

ways that chemicals can influence endocrine systems challenges efforts to characterize chemicals that can cause endocrine responses, ii) many responses in aquatic biota have been associated with complex mixtures where the causative agents remain unidentified, and iii) most literature information deals with mammalian studies using pure compounds so there is considerable uncertainty regarding extrapolation to aquatic species and efficacy of environmental concentrations. An overview of the literature on EDS, specific to exposure within Canadian aquatic environments, is presented to emphasize the diversity and complexity of chemicals capable of altering endocrine function.  
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**1091. An overview of the latest development of microencapsulation for agricultural products.**

Gimeno, M.  
*Journal of Environmental Science and Health: Part B, Pesticides, Food Contaminants and Agricultural Wastes* B31 (3): 407-420. (1996)  
NAL Call #: TD172.J61;  
ISSN: 0360-1234 [JPFCD2].  
Notes: Special issue: Pesticide chemistry for sustainable agriculture / edited by A. Ambros. Paper presented at the Fifth European Conference on Chemistry and the Environment, May 1995, Budapest, Hungary. Includes references.  
Descriptors: agricultural chemicals/ pesticides/ formulations/ controlled release/ microencapsulation/ product development/ toxicity  
This citation is from AGRICOLA.

**1092. Overview of the rivers in the West.**

Rosgen, D. L.  
In: General Technical Report RM; Vol. 226.  
Fort Collins, Colo.: Rocky Mountain Forest and Range Experiment Station, Forest Service, U.S. Department of Agriculture, 1993; pp. 8-15.  
Notes: In the series analytic: Riparian management: common threads and shared interests. Paper presented at a conference on Feb. 4-6, 1993, Albuquerque, New Mexico;  
ISSN: 0277-5786  
NAL Call #: aSD11.A42

Descriptors: rivers/ stream flow/ erosion/ sediment/ riverbank protection/ channels/ Western states of USA  
This citation is from AGRICOLA.

**1093. An Overview on Organic Contaminants, Focusing on Monitoring of a Few Chlorinated Organic Pollutants, Through Immission Studies.**

Reutergaard, L.  
*Resources, Conservation and Recycling* 16 (1-4): 361-382. (1996)  
NAL Call #: TP156.R38R47;  
ISSN: 0921-3449.  
Notes: Conference: Int. Symp. on Environmental Management and Pollution Control, Bangkok (Thailand), 7-14 Nov 1994; Source: Pollution Control and Management and Environmental Toxicology., 1996; Editors: Wise, D. L. //Polprasert, C. //Reutergaard, L. //Visvanathan, C. //Suselo, T. B.  
Descriptors: fuel/ organic compounds/ fertilizers/ herbicides/ bioaccumulation/ trophic level/ contamination/ chlorinated hydrocarbons/ food chains/ path of pollutants/ monitoring/ pollution monitoring/ Sources and fate of pollution/ Toxicology and health  
Abstract: The problem of environmental pollution is usually considered to be a consequence of the industrialization and urbanization processes in the late 19th and early 20th centuries. Fertilizers and herbicides were introduced into agriculture, the chemical industry developed new products and the large-scale use of fossil fuels increased rapidly. Population growth in the cities gave rise to the problems of garbage disposal and domestic effluents into surrounding waters and the contribution of industrial discharges directly into the environment grew rapidly. During the last decades, however, both scientists and society have become aware of the growing contamination and pollution problems. Some of the man-made chemicals were shown to be extremely persistent in the environment and to accumulate in fatty tissues of animals. At the same time, insects, plants, and fungi developed new forms that were resistant to the chemicals used to combat them. Industries grew up where population densities were high and transportation facilities were good. These places were in many

cases along river banks, bays, and coast lines. Thus pollution of the aquatic environment became an issue, but it was soon realized that weathering processes transported contaminants even to remote areas. The presentation will briefly consider the influence of some classes of chlorinated organic pollutants on different trophic levels. The emphasis will be on substances which are persistent and which show bioaccumulation properties in food chains. Within this group of substances the majority are chlorinated organic compounds.  
(DBO)  
© Cambridge Scientific Abstracts (CSA)

**1094. Pacific salmon, nutrients, and the dynamics of freshwater and riparian ecosystems.**

Naiman, Robert J; Bilby, Robert E; Schindler, Daniel E; and Helfield, James M  
*Ecosystems* 5 (4): 399-417. (2002)  
NAL Call #: QH540.E3645;  
ISSN: 1432-9840  
Descriptors: nutrients: marine derived/ Oncorhynchus spp. [Pacific salmon] (Osteichthyes): anadromous/ Animals/ Chordates/ Fish/ Nonhuman Vertebrates/ Vertebrates/ aquatic productivity/ climate cycles/ ecosystem dynamics: freshwater, riparian/ management implications/ marine environments/ predation/ resource management/ vegetation  
Abstract: Pacific salmon (Oncorhynchus spp.) accumulate substantial nutrients in their bodies as they grow to adulthood at sea. These nutrients are carried to predominantly oligotrophic lakes and streams, where they are released during and after spawning. Research over more than 3 decades has shown that the annual deposition of salmon-borne marine-derived nutrients (MD-nutrients) is important for the productivity of freshwater communities throughout the Pacific coastal region. However, the pathways and mechanisms for MD-nutrient transfer and accumulation in freshwater and riparian ecosystems remain virtually unexplored, consequently, there are many uncertainties in this area. This article addresses three related topics. First, we summarize recent advances in our understanding of the linkages among MD-nutrients, freshwater (including riparian) ecosystems, and community dynamics by addressing

the importance of MD-nutrients to lakes and streams and by then reviewing large-scale and long-term processes in the atmosphere and ocean that govern variability in salmon populations. Second, we evaluate the validity of the discoveries and their implications for active ecosystem management, noting areas where extrapolation from these results still requires great caution. Finally, we outline five key research issues where additional discoveries could greatly augment our understanding of the processes shaping the structure and dynamics of salmon populations and the characteristics of their freshwater habitat and associated riparian zones. Collectively, the data suggest that the freshwater portion of the salmon production system is intimately linked to the ocean. Moreover, for the system to be sustainable, a holistic approach to management will be required. This holistic approach will need to treat climate cycles, salmon, riparian vegetation, predators, and MD-nutrient flowpaths and feedbacks as an integrated system.

