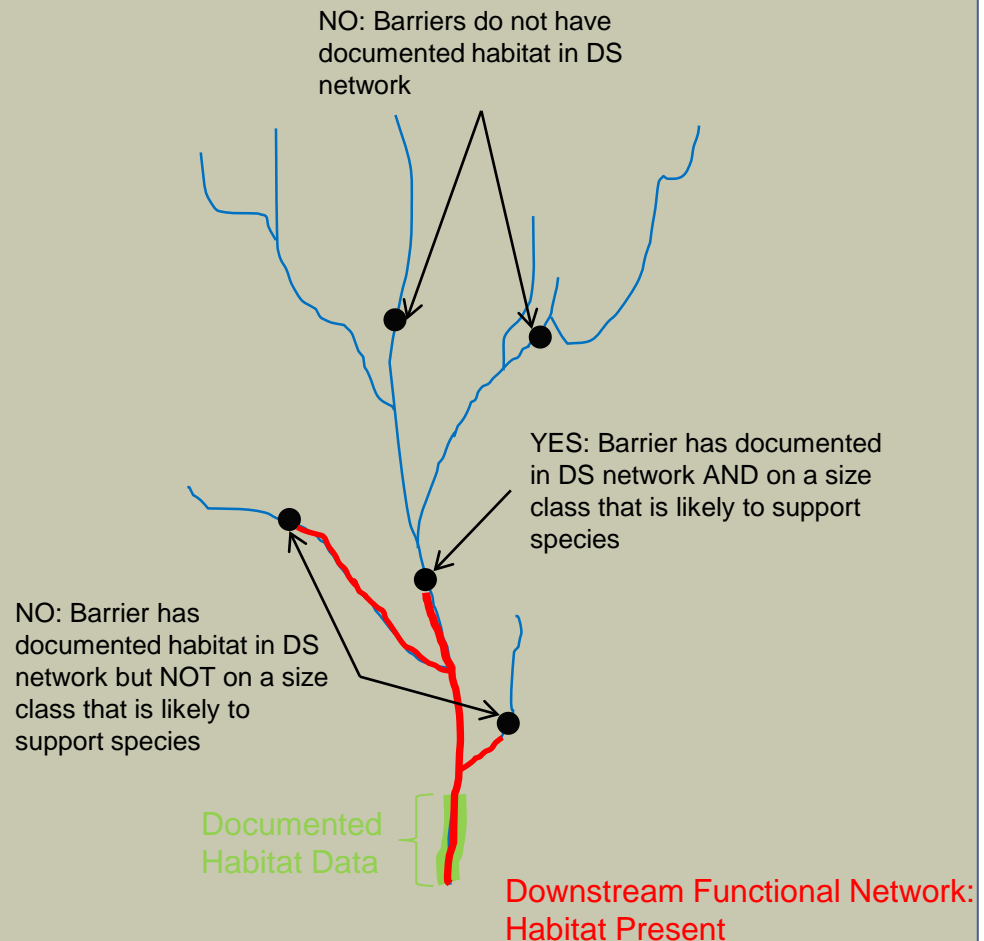
- Category: Ecological
- Presence of blueback herring downstream of Barrier. Based on:
 1. Documented habitat in some portion of the Barrier's downstream functional network
 2. **AND** Barrier is on a stream that is likely to support that species based on stream size
 1. Size 1a +
- Fish habitat data from multiple sources. See the Map Layer descriptions for more details.
- Unit: Unitless Classes: “Current”, “Historical”, “None Documented”
- GIS Name: DSBLUEBACK



