NEON USER GUIDE TO RIPARIAN COMPOSITION AND STRUCTURE (NEON.DP1.20275)

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CHANGE RECORD

REVISION	DATE	DESCRIPTION OF CHANGE
A		Initial Release

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1 DESCRIPTION

1.1 Purpose

This document provides an overview of the data included in this NEON Level 1 data product, the quality controlled product generated from raw Level 0 data, and associated metadata. In the NEON data products framework, the raw data collected in the field, for example, the dry weights of litter functional groups from a single collection event are considered the lowest level (Level 0). Raw data that have been quality checked via the steps detailed herein, as well as simple metrics that emerge from the raw data are considered Level 1 data products.

The text herein provides a discussion of measurement theory and implementation, data product provenance, quality assurance and control methods used, and approximations and/or assumptions made during L1 data creation.

1.2 Scope

This document describes the steps needed to generate the L1 data product Riparian Composition and Structure - and associated metadata from input data. This document also provides details relevant to the publication of the data products via the NEON data portal, with additional detail available in the file, NEON Data Variables for Riparian composition and structure (NEON.DP1.20275) (AD[04]), provided in the download package for this data product.

This document describes the process for ingesting and performing automated quality assurance and control procedures on the data collected in the field pertaining to AOS Protocol and Procedure: Riparian Habitat Assessment (AD[06]). The raw data that are processed in this document are detailed in the file, NEON Raw Data Validation for riparian composition and cover (NEON.DP0.20275) (AD[03]), provided in the download package for this data product. Please note that raw data products (denoted by 'DP0') may not always have the same numbers (e.g., '10033') as the corresponding L1 data product.

2 RELATED DOCUMENTS AND ACRONYMS

2.1 Associated Documents

AD[01]	NEON.DOC.000001	NEON Observatory Design (NOD) Requirements
AD[02]	NEON.DOC.002652	NEON Level 1, Level 2 and Level 3 Data Products Catalog
AD[03]	NEON.DP0.20275.001 _dataValidation.csv	NEON Raw Data Validation for riparian composition and cover (NEON.DP0.20275)
AD[04]	NEON.DP1.20275.001 _variables.csv	NEON Data Variables for Riparian composition and structure (NEON.DP1.20275)
AD[05]	NEON.DOC.001152	Aquatic Sample Strategy
AD[06]	NEON.DOC.003826	AOS Protocol and Procedure: Riparian Habitat Assessment
AD[07]	NEON.DOC.000008	NEON Acronym List
AD[08]	NEON.DOC.000243	NEON Glossary of Terms
AD[09]	OS_Generic_Transitions .pdf	NEON Algorithm Theoretical Basis Document: OS Generic Transitions
AD[10]		NEON's Ingest Conversion Language (NICL) specifications
AD[11]	NEON.DOC.004842	AOS Commissioning Test Report: Riparian Habitat Assessment Process Quality
AD[12]	NEON.DOC.004848	AOS Commissioning Test Report: Riparian Habitat Assessment Data Quality

2.2 Acronyms

Acronym	Definition
EMAP	Environmental Monitoring and Assessment Program
EPA	U.S. Environmental Protection Agency
MODIS	Moderate Resolution Imaging Spectroradiometer
NDVI	Normalized Difference Vegetation Index

3 DATA PRODUCT DESCRIPTION

Riparian composition and structure products provide an estimate of the riparian vegetation, human impacts, and bank characteristics, which buffer the banks of NEON Aquatic lakes, rivers, and streams. The protocol is derived from methods developed by the U.S. Environmental Protection Agency (2008), U.S. Fish and Wildlife Service (1979, 1997, 2009) and U.S. Department of Agriculture (1959).

3.1 Spatial Sampling Design

The Riparian habitat assessment protocol is executed at NEON aquatic sites. At wadeable streams, 10 riparian transects are evenly distributed throughout the 1 km biological sampling reach (Figure 1). At lakes, 10 evenly spaced transects are established around the lake perimeter (Figure 2). Large river sites include 5 right bank and 5 left bank transects that are evenly spaced throughout the 1 km reach (Figure 3). The riparian area surveyed at each transect extends up to 50 m from the shoreline/bank towards the terrestrial systems (less if the plot is visibly obstructed) and 20 m (10 m each side of central point) along the shoreline.
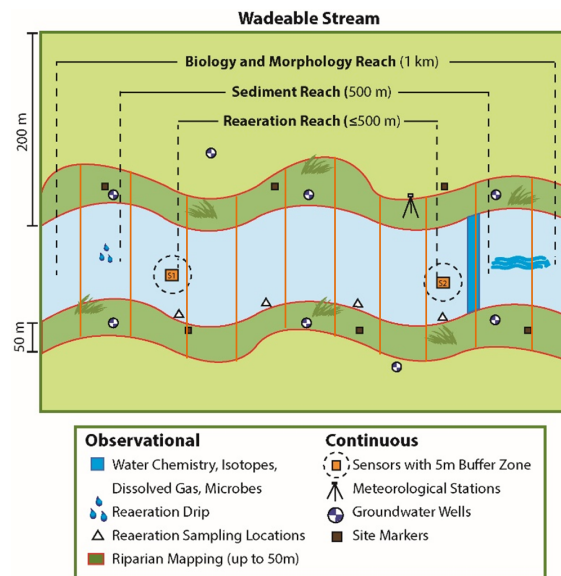