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**1095. Paradigms of metal accumulation in rooted aquatic vascular plants.**

Jackson, L J

*Science of the Total Environment* 219 (2-3): 223-231. (1998)

NAL Call #: RA565.S365;

ISSN: 0048-9697

*Descriptors:* metals: accumulation, bioavailability/ plant (Plantae): rooted aquatic vascular/ Plants/ sediment

*Abstract:* This paper reviews paradigms of metal accumulation in rooted aquatic vascular plants. Radio-tracer studies have demonstrated that root uptake from sediments with subsequent translocation to above-ground tissues is the principal pathway for metal movement. The metal concentration of rooted macrophytes is generally proportional to metal concentrations in the underlying sediments, excluding crystal lattice-bound metals. Deviations from 1:1 predictions between sediment and macrophyte metal concentrations have been shown to be correlated to variation in sediment geochemistry. Sediment pH, redox potential and organic content are three particularly important sediment variables that affect phase partitioning of metals, and their bioavailability. Metals contained within

macrophyte tissues can participate in cycling within the littoral zone, or at senescence, lost to the surrounding water in a dissolved form or exported out of the lake bound to shoot fragments. Relatively little is known about the trophic transfer of macrophyte-bound metals to herbivores or algae. A better understanding of the role of rooted aquatic macrophytes in ecosystem processes is likely to be advanced by considering the fate of plant metals leaked during the summer, and those dissolved forms lost to the water column during senescence. Modeling metal accumulation in aquatic vascular plants has been restricted to empirical models that provide descriptions of general patterns.

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**1096. Parameterisation of hydrological models: A review and lessons learned from studies of an agricultural catchment (Naizin, France).**

Durand, P.; Gascuel Odoux, C.; and Cordier, M. O.

*Agronomie* 22 (2): 217-228.

(Mar. 2002)

NAL Call #: SB7.A3;

ISSN: 0249-5627 [AGRNDZ].

*Notes:* Special issue: Parameter estimation for crop models / edited by D. Wallach. Proceedings of a seminar held June 2000, Toulouse, France. Includes references.

*Descriptors:* agricultural land/ watersheds/ catchment hydrology/ simulation models/ mathematical models/ Bayesian theory/ Monte Carlo method/ estimation/ hydraulic conductivity/ water flow/ soil water/ Brittany/ generalized likelihood uncertainty estimation/ maximum storage in root zone/ channel flow velocity

This citation is from AGRICOLA.

**1097. Parasitic protozoa and the waterborne route for the transmission of disease.**

Smith, H. V.; Ahmad, R. A.; and Watkins, J.

*Tropical Biomedicine* 14 (1/2): 35-49. (1997);

ISSN: 0127-5720

This citation is provided courtesy of CAB International/CABI Publishing.

**1098. Parasitism and Ecology of Wetlands: A Review.**

Thomas, F.; Cezilly, F.; De Meeues, T.; Crivelli, A.; and Renaud, F.

*Estuaries* 20 (3): 646-654. (1997)

NAL Call #: GC96.E79;

ISSN: 0160-8347

*Descriptors:* Ecosystems/ Wetlands/ Ecology/ Coastal Waters/ Parasites/ Reviews/ Predation/ Conservation/ Literature reviews/ Estuaries/ Nature conservation/ Species interactions: parasites and diseases/ Ecology/ Community Studies/ Wetlands

*Abstract:* Recent advances in ecology have suggested that parasites, through the spectrum of their effects, could act as key species in ecosystems. Wetlands are productive ecosystems within which parasitism is diversified. There already exists evidence for direct and indirect effects of parasites on their host species. The influence of parasites on the population ecology of hosts includes survival, castration, sexual selection, predation, and spatial distribution. Parasites can also affect the evolution of host biological diversity (i.e., genetic structure and interspecific competition) and trophic interactions between prey and predators. The key role parasites might play in the ecology of coastal waters and wetlands should be considered in conservation programs applied to such ecosystems.

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**1099. Particulate matter emissions from confined animal feeding operations: Management and control measures.**

Auvermann, B. W.; Bottcher, R. W.; Parnell, C. B.; Shaw, B.; and Worley, J.

In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.

NAL Call #: TD930.2-.W45-2002

*Descriptors:* Agricultural wastes--- Environmental aspects--- United States

**1100. Past and future impacts of wetland regulations on playa ecology in the Southern Great Plains.**

Haukos, D. A. and Smith, L. M.  
*Wetlands* 23 (3): 577-589. (2003)  
NAL Call #: QH75.A1W47;  
ISSN: 0277-5212.

Notes: Number of References: 52;  
Soc Wetland Scientists  
Descriptors: Environment/ Ecology/  
playa wetlands/ regulations/ Southern  
High Plains/ Texas/ lakes/  
vegetation/ basins

**Abstract:** Playa wetlands provide functions critical to the existence of life on the High Plains portion of the Great Plains, including surface drainage, aquifer recharge, and wildlife habitat. These small, circular, isolated depressional wetlands with closed watersheds have a dynamic, unpredictable hydroperiod, which is essential to the maintenance of biodiversity. Most numerous in the Southern High Plains of northwestern Texas and eastern New Mexico, playas have been impacted by sedimentation, pit excavation, road construction, industrial and municipal wastewater, feedlot runoff, urban development, overgrazing, and deliberate filling. Despite being declared, as a wetland class, jurisdictional "waters of the United States" since 1977, regulations and laws for conservation of wetland functions have seldom been applied to playas. The January 2001 Supreme Court decision, *Solid Waste Agency of Northern Cook County (SWANCC) v. United States Army of Corps of Engineers*, likely eliminated federal regulation of impacts covered by the Clean Water Act in all but a few playas. Although still subject to the Federal "Swampbuster" provision enacted by the 1985 Food Security Act, extended natural dry periods allows for frequent cultivation and other activities in playas without incurring violation, contributing to the continued degradation of playa functions. None of the states with significant numbers of playas have regulations for the conservation of playa functions. Suggestions for the successful future conservation of playas and their associated functions include (1) increased promotion and implementation of existing federal and state conservation programs specifically for playas; (2) proposed state regulations for playa conservation; (3) recognition of agricultural impacts on wetland

determinations; (4) creation of Welland Management Districts to preserve intact, functioning playas; and (5) increased public education on the value of playas.  
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**1101. Patch Characteristics and Landscape Context as Predictors of Species Presence and Abundance: A Review.**