American Shad habitat in Downstream Functional Network

31

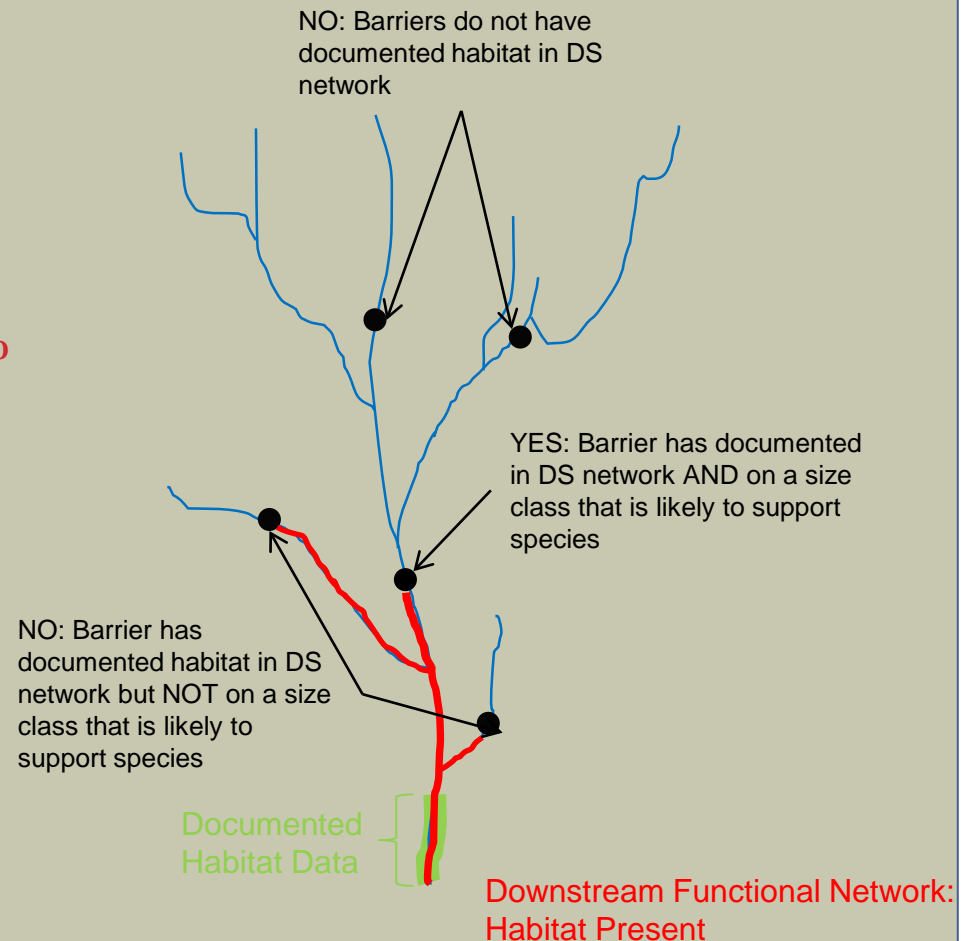
- Category: Ecological
- Presence of American shad downstream of Barrier. Based on:
 1. Documented habitat in some portion of the Barrier's downstream functional network
 2. **AND** Barrier is on a stream that is likely to support that species based on stream size
 1. Size 2+ Rivers
- Fish habitat data from multiple sources. See the Map Layer descriptions for more details.
- Unit: Unitless Classes: “Current”, “Historical”, “None Documented”
- GIS Name: DSAMSHAD