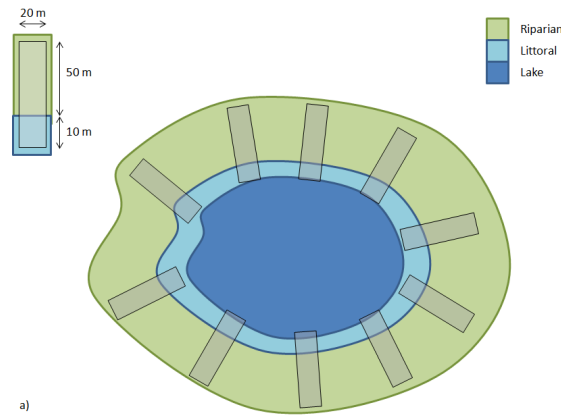Figure 1: Riparian habitat assessment locations for wadeable streams

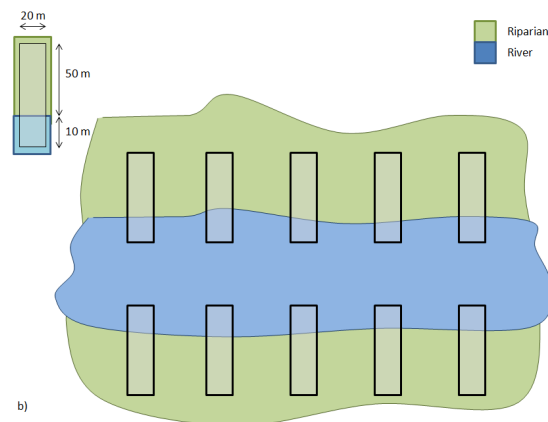Figure 2: Riparian habitat assessment locations for lakes

Figure 3: Riparian habitat assessment locations for rivers

3.2   Temporal Sampling Design

Riparian habitat assessment occurs once per year, during periods of peak-greenness as determined by the range of historical dates when MODIS NDVI greenness is within 90% of site maximum.

3.3   Variables Reported

All variables reported from the field or laboratory technician (L0 data) are listed in the file, NEON Raw Data Validation for riparian composition and cover (NEON.DP0.20275) (AD[03]). All variables reported in the published data (L1 data) are also provided separately in the file, NEON Data Variables for Riparian composition and structure (NEON.DP1.20275) (AD[04]).

Field names have been standardized with Darwin Core terms (http://rs.tdwg.org/dwc/; accessed 16 February 2014), the Global Biodiversity Information Facility vocabularies (http://rs.gbif.org/vocabulary/gbif/; accessed 16

February 2014), the VegCore data dictionary (https://projects.nceas.ucsb.edu/nceas/projects/bien/wiki/VegCore; accessed 16 February 2014), where applicable. NEON AOS spatial data employs the World Geodetic System 1984 (WGS84) for its fundamental reference datum and Earth Gravitational Model 96 (EGM96) for its reference gravitational ellipsoid. Latitudes and longitudes are denoted in decimal notation to six decimal places, with longitudes indicated as negative west of the Greenwich meridian.

Some variables described in this document may be for NEON internal use only and will not appear in downloaded data.

3.4   Spatial Resolution and Extent

The basic spatial data included in the data downloaded include the latitude, longitude, and elevation of a fixed riparian location (based on type of aquatic site, see below) where sampling occurred + associated uncertainty due to GPS error. Each observation includes looking at an area approximately 20 m wide (along the bank) and 50 m deep (perpendicular to the bank, into the riparian zone).

Wadeable stream: The 1 km permitted wadeable stream reach is divided into 10 equally spaced riparian transects. Riparian observations occur at each bank of the fixed transects, resulting in 20 observations per stream per year. The basic spatial data refers to the point along this transect at the center of the stream.

Rivers: The 1 km permitted river reach is divided into 10 equally spaced riparian points, 5 along each bank. Riparian observations occur at each point, resulting in 10 observations per river per year. The basic spatial data refers to the point (which is situated 10m from the bank).

Lakes: The shoreline of the lake is divided into 10 equally spaced riparian points. Riparian observations occur at each point, resulting in 10 observations per lake per year. The basic spatial data refers to the point (which is situated 10m from the bank), and the uncertainty includes the width of the observation, and the GPS error.

Overall, this results in a spatial hierarchy of:

bankLR (left or right bank, not applicable for lakes) →**namedLocation** (unique ID given to the individual transect) → **siteID** (ID of NEON site) → **domainID** (ID of a NEON domain).

3.5   Temporal Resolution and Extent

The finest resolution at which temporal data are reported is the **startDate**, the date and time of day at which the assessment of a particular transect began.