Mazerolle, MJ and Villard, MA  
*Ecoscience* 6 (1): 117-124. (1999);  
ISSN: 1195-6860

Descriptors: Ecosystems/ Ecotypes/  
Variability/ Correlation analysis/  
Species diversity/ Abundance/  
Literature reviews/ Aquatic organisms/  
Reptilia/ Amphibia/ Pisces/  
Gastropoda/ Invertebrata/ Vertebrata  
**Abstract:** Studies were reviewed which simultaneously considered landscape-scale and patch-scale effects in order to answer the

following question: does the inclusion of landscape characteristics as explanatory variables increase the ability to predict species presence and abundance when local (i.e., habitat patch) conditions are known? The 61 studies selected cover a wide array of taxa, landscape types, and explanatory variables, but many (36%) focused on avian communities in forests fragmented by agriculture. Patch-scale variables had a significant effect on invertebrates, amphibians, reptiles, birds, and mammals in all landscape types. Landscape-scale characteristics also were significant predictors of species presence and abundance for vertebrates (fish, reptiles, amphibians, birds etc.) but not for the majority of invertebrates (Gastropoda etc.) in the studies reviewed. Results indicate that both patch and landscape characteristics should be included in models investigating the distribution and abundance of animals, at least for vertebrates. Results from this review suggest that the inclusion of landscape characteristics will enhance conservation strategies if the landscape scale is properly defined with respect to the taxon or taxa under investigation.

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**1102. Pathogen reduction in sewage sludge by composting and other biological treatments: A review.**

Dumontet, S.; Dinel, H.; and Baloda, S. B.  
*Biological Agriculture & Horticulture* 16 (4): 409-430. (1999);  
ISSN: 0144-8765

This citation is provided courtesy of CAB International/CABI Publishing.

**1103. Pathogen survival in swine manure environments and transmission of human enteric illness: A review.**

Guan TatYee and Holley, R. A.  
*Journal of Environmental Quality* 32 (2): 383-392. (2003)  
NAL Call #: QH540.J6;  
ISSN: 0047-2425

This citation is provided courtesy of CAB International/CABI Publishing.

**1104. Pathogens and manure management systems: A review.**

Bicudo, J. R. and Goyal, S. M.  
*Environmental Technology* 24 (1): 115-130. (2003)  
NAL Call #: TD1.E59;  
ISSN: 0959-3330

This citation is provided courtesy of CAB International/CABI Publishing.

**1105. Pathogens excreted by livestock and transmitted to humans through water.**

Atwill, Edward R. and University of California, Davis. Animal Agricultural Research Center. University of California Davis.  
Agricultural Issues Center.

Davis, Calif.: UCD Animal Agriculture Research Center: UC Agricultural Issues Center; vi, 19 p. (1997)

Notes: "August 1997." Includes bibliographical references (p. 13-18).  
NAL Call #: RA642.W3-A89-1997  
Descriptors: Waterborne infection/  
Animal waste---Environmental aspects/  
Water quality management  
This citation is from AGRICOLA.

**1106. Pathogens in animal wastes and the impacts of waste management practices on their survival, transport and fate.**

Sobsey, M. D.; Khatib, L. A.; Hill, V. R.; Alocilja, E.; and Pillai, S.  
In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture;

Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.  
*NAL Call #:* TD930.2-W45-2002  
*Descriptors:* Agricultural wastes---Environmental aspects---United States

**1107. PCR and the detection of microbial pathogens in water and wastewater.**

Toze, Simon  
*Water Research* 33 (17): 3545-3556. (1999)  
*NAL Call #:* TD420.W3;  
*ISSN:* 0043-1354  
*Descriptors:* bacteria (Bacteria): pathogen/ helminths (Aschelminthes)/ protozoans (Protozoa): pathogen/ viruses (Viruses): pathogen/ Animals/ Aschelminths/ Bacteria/ Eubacteria/ Helminths/ Invertebrates/ Microorganisms/ Protozoans/ Viruses/ ecotoxicology/ environmental contamination/ false positives/ fecal contamination/ health risks/ microbial pathogen detection/ quantification difficulty/ wastewater  
 © Thomson

**1108. Performance of bedding materials in reducing ammonia emissions from pig manure.**

Andersson, Mats.  
 Lund, Sweden: Sveriges lantbruksuniversitet, Institutionen for jordbrukets biosystem och teknologi (JBT); 50 p.: ill.; Series: Rapport (Sveriges lantbruksuniversitet. Institutionen for jordbrukets biosystem och teknologi) 101. (1995)  
*Notes:* "ISRN-SLU-JBT-R--101--SE."  
 Includes bibliographical references (p. 44-46).  
*NAL Call #:* TH4911.A1S9--no.101  
 This citation is from AGRICOLA.