Hickory Shad habitat in Downstream Functional Network

32

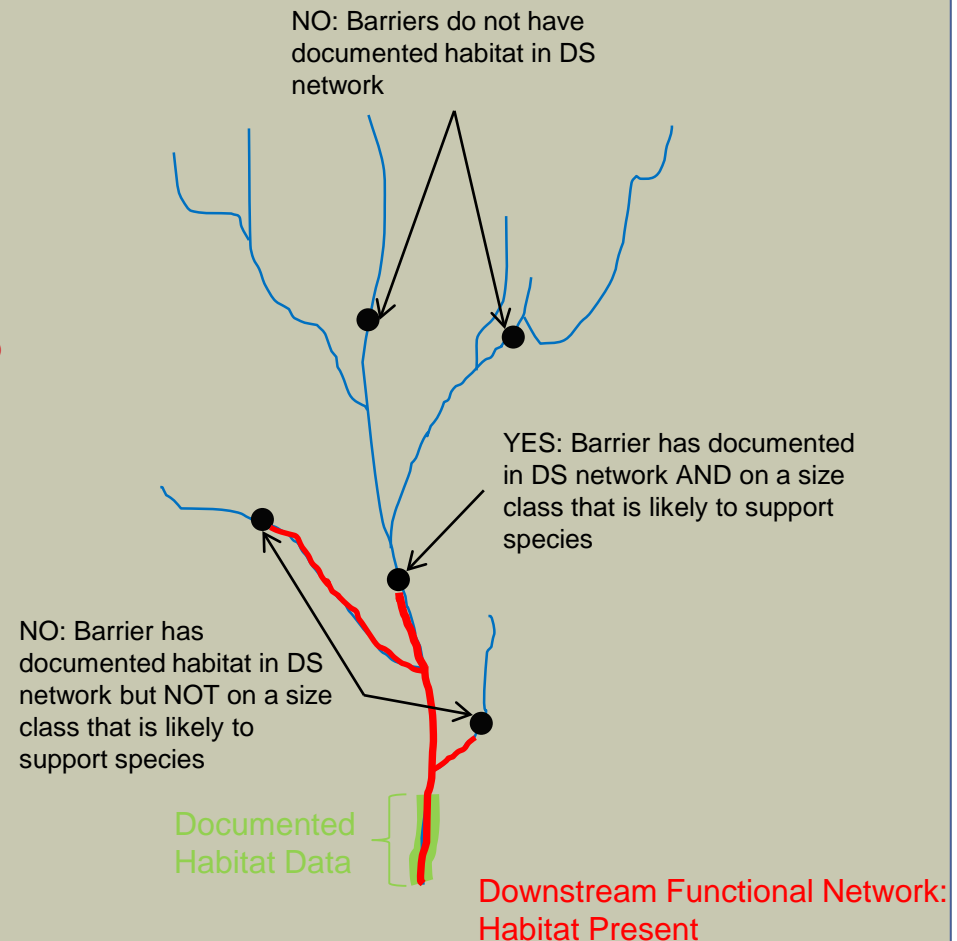
- Category: Ecological
- Presence of Hickory shad downstream of Barrier. Based on:
 1. Documented habitat in some portion of the Barrier's downstream functional network
 2. **AND** Barrier is on a stream that is likely to support that species based on stream size
 1. Size 2+ Rivers
- Fish habitat data from multiple sources. See the Map Layer descriptions for more details.
- Unit: Unitless Classes: “Current”, “Historical”, “None Documented”
- GIS Name: DSHICKSHAD