3.6   Associated Data Streams

namedLocation, **startDate** are linking variables that tie specific observations and associated metadata to the Riparian Vegetation % Cover data product (NEON.DP1.20191).

3.7 Product Instances

Each of 10 riparian transects per stream site is expected to be surveyed once per year, one observation per bank, yielding 20 data product instances per stream site per calendar year.

Each of 10 riparian points per river or lake site is expected to be surveyed once per year, yielding 10 data product instances per stream site per calendar year.

4 DATA QUALITY

4.1 DATA ENTRY CONSTRAINT AND VALIDATION

Many quality control measures are implemented at the point of data entry within a mobile data entry application or web user interface (UI). For example, data formats are constrained and data values controlled through the provision of dropdown options, which reduces the number of processing steps necessary to prepare the raw data for publication. An additional set of constraints are implemented during the process of ingest into the NEON database. The product-specific data constraint and validation requirements built into data entry applications and database ingest are described in the document NEON Raw Data Validation for riparian composition and cover (NEON.DP0.20275), provided with every download of this data product. Contained within this file is a field named 'entryValidationRulesForm', which describes syntactically the validation rules for each field built into the data entry application. Data entry constraints are described in Nicl syntax in the validation file provided with every data download, and the Nicl language is described in NEON's Ingest Conversion Language (NICL) specifications (AD[10]).

A schematic of the data entry application design is depicted in Figure 4.

4.2 Automated Data Processing Steps

Following data entry into a mobile application or web user interface, the steps used to process the data through to publication on the NEON Data Portal are detailed in the NEON Algorithm Theoretical Basis Document: OS Generic Transitions (AD[09]).

4.3 Data Revision

All data are provisional until a numbered version is released; the first release of a static version of NEON data, annotated with a globally unique identifier, is planned to take place in 2020. During the provisional period, QA/QC is an active process, as opposed to a discrete activity performed once, and records are updated on a rolling basis as a result of scheduled tests or feedback from data users. The Change Log section of the data product readme, provided with every data download, contains a history of major known errors and revisions.
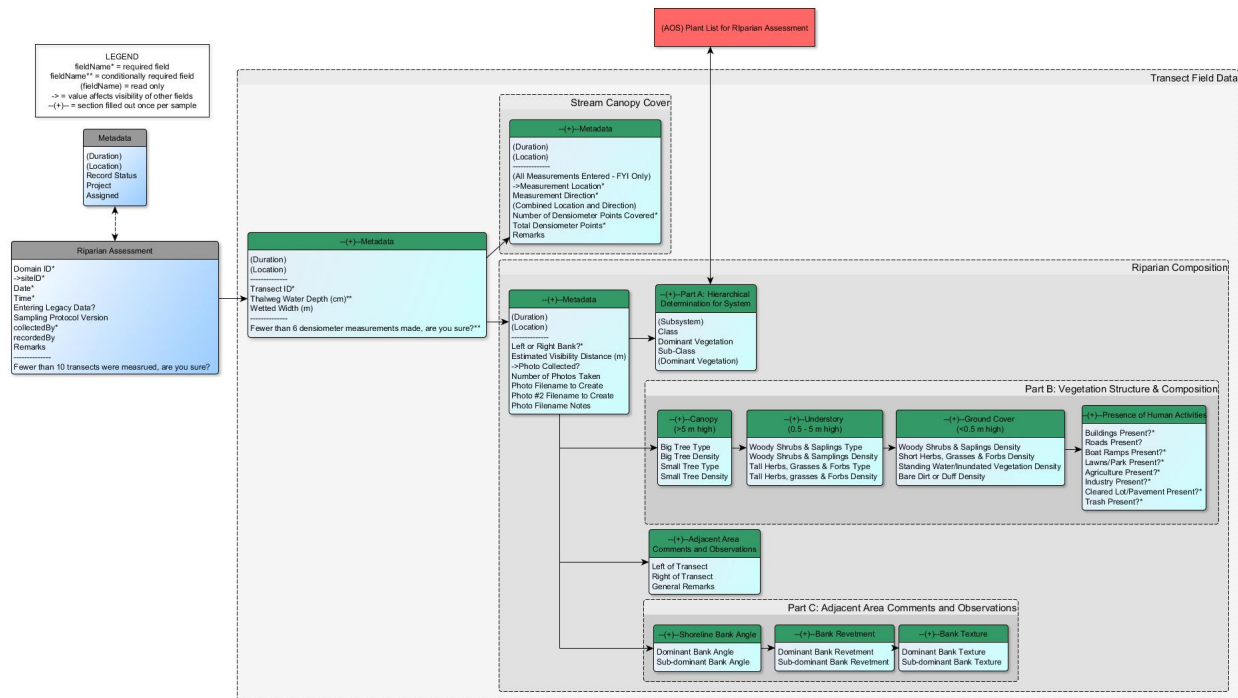
Figure 4: Schematic of the applications used by field technicians to enter riparian field data

4.4 Quality Flagging

The **dataQF** field in each record is a quality flag for known issues applying to the record, added by NEON Science upon data review. At this time, there are no known issues applying to the records in this data product

5 REFERENCES

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