**1109. The performance of the human nose in odour measurement.**

Walker, J C  
*Water Science and Technology* 44 (9): 1-7. (2001)  
*NAL Call #:* TD420.A1P7;  
*ISSN:* 0273-1223  
*Descriptors:* human (Hominidae)/ Animals/ Chordates/ Humans/ Mammals/ Primates/ Vertebrates/ environmental health/ indoor air quality/ water quality  
*Abstract:* Over the last 20 years or so, there has been steadily increasing activity in the area of applied human odour measurement. This has been especially true outside of the United

States. Yet, for about 40 years, there has also been decreasing interest and activity, on the part of academic smell researchers, in rigorous quantitative measurement of the functional properties of the human olfactory system. There are some optimistic signs, however, that this situation may be improving. Applied meetings such as this one are reaching out to learn more about basic research in human olfaction and some research groups are venturing out to indoor air quality, environmental health, water quality and other applied areas. In this paper I hope to support and accelerate the increasingly fruitful interactions that are beginning. The paper aims to make four main points. First, some of the most important ways in which the laboratory differs from everyday life will be noted. Keeping these differences in mind lessens the risk that laboratory data will be used uncritically to make predictions of real-world responses to chemical stimuli. Next, the specific benefits that would accrue from more fruitful interactions between basic and applied researchers will be highlighted; this is perhaps best seen by noting problem areas resulting from too little cross-fertilisation. Third, the CEN standard for the measurement of odour thresholds will be discussed in light of what is known concerning both the functional aspects of the human olfactory system and the current state of knowledge concerning best methods for investigating this system. Finally, some recent work we have done that was designed to help characterise human odour responses and demonstrate improved methodology, will be briefly mentioned. The paper concludes with suggestions as to how the scientific basis of applied odour measurement may best be enhanced.  
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**1110. Periphyton function in lake ecosystems.**

Vadeboncoeur, Yvonne and Steinman, Alan D  
*The Scientific World* 2: 1449-1468. (2002)  
*NAL Call #:* 472 SCI25;  
*ISSN:* 1537-744X  
*Descriptors:* nutrients/ periphyton (Organisms): abundance, growth, productivity/ phytoplankton (Algae)/ Algae/ Microorganisms/ Nonvascular Plants/ Plants/ dissolved organic matter loading/ food web interactions/

habitat availability/ habitat type/ lake ecosystems/ lake morphometry/ landscape properties/ light availability/ nutrient cycling/ primary productivity/ resource competition/ sediments/ shallow depths/ trophic conditions/ water column transparency/ watershed related properties  
*Abstract:* Periphyton communities have received relatively little attention in lake ecosystems. However, evidence is increasing that they play a key role in primary productivity, nutrient cycling, and food web interactions. This review summarizes those findings and places them in a conceptual framework to evaluate the functional importance of periphyton in lakes. The role of periphyton is conceptualized based on a spatial hierarchy. At the coarsest scale, landscape properties such as lake morphometry, influence the amount of available habitat for periphyton growth. Watershed-related properties, such as loading of dissolved organic matter, nutrients, and sediments influence light availability and hence periphyton productivity. At the finer scale of within the lake, both habitat availability and habitat type affect periphyton growth and abundance. In addition, periphyton and phytoplankton compete for available resources at the within-lake scale. Our review indicates that periphyton plays an important functional role in lake nutrient cycles and food webs, especially under such conditions as relatively shallow depths, nutrient-poor conditions, or high water-column transparency. We recommend more studies assessing periphyton function across a spectrum of lake morphometry and trophic conditions. Periphyton communities have received relatively little attention in lake ecosystems. However, evidence is increasing that they play a key role in primary productivity, nutrient cycling, and food web interactions.  
 © Thomson

**1111. Pest and pesticide management on southern forests.**

United States. Forest Service. Southern Region.  
 Atlanta, GA: USDA Forest Service, Southern Region; vi, 46 p.: ill., col. map; Series: Management bulletin R8 MB 60. (1994)  
*Notes:* "September 1994." Includes bibliographical references (p. 43) and index.  
*NAL Call #:* aSB763.A13P47--1994

*Descriptors:* Trees---Diseases and pests---Southern States/ Trees--- Diseases and pests---Control--- Southern States  
This citation is from AGRICOLA.

**1112. Pest management implications of glyphosate-resistant wheat (*Triticum aestivum*) in the Western United States.**

Lyon, D. J.; Bussan, A. J.; Evans, J. O.; Mallory Smith, C. A.; and Peeper, T. F.

*Weed Technology* 16 (3): 680-690. (July 2002-Sept. 2002)

NAL Call #: SB610.W39;

ISSN: 0890-037X [WETEE9]

*Descriptors:* triticum aestivum/ glyphosate/ herbicide resistance/ weed control/ pest management/ cultivars/ crop plants as weeds/ application date/ risk assessment/ weed associations/ rotations/ herbicide resistant weeds/ crop management/ information needs/ literature reviews/ United States  
This citation is from AGRICOLA.

**1113. Pesticide acute toxicity reference values for birds.**

Mineau, P.; Baril, A.; Collins, B. T.; Duffe, J.; Joerman, G.; and Luttkik, R. *Reviews of Environmental Contamination and Toxicology*

170: 13-74. (2001)

NAL Call #: TX501.R48;

ISSN: 0179-5953 [RCTOE4]

*Descriptors:* wild birds/ toxicity/ pesticides/ risk assessment/ literature reviews

This citation is from AGRICOLA.

**1114. Pesticide chemical oxidation processes: An analytical approach.**

Chiron, Serge; Fernandez, Alba Amadeo R; and Rodriguez, Antonio *Trends in Analytical Chemistry* 16 (9): 518-527. (1997)

NAL Call #: QD71.T7;

ISSN: 0165-9936

*Descriptors:* organophosphorus compounds/ phenoxyacids/ triazines/ water/ by product identification/ degree of mineralization/ pesticide chemical oxidation processes  
*Abstract:* This article gives an overview of the different analytical approaches for carrying out pesticide degradation studies in waters by means of advanced oxidation processes (AOPs). The degree of mineralization achieved under AOPs and the identity of by-products of a large number of compounds belonging to the major pesticide

families, triazines, phenoxyacids, and organophosphorus compounds, are presented. Critical comments are aimed at emphasizing the lack of suitable analytical methods in order to both follow the kinetics of formation and disappearance of by-products and identify their chemical structures. More particularly the crucial role of gas chromatography and liquid chromatography in combination with mass spectrometry is stated.  
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**1115. Pesticide Chemical Oxidation: State-of-the-Art.**

Chiron, S.; Fernandez-Alba, A.; Rodriguez, A.; and Garcia-Calvo, E. *Water Research* 34 (2):

366-377. (2000)

NAL Call #: TD420.W3;

ISSN: 0043-1354.