Striped Bass habitat in Downstream Functional Network

33

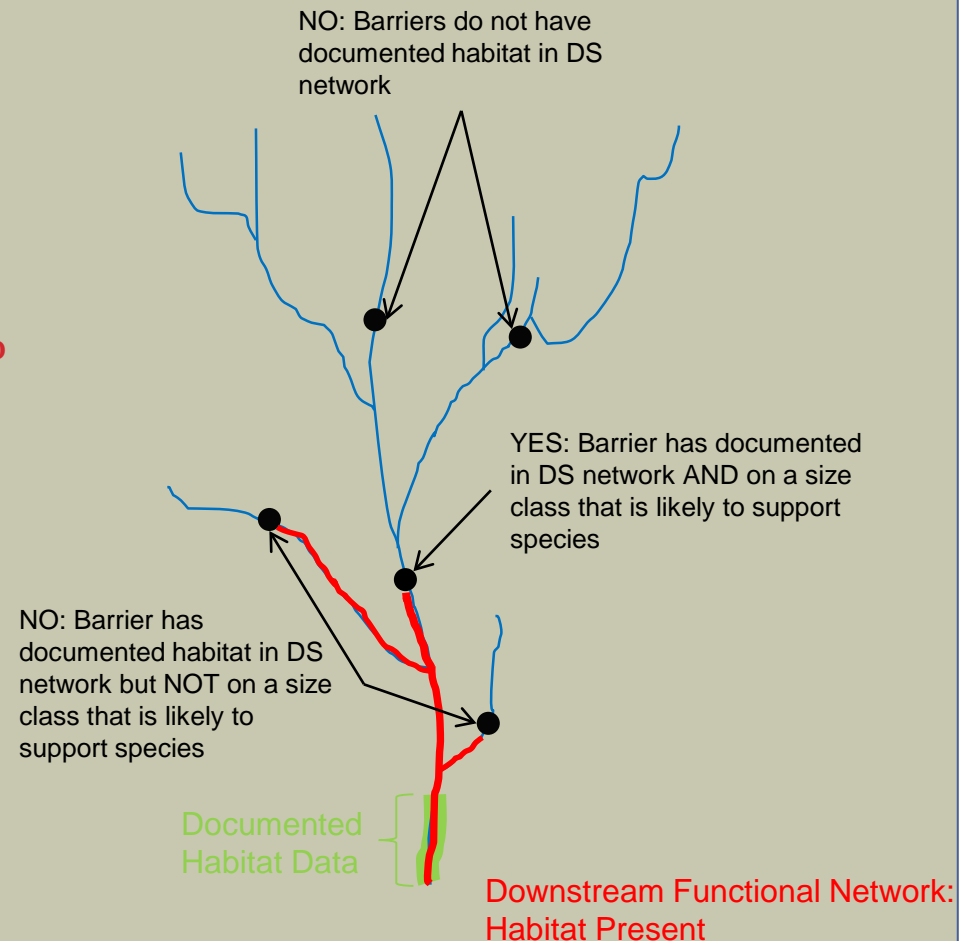
- Category: Ecological
- Presence of striped bass downstream of Barrier. Based on:
 1. Documented habitat in some portion of the Barrier's downstream functional network
 2. **AND** Barrier is on a stream that is likely to support that species based on stream size
 1. Size 3b+ Rivers
- Fish habitat data from multiple sources. See the Map Layer descriptions for more details.
- Unit: Unitless Classes: “Current”, “Historical”, “None Documented”
- GIS Name: DSSTRBASS



Atlantic Sturgeon habitat in Downstream Functional Network

34

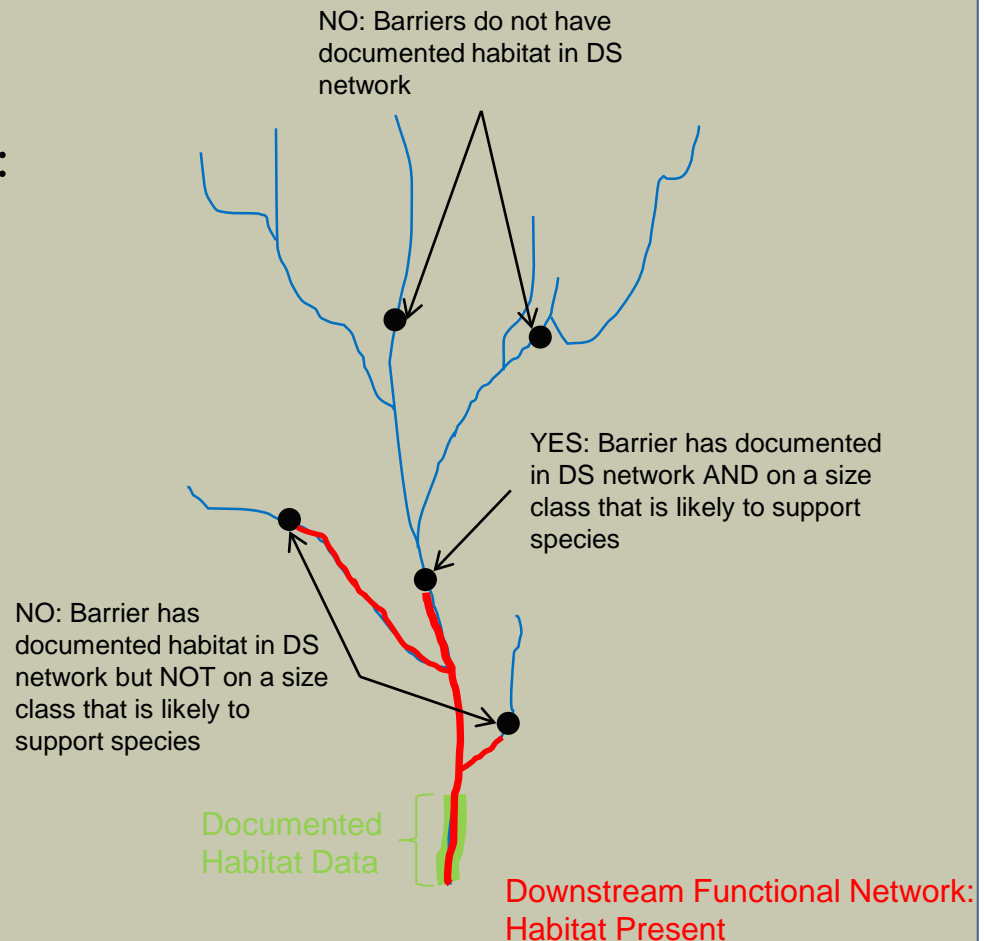
- Category: Ecological
- Presence of Atlantic sturgeon downstream of barrier. Based on:
 1. Documented habitat in some portion of the barrier's downstream functional network
 2. **AND** barrier is on a stream that is likely to support that species based on stream size
 1. Size 4+ Rivers
- Fish habitat data from multiple sources. See the Map Layer descriptions for more details.
- Unit: Unitless Classes: “Current”, “Historical”, “None Documented”
- GIS Name: DSATLSTUR



