Smithsonian Environmental Research Center

Vegetated Stream Riparian Zones: Their Effects on Stream Nutrients, Sediments, and Toxic Substances An Annotated and Indexed Bibliography of the world literature
including buffer strips, and interactions with hyporheic zones and floodplains

by Dave Correll
Smithsonian Environmental Research Center
Edgewater, Maryland, USA 21037-0028

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Introduction

The goal of this document is to comprehensively cite and subject index the World literature on vegetated stream riparian zone water quality effects. In this edition the scope of the bibliography has been expanded to include literature on hyporheic zone and floodplain/stream channel interactions. Previous editions included buffer strip research, since these studies seemed easily transferable. Each citation, with the exception of student theses, has been obtained, studied for content, and cross-indexed for other relevant citations. Only publications which were readily obtained through a research library system were included. Publications on tidally-influenced wetlands and exclusively lake riparian zones were excluded.

In order to make this goal tenable I have established somewhat arbitrary, but fairly rigid boundaries for relevant subject matter. Studies of all types of vegetation were included; forest, grass, herbaceous. Relevant studies include influences on water quality of inputs of surface and groundwater from the uplands and interactive effects among the water in the channel, the hyporheic zone, and the floodplain. Water quality includes concentrations of nutrients, suspended sediments, dissolved and particulate organic matter, pH, metals, and pesticides of all types. Studies of large woody debris are specifically excluded. Also excluded are studies of the application of municipal sewage and industrial/mining effluent to riparian zones. However, studies were included of effects on agricultural waste waters and a limited number of studies on urban or suburban drainage waters. I have excluded riparian vegetation habitat effects, both terrestrial and aquatic, and in-stream processes such as productivity, nutrient cycling/spiraling, water temperature, and channel morphology.

All citations except for those of student theses have brief annotations to help identify the aspects of these studies, which are particularly relevant. They are also coded for subject matter as listed below.

- **Document Type**
  - ☐ D = Contains New Research Data
  - ☐ M = Management Oriented
  - ☐ R = Review of Relevant Publications
- **Vegetation Type in Riparian Zone**
  - ☐ F = Forest
  - ☐ G = Grass
  - ☐ H = Herbaceous
- **Stream Order, e.g. 1st order, 2nd order**
- **Hydrologic Parameters**
  - ☐ GW = Groundwater
  - ☐ HZ = Hyporheic Zone Interactions
  - ☐ OF = Overland Storm Flows
  - ☐ TS = Hydrologic Tracers Utilized
- **Geology of Study Site**
  - ☐ CP = Coastal Plain Province
  - ☐ PT = Piedmont Province
  - ☐ MT = Mountain Provinces
- **Water Quality Parameters**
  - ☐ Al = Aluminum
  - ☐ Ca = Calcium
  - ☐ DAM = Dissolved Ammonium
  - ☐ DOM = Dissolved Organic Matter

- ☐ DPP = Dissolved Phosphate Phosphorus
- ☐ DTKN = Dissolved Total Kjeldahl Nitrogen
- ☐ DTP = Dissolved Total Phosphorus
- ☐ Fe = Iron
- ☐ HERB = Herbicides
- ☐ INS = Insecticides
- ☐ K = Potassium
- ☐ Mg = Magnesium
- ☐ Mn = Manganese
- ☐ Na = Sodium
- ☐ NIT = Nitrate & Nitrite
- ☐ PAM = Particulate Ammonium
- ☐ pH = pH
- ☐ POM = Particulate Organic Matter
- ☐ PPP = Particulate Phosphate Phosphorus
- ☐ PTN = Particulate Total Nitrogen
- ☐ PTP = Particulate Total Phosphorus
- ☐ PTKN = Particulate Total Kjeldahl Nitrogen
- ☐ TN = Total Nitrogen
- ☐ TP = Total Phosphorus
- ☐ TrM = Trace Metals
- ☐ TSS = Total Suspended Sediments

- **Riparian Processes**
  - ☐ BioStor = Storage in Biomass of Riparian Zone
  - ☐ Denit-F = Denitrification Measurements in the Field
  - ☐ Denit-L = Denitrification or Denitrification Potential Measurements in the Laboratory
  - ☐ Nitrif = Nitrification Measurements
  - ☐ ET = Evapotranspiration in Riparian Zone
  - ☐ Flux = Flux Rates Measured Through Riparian Zone
  - ☐ Infil = Infiltration in Riparian Zone
  - ☐ MBal = Mass Balance of Movement Through Riparian Zone
  - ☐ NutCyc = Special Effects of Nutrient Cycling Within Riparian Zone
  - ☐ SedTrap = Sediment Trapping Rates Within Riparian Zone

While these subject codes are not comprehensive, they cover many of the topics relevant to this bibliography. A maximum of eight subject codes were assigned to each publication. In some cases many more could have been selected so those that seemed the most important were selected.

The materials in this bibliography will be maintained in a MS Word computer file, which can be searched for individual or combinations of factors for special interests of users. Obviously, it can also be updated periodically. I hope it will be a useful research and management tool for everyone interested in this topic. You should feel free to download this complete file onto your PC and proceed to conduct your own subject searches. If you are aware of relevant literature not included in this edition, please send a copy to me or E-mail the citation (Correll@SERC.SI.edu).

References

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3. **Altier, L.S., R.R. Lowrance, R.G. Williams, J.M. Sheridan, D.D. Bosch, W.C. Hubbard, W.C. Mills, and D.L. Thomas (1994)** An ecosystem model for the management of riparian areas. pp. 373-387. in: Riparian Ecosystems in the Humid U.S., Functions, Values and Management., (ed). Wash., D.C.: Natl. Assoc. Conserv. Districts. Description of a Model Under Development for a Riparian Vegetative Buffer System. Includes Hydrology,

Nutrient Dynamics, Nutrient Storage in Woody Plant Biomass. Presents Results of Preliminary Hydrologic Calibrations in a Georgia Coastal Plain Site. **OF; GW; ET; BioStor; Flux; NutCyc; CP**

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5. **Altman, S.J. and R.R. Parizek (1995)** Dilution of nonpoint-source nitrate in groundwater. J. Environ. Qual. 24(4); 707-718. Movement of Groundwater was Measured in two Dimensions and Changes in Nitrate and other Nutrients was Related to Dilution from other Groundwater**. D; F; GW; MT; NIT; DAM; DTKN; K; DTP; TS**

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