Notes: DOI: 10.1016/S0043-1354(99)00173-6

*Descriptors:* Pesticides/ Oxidation/ Degradation/ Optimization/ Mass Spectrometry/ Byproducts/ Wastewater Treatment/ Technology/ Reviews/ Kinetics/ Ozonation/ Photolysis/ Chemical degradation/ titanium dioxide/ Pesticides/ Decomposition/ Spectrometry (Mass)/ Wastewater treatment processes/ Sewage & wastewater treatment/ Industrial Effluents

*Abstract:* The various currently used chemical oxidation processes (AOPs), for pesticide elimination from wastewater are reported.

Heterogeneous TiO<sub>2</sub> photocatalysis, ozonation and photo-Fenton's reagent are the most intensively investigated technologies. Theoretical and practical advantages and limitations of each method are discussed. Degradation mechanism and experimental conditions employed for the optimization of each technology are reviewed.

Performances such as the achieved degree of mineralization and obtained degradation rates are detailed. The various analytical approaches for studying pesticide degradation by AOPs are also discussed. Formation of by-products is unavoidable during cost effective treatments. Their detection and identification are required in order to determine which kind of chemical structures are left at the end of the process. For this purpose, the crucial role of gas and liquid mass spectrometry is emphasized. The review reveals a general lack of data on kinetics of

formation and disappearance of the major by-products. The efficiency of AOPs has scarcely been investigated at industrial scales, i.e. in presence of a mixture of active ingredients together with their formulating agents and at concentration levels above 10 mg/l. The more polar by-products are largely unknown and their toxicity is usually not addressed.

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**1116. Pesticide Contamination of Surface Waters: An Approach to the Use of Buffers.**

Harris, G. and Forster, A.

In: Buffer Zones: Their Processes and Potential in Water Protection Conference Handbook. (Held 2 Aug 1930-2 Sep 1996 at Oxfordshire, UK.) Cardigan, UK: Samara Publishing Limited; pp. 20-21; 1996.

Notes: Conference: Int. Conf. Buffer Zones: Their Processes and Potential in Water Protection, Woodstock, Oxfordshire (UK), 30 Aug-2 Sep 1996

*Descriptors:* path of pollutants/ pesticides/ contamination/ surface water/ literature review/ catchment areas/ leaching/ degradation/ retention/ permeability coefficient/ subsurface drainage/ particulate matter/ adsorption/ water pollution control/ catchments/ drainage/ buffer zones/ Sources and fate of pollution / Freshwater pollution

*Abstract:* As contamination of surface waters by pesticides has become more widespread, the need for measures that can reduce the risk of pesticides reaching watercourses has increased. These include influencing the movement of water and possible chemical contaminants at the hillslope, to reduce pesticide export, as well as measures to minimise the input to the water body itself. One such measure gaining considerable acceptance is the use of a streamside buffer, which is a feature established to separate the pollution source - the adjacent agricultural area - from the watercourse. Buffers have become attractive because they are seen as offering a non-chemical treatment for pesticides and provide an additional measure within a catchment management approach to reduce the risk of contamination. In addition, buffers are seen as important as they provide an opportunity for conservation opportunities for flora and fauna. This paper reviews the transport mechanisms of pesticides

within catchments and assesses the key parameters that influence pesticide loss from studies undertaken in Central and Northern Europe and the United States. The importance of sub-surface drainage in influencing the division between surface and subsurface movement of pesticides is discussed together with an assessment of the potential for the occurrence of erosion and the transport of pesticides attached to particulates. The significance of selected pesticides in the water and sediment phase to the aquatic environment is also reviewed. At the hillslope, the adsorption of the pesticide together with the degradation rate, are shown to be the main parameters determining the potential for leaching of pesticides. However, soil type can also be important, and in particular the presence of macropores in clay soils, are shown as critical to the speed with which pesticides can reach the watercourse.  
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**1117. Pesticide Contamination of Surface Waters: The Potential Role of Buffer Zones.**

Harris, G. L. and Forster, A.  
 In: *Buffer Zones: Their Processes and Potential in Water Protection.*  
 Haycock, N. E.; Burt, T. P.; Goulding, K. W. T.; and Pinay, G. (eds.)  
 Hertfordshire, UK: Quest Environmental; pp. 62-69; 1997.  
*Notes:* Conference: International Conference on Buffer Zones, [np], Sep 1996; Source: *Buffer Zones: Their Processes and Potential in Water Protection.*, Quest Environmental, PO Box 45, Harpenden, Hertfordshire, AL5 5LJ (UK); ISBN: 0-9530051-0-0  
*Descriptors:* Europe/ pesticides/ surface water/ literature review/ path of pollutants/ zones/ riparian land/ water quality control/ environmental protection/ remediation/ water pollution/ groundwater pollution/ agricultural runoff/ literature reviews/ Europe/ buffer zones/ Sources and fate of pollution/ Water quality control/ Freshwater pollution/ Characteristics, behavior and fate  
*Abstract:* The movement of pesticides to surface waters has become an area of concern across Europe and other countries where pesticide usage is a key part of crop management. Pesticide losses to

surface waters can be rapid; as a consequence, remedial measures may have a more or less immediate effect in reducing contamination, and resulting environmental impact. One such measure attracting increasingly widespread interest is the use of buffers generally considered to be best located close to, or adjacent to, surface water courses. However, the mechanisms by which buffer zones can control pesticide loss are not well understood, neither is the optimum design and function of buffers always clear. This review paper considers the mechanisms and importance of pesticide transport to surface waters and assesses the evidence that indicates whether buffers can be effective in protecting both water quality and the environment. In particular, the paper examines research which addresses the appropriate design of buffers and assesses the potential long-term role for these landscape features.  
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**1118. Pesticide effects of bacterial diversity in agricultural soils: A review.**