Atlantic Salmon habitat in Downstream Functional Network

35

- Category: Ecological
- Presence of Atlantic Salmon downstream of barrier. Based on:
 1. Documented habitat in some portion of the barrier's downstream functional network
 2. **AND** barrier is on a stream that is likely to support that species based on stream size
 1. Size 1a+ Rivers
- Fish habitat data from multiple sources. See the Map Layer descriptions for more details.
- Unit: Unitless Classes: “Current”, “Historical”, “None Documented”
- GIS Name: DSATLSALM



Native Fish Species Richness - HUC 8

36

- Category: Ecological - Resident
- Current native fish species richness in the watershed within which the barrier is located
- Based on NatureServe watershed (8-digit HUC) data
- Unit: #
- Sort Order: Descending
- GIS Name: fishRich

Rare Fish in HUC8

37

- Category: Ecological - Resident
- Count of rare (G1-G3) fish species in the watershed within which the barrier is located
- Based on NatureServe watershed (HUC8) data
- Unit: #
- Sort Order: Descending
- GIS Name: g123Fish

Rare Mussels in HUC8

38

- Category: Ecological - Resident
- Count of rare (G1-G3) mussel species in the watershed within which the barrier is located
- Based on NatureServe watershed (HUC8) data
- Unit: #
- Sort Order: Descending
- GIS Name: g123Mussel

Rare Crayfish in HUC8

39

- Category: Ecological - Resident
- Count of rare (G1-G3) crayfish species in the watershed within which the barrier is located
- Based on NatureServe watershed (HUC8) data
- Unit: #
- Sort Order: Descending
- GIS Name: g123Cray

Barrier within EBTJV Catchment with Trout

40

- Category: Ecological - Resident
- Barrier within an NHD catchment occupied by trout based on Eastern Brook Trout Joint Venture (EBTJV) data. (Mark Hudy 2012)
- Catchments with trout identified by the query “Trout =1”
- Unit: Boolean
- Sort Order: Descending
- GIS Name: in_EBTJV_2012

Barrier within Modeled Trout Catchment

41

- Category: Ecological - Resident
- Barrier within a catchment with modeled brook trout occupancy. ([DeWeber & Wagner 2015](#))
- Catchments occupied by brook trout identified using the “occur46” scenario from [DeWeber & Wagner 2015](#):
 - a binary classification (1 = present; 0 = absent) of Brook Trout occurrence based on a threshold that was equal to prevalence in the training data set, which produces near-optimal classification accuracy and could be used when false positives and false negatives have equal costs.
- Unit: Boolean
- Sort Order: Descending
- GIS Name: in_deWeberTrout