Johnsen, K.; Jacobsen, C. S.; Torsvik, V.; and Sorenson, A.J.  
*Biology and Fertility of Soils* 33 (6): 443-453. (June 2001)  
 NAL Call #: QH84.8.B46;  
 ISSN: 0178-2762  
*Descriptors:* agricultural soils/ soil bacterial/ species diversity/ biodiversity/ polymerase chain reaction/ ribosomal DNA/ identification/ adverse effects/ pesticides/ metabolism/ soil fertility/ measurement/ sampling/ temporal variation/ spatial variation/ mineralization/ literature reviews/ pesticide residues  
*Abstract:* According to guidelines for the approval of pesticides, side-effects on soil microorganisms should be determined by studying functional parameters such as carbon or nitrogen mineralisation. However, the microbial diversity may have been markedly changed following pesticide use despite unaltered metabolism, and such changes may affect soil fertility. This review evaluates new methods for measuring pesticide effects on bacterial diversity, and discusses how sampling should take temporal and spatial heterogeneity into account. Future research on pesticide approval protocols should

establish the relationships between mineralisation assays and new and rapid bacterial diversity profiling methods, and should include the possible ecological implications of altered bacterial diversity for soil fertility.  
 This citation is from AGRICOLA.

**1119. Pesticide Fate and Behaviour in Australian Soils in Relation to Contamination and Management of Soil and Water: A Review.**

Kookana, R. S.; Baskaran, S.; and Naidu, R.  
*Australian Journal of Soil Research* 36 (5): 715-764. (1998)  
 NAL Call #: 56.8 Au7;  
 ISSN: 0004-9573  
*Descriptors:* Australia/ Fate of Pollutants/ Pesticides/ Soil Contamination/ Water Pollution Sources/ Public Health/ Pesticide Residues/ Groundwater pollution/ Water pollution/ Air pollution/ Sources and fate of pollution/ Environmental action/ Pesticides  
*Abstract:* Pesticides, if used as recommended, are generally expected to cause little adverse impact on the environment. However, it is evident that trace levels of pesticide residues present in soil, water, air, and sometimes food, may result in harmful effects on human and environmental health. Pesticides can pose health risks through several exposure pathways including direct occupational related exposure, through food, or through the residues present in the environment. This paper reviews available information on the nature and extent of pesticide contamination of Australian soils, surface water, and groundwaters. Published studies on the fate and behaviour of pesticides in Australian soils have also been reviewed, covering the key processes controlling the fate and behaviour of pesticides in soils, namely sorption-desorption, degradation (biological and abiotic), and volatilisation in soil and their off-site transport into surface and groundwaters. Some management options for minimising the diffuse source pollution of soils and waters by pesticides and remediation of contaminated soils and water have also been discussed. The review concludes that contamination of soils and water with pesticides has occurred in Australia and there is a need to understand the behaviour of pesticides in the soil environment in

order to develop management practices to minimise any adverse impact on our environment in future.  
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**1120. Pesticide fate in farming systems: Research and monitoring.**

Kookana, R. S. and Simpson, B. W. *Communications in Soil Science and Plant Analysis* 31 (11/14): 1641-1659. (2000)

NAL Call #: S590.C63;  
ISSN: 0010-3624 [CSOSA2].

Notes: Paper presented at the 1999 International Symposium on Soil and Plant Analysis held March 22-29, 1999, Brisbane, Queensland, Australia. Includes references.

Descriptors: pesticide residues/ losses from soil/ soil pollution/ water pollution/ runoff/ cropping systems/ crop production/ leaching/ volatilization/ sorption/ degradation/ literature reviews/ Australia

Abstract: Pesticides, being toxic by design, cause considerable public concern about their possible non-target impact on the ecosystem and human health. Pesticide use has increased substantially in Australia and globally over the last two decades, partly due to changes in tillage practices. Some 400 chemically active ingredients, of varying properties, are currently available in Australia alone. Pesticide residues have been found, mostly at acceptable levels, in food commodities and in surface and ground water bodies in Australia. Such contamination needs to be minimized. However, the variety of pesticides, their use under a range of soil and climatic conditions and the complexity of processes governing their fate make this task particularly daunting. Furthermore, as little local data is available for Australian conditions, there is danger in extrapolating overseas Temperate Zone data, especially for risk assessment in tropical regions. The effect of farming practices, e.g. conservation tillage, on run-off and leaching losses, needs better understanding and quantification. Such studies aimed at providing knowledge on the fate and persistence of pesticides must be supported by sound information on pesticide usage (inputs), particularly at catchment-scale. Correct sampling and analytical protocols are crucial for any research or monitoring study.

Analysts are faced with a continuous demand for newer, cost effective and improved analytical methods for pesticides and their metabolites, for better sensitivity and quality control. This citation is from AGRICOLA.

**1121. Pesticide-induced immunotoxicity: Are Great Lakes residents at risk?**

Thomas, P. T. *Environmental Health Perspectives* 103 (9 [supplement]): 55-61. (1995); ISSN: 0091-6765.

Notes: Special issue: Human health and environmental pollution in the great lakes; Document number: NIH 95-218

Descriptors: pesticides/ immunotoxicity/ man/ North America, Great Lakes/ reviews/ organophosphates/ organochlorines/ organochlorine compounds/ immunity/ toxicity/ public health/ literature reviews/ risks/ literature review/ organophosphorus compounds/ immunotoxicity/ Reviews/ Toxicology and health/ Chemicals (corrosion)/ Public health/ medicines/ dangerous organisms/ Effects of pollution

Abstract: Several organophosphate and organochlorine compounds, including pesticides commonly found in the Great Lakes basin, have the potential to induce immunotoxicity. Because of biomagnification and accumulation in the food chain, Great Lakes residents may inadvertently be exposed to these compounds and thus face increased risk of immune dysfunction. In spite of the laboratory animal data and evidence from occupational exposures that suggest immunotoxicity, there is no definitive evidence as yet that environmental exposure to these xenobiotics poses a significant threat to the human immune system that is sufficient to predispose residents of the Great Lakes basin to increased disease. However, uncertainties with regard to exposure levels, predictability of tests, suitability of the animal models, and immune reserve cannot be ruled out when making risk assessment decisions such as this.

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**1122. Pesticide inputs and risks in coastal wetlands.**

Clark, J. R.; Lewis, M. A.; and Pait, A. D.

*Environmental Toxicology and Chemistry* 12 (12): 2225-2233. (Dec. 1993)

NAL Call #: QH545.A1E58;  
ISSN: 0730-7268 [ETOC DK].

Notes: Annual Review Issue: Wetland Ecotoxicology and Chemistry. Includes references.

Descriptors: pesticides/ wetlands/ coastal areas/ toxicology/ environmental impact/ exposure/ sublethal effects/ literature reviews/ ecotoxicology  
This citation is from AGRICOLA.

**1123. Pesticide levels in groundwater: Value and limitations of monitoring.**

Funari, Enzo; Donati, Loredana; Sandroni, Donatello; and Vighi, Marco In: Pesticide risk in groundwater/ Vighi, M. and Funari, E. Boca Raton, FL: CRC Press, 1995; pp. 3-44.

ISBN: 0873714393

Descriptors: Conservation / Ecology (Environmental Sciences)/ Pest Assessment Control and Management/ Pollution Assessment Control and Management/ Toxicology/ Hominidae (Hominidae)/ animals/ chordates/ humans/ mammals/ primates/ vertebrates/ environmental toxicology/ herbicides/ human impact/ pollutants

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**1124. Pesticide Loss to Water: A Review of Possible Agricultural Management Opportunities to Minimise Pesticide Movement.**

Harris, G. L.

In: Pesticide Movement to Water/ Walker, A.; Allen, R.; Bailey, S. W.; Blair, A. M.; Brown, C. D.; Gunther, P.; Leake, C. R.; and Nicholls, P. H.; Series: BCPC Monographs 62. Alton, Hampshire, UK: British Crop Protection Council, 1995; pp. 371-380.

Notes: Conference: British Crop Protection Council Symposium, Coventry (UK), 3-5 Apr 1995;

ISBN: 0-948404-85-X;  
ISSN: 0306-3941

Descriptors: pesticides/ water pollution/ agriculture/ environmental protection/ water quality/ groundwater pollution/ catchment areas/ physicochemical properties/ path of pollutants/ surface water/ catchments/

pollution dispersion/ agricultural runoff/ groundwater contamination/ Water quality control/ Freshwater pollution

**Abstract:** The movement of pesticides to surface and groundwater has been an area of increasing concern as EC Directives on water quality have been introduced. Losses of pesticides to groundwater form part of a long-term cycle as the water can take decades to reach depths where water abstraction takes place. As a result, concentrations tend to be lower for most chemicals than those found in water leaving the top metre of the soil, and measures adopted now to reduce pesticide levels in groundwater will take many years to show effect. In contrast, pesticide losses to surface waters are more immediate and concentrations can be transient at the small catchment scale. Various agricultural measures are being evaluated in the U.K., and elsewhere, to minimise loss of pesticides to surface waters. These measures, if effective, will have a counterpart role in the effort to reduce pesticide losses to depth. This paper reviews the mechanisms of pesticide transport and some of the opportunities being assessed in the U.K. to reduce the movement of pesticides.

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**1125. Pesticide metabolism in plants and microorganisms.**

Eerd, L. L. van; Hoagland, R. E.; Zablutowicz, R. M.; and Hall, J. C. *Weed Science* 51 (4): 472-495. (2003)

NAL Call #: 79.8-W41; ISSN: 0043-1745

This citation is provided courtesy of CAB International/CABI Publishing.

**1126. Pesticide soil sorption parameters: Theory, measurement, uses, limitations and reliability.**

Don, Wauchope R; Yeh, Simon; Linders, Jan B H J; Kloskowski, Regina; Tanaka, Keiji; Rubin, Baruch; Katayama, Arata; Koedel, Werner; Gerstl, Zev; Lane, Michael; and Unsworth, John B

*Pest Management Science* 58 (5): 419-445. (2002)

NAL Call #: SB951-.P47; ISSN: 1526-498X

**Descriptors:** pesticide: leaching, soil sorption parameters/ hydrologic system/ soil properties/ soil variability

**Abstract:** The soil sorption coefficient Kd and the soil organic carbon sorption coefficient KOC of pesticides are basic parameters used by environmental scientists and regulatory agencies worldwide in describing the environmental fate and behavior of pesticides. They are a measure of the strength of sorption of pesticides to soils and other geosorbent surfaces at the water/solid interface, and are thus directly related to both environmental mobility and persistence. KOC is regarded as a 'universal' parameter related to the hydrophobicity of the pesticide molecule, which applies to a given pesticide in all soils. This assumption is known to be inexact, but it is used in this way in modeling and estimating risk for pesticide leaching and runoff. In this report we examine the theory, uses, measurement or estimation, limitations and reliability of these parameters and provide some 'rules of thumb' for the use of these parameters in describing the behavior and fate of pesticides in the environment, especially in analysis by modeling.

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**1127. Pesticide studies: Replicability of micro/mesocosms.**

Sanderson, Hans

*Environmental Science and Pollution Research International* 9 (6): 429-435. (2002); ISSN: 0944-1344

**Descriptors:** pesticide/ mesocosm replicability/ microcosm replicability/ pesticide registration/ Type II error

**Abstract:** The objective of this state-of-the-art review was to quantify the replicability of pesticide studies using micro/mesocosms. Low interpretability of micro/mesocosm studies, and inconclusive and highly variable data, resulted in a discontinuation of the use of these studies for the registration of pesticides. Coefficients of variation, CV%, were calculated on the basis of data tables as a measure of statistical 'effectiveness' taken from the literature. The average CV in the investigated studies was 45%; larger out-door mesocosms averaged 51%, and smaller indoor micro/mesocosms averaged 32%. CVs on variables involving animals were higher than CVs on plant end-points, which in turn were higher than abiotic variables for all experiments. However, to enhance the interpretability and implementation

of micro/mesocosm studies for pesticide registration, a number of context-dependent steps could be incorporated; 1) determine the appropriate experimental design and number of replicates by using power analysis, 2) Utilise advanced statistical analysis, such as probabilistic effect distribution and principal response curves, 4) report, preferably in quantitative terms using power analysis, the risk of Type II error. The author's primary conclusion is that the level of CVs is context dependent and, therefore, it is not possible to suggest a generally acceptable level of CVs for all experiments. This has been suggested both directly and indirectly in the literature. Moreover, the number of insignificant ( $p > 0.05$ ) results is high, 88% of all test biotic variables had no statistical significance. The average number of replicates were 3-4, which theoretically should yield significant effects at least at the highest test-concentration, then resulting in 75-66% insignificant results.