Barrier blocks EBTJV 2012 Catchments

42

- Category: Ecological – Resident
- NHD catchments occupied by trout are in one of a barriers functional networks – either upstream or downstream, but not both
- Based on 2012 EBTJV data
- Unit: Boolean
- Sort Order: Descending
- GIS Name: block_EBTJV_2012

Barrier blocks Modeled Trout Catchments

43

- Category: Ecological – Resident
- NHD catchments occupied by trout are in one of a barriers functional networks – either upstream or downstream, but not both
- Based on DeWeber & Wagner 2015 data
- Unit: Boolean
- Sort Order: Descending
- GIS Name: block_BT_DeWeber

River Size Class

44

- Category: Size or System Type
- River size class based on NE Aquatic Habitat Classification

1 = Size 1a - Headwaters (<3.861 sq.mi.)

2 = Size 1b: Creeks ($\geq 3.861 < 38.61$ sq.mi.)

3 = Size 2: Small River ($\geq 38.61 < 200$ sq. mi.)

4 = Size 3a: Medium Tributary Rivers ($\geq 200 < 1000$ sq.mi.)

5 = Size 3b: Medium Mainstem Rivers ($\geq 1000 < 3861$ sq mi)

6 = Size 4: Large Rivers ($\geq 3861 < 9653$ sq.mi.)

7 = Size 5: Great Rivers (≥ 9653 sq.mi.)

(measure = upstream drainage area)

- Unit: Class based on drainage area
- Sort Order: Ascending
- GIS Name: NESZCL_Int

Total # Reconnected Stream Size Classes >0.5 Miles(upstream + downstream)

45

- Category: Size or System Type
- Number of unique stream size classes >0.5 miles in total upstream and downstream functional networks
- Where stream size defined as:
 - 1a: Headwaters (<3.861 sq.mi.)
 - 1b: Creeks ($\geq 3.861 < 38.61$ sq.mi.)
 - 2: Small River ($\geq 38.61 < 200$ sq. mi.)
 - 3a: Medium Tributary Rivers ($\geq 200 < 1000$ sq.mi.)
 - 3b: Medium Mainstem Rivers ($\geq 1000 < 3861$ sq.mi.)
 - 4: Large Rivers ($\geq 3861 < 9653$ sq.mi.)
 - 5: Great Rivers (≥ 9653 sq.mi.)

(measure = upstream drainage area)

- GIS Name: TotNumSzCl

Upstream Size Classes

46

- Category: Size or System Type
- Number of upstream stream size classes in a barrier's upstream functional network
- e.g. If a downstream functional network had small rivers (size 2) and medium tributary rivers (size 3a), while an upstream functional network had these as well as 2 miles of creek (size 1b), the gain would be 1.
- Unit: #
- Sort Order: Descending
- GIS Name: usNumSzCl

Upstream Size Classes Gained by Removal / Bypass

47

- Category: Size or System Type
- Number of upstream stream size classes gained if Barrier were to be removed. Stream segments must be >0.5 miles to be considered a gain and the size class must not be present in the downstream functional network.
- e.g. If a downstream functional network had small rivers (size 2) and medium tributary rivers (size 3a), while an upstream functional network had these as well as 2 miles of creek (size 1b), the gain would be 1.
- Unit: #
- Sort Order: Descending
- GIS Name: usSzClGn

Miles of Cold Water Habitat in Total Functional Network

48

- Category: Size or System Type
- Miles of Cold Water habitat in the total functional network of a barrier
- Cold water habitat data from the Northeast Aquatic Habitat Classification
- Unit: Miles
- Sort Order: Descending
- GIS Name: totMiCold

Miles of Cold or Cool Water Habitat in Total Functional Network

49

- Category: Size or System Type
- Miles of Cold or Cool Water habitat in the total functional network of a barrier
- Cold water habitat data from the Northeast Aquatic Habitat Classification
- Unit: Miles
- Sort Order: Descending
- GIS Name: totMiCC

Critical Linkages: Cold Water Restoration Potential

50

- Restoration potential from the UMass Critical Linkages Cold Water analysis
- Based on the 16°C run (log normalized values)
- See <http://sce.ecosheds.org/> for more information about this data and access additional Critical Linkages analysis runs and associated data