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**1128. Pesticide Toxicity Endpoints in Aquatic Ecosystems.**

Simon, D.; Helliwell, S.; and Robards, K.

*Journal of Aquatic Ecosystem Stress and Recovery* 6 (2): 159-177. (1998) NAL Call #: QH541.5.W3 J68; ISSN: 1386-1980.

**Notes:** DOI: 10.1023/A:1009920227241

**Descriptors:** Pesticides/ Pollution effects/ Nutrients (mineral)/ Plankton/ Toxicity tests/ Bioassays/ Toxicity/ Ecosystems/ Reviews/ Nutrients/ Numerical Analysis/ Fuzzy Logic/ Model Studies/ Aquatic environment/ Toxicity testing/ multispecies testing/ Methods and instruments/ Instruments/ Methods/ Effects of pollution/ Toxicology and health

**Abstract:** To adequately protect aquatic ecosystems from impact by anthropogenic perturbations it is necessary to distinguish what is safe from what is not. This review examines approaches to this problem in relation to primary and secondary effects of pesticides. Understanding nutrient - plankton and plankton - plankton interrelationships on both spatial and temporal scales is important if secondary or indirect effects are to be assessed. Before defining or measuring a toxicity

endpoint, consideration must be given to whether to use single species or multispecies tests. Each has its strengths and weaknesses and is reviewed. In single species testing, toxicity endpoints can be more clearly defined but extrapolation of effects to an ecosystem is more difficult than with multispecies testing and can often lead to incorrect conclusions. Interpretation of multispecies testing results are challenging and numerical analysis techniques including methods whose objectives are inference, classification and ordination are required. Conceptual and fuzzy logic modelling techniques promise a solution to the interpretation of multispecies tests.

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**1129. Pesticide transport to subsurface tile drains in humid regions of North America.**

Kladivko, Eileen J; Brown, Larry C; and Baker, James L

*Critical Reviews in Environmental Science and Technology* 31 (1):

1-62. (2001)

NAL Call #: QH545.A1C7;

ISSN: 1064-3389

*Descriptors:* pesticides: pesticide, pollutant, toxin, transport/ crop production/ environmental protection/ humidity/ rainfall/ soil surface runoff / water quality/ weather patterns

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**1130. Pesticide use in the U.S. and policy implications: A focus on herbicides.**

Short, Polly and Colborn, Theo

*Toxicology and Industrial Health* 15

(1-2): 240-275. (1999);

ISSN: 0748-2337

*Descriptors:* herbicide: endocrine disruptor, enzyme inhibitor, toxicity, usage, resistance/ pesticide: toxicity, usage/ plant (Plantae): crop, weed/ Plants/ agriculture

*Abstract:* This article examines herbicide use in the United States, providing estimates of poundage, land surface covered, distribution, and recent trends based on federal and state figures. Herbicides are by far the most widely used class of pesticide in the US, where 556 million lbs of herbicide active ingredients (AIs) were applied in 1995. Agriculture accounts for the majority of herbicide use, totaling 461 million lbs of AIs in 1995. Over 60% of the poundage of all agricultural herbicides consist of those

that are capable of disrupting the endocrine and/or reproductive systems of animals. In addition, at least 17 types of 'inert ingredients,' which can equal 90% or more of a pesticide product, have been identified as having potential endocrine-disrupting effects. Atrazine is the predominant herbicide used according to poundage, with 68-73 million lbs of AIs applied in 1995. However, 2,4-D is the most widespread herbicide, covering 78 million acres for agricultural uses alone. Both of these herbicides are reported endocrine disruptors. Acetolactate synthase (ALS) inhibitors, namely the sulfonylureas and imidazolinones, are one of the fastest growing classes of herbicides. Many of these herbicides are 100 times more toxic to select plant species than their predecessors, so they can be applied at rates approximately 100 times lower. Consequently, they can affect plant species at concentration levels so low that no standard chemical protocol can detect them. Due in part to these more potent herbicides, the poundage of herbicides used in the US has decreased since the mid-1980s; however, the available data suggest that the number of treated acres has not significantly declined. A thorough assessment of potential exposure to herbicides by wildlife and humans is limited due to the inaccessibility of production and usage data.

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**1131. Pesticides and herbicides.**

Ro, K. S. and Chung, K. H.

*Water Environment Research* 66 (4):

432-433. (June 1994)

NAL Call #: TD419.R47;

ISSN: 1061-4303 [WAERED]

*Descriptors:* pesticides/ herbicides/ transport processes/ environmental impact/ pollution/ movement in soil/ biodegradation/ dynamics/ residues/ literature reviews

This citation is from AGRICOLA.

**1132. Pesticides and herbicides.**

Ro, K. S. and Libra, J. A.

*Water Environment Research* 67 (4):

548-552. (June 1995)

NAL Call #: TD419.R47;

ISSN: 1061-4303 [WAERED]

*Descriptors:* pesticides/ herbicides/ pesticide residues/ herbicide residues/ soil pollution/ water pollution/ toxicity/ literature reviews

This citation is from AGRICOLA.

**1133. Pesticides and Herbicides.**

Libra, J. A.; Ro, Kyoung S.; Chung, K. Y. U.; and Chung, Y. U. N.

*Water Environment Research* 68 (4):

564-568. (1996)

NAL Call #: TD419.R47;

ISSN: 1061-4303

*Descriptors:* literature review/ pesticides/ herbicides/ pollutant identification/ spatial distribution/ water pollution effects/ water pollution/ fate of pollutants/ Sources and fate of pollution/ Secondary publication and distribution

*Abstract:* The distribution of endosulfan residues in the drainage waterways of the Lower Fraser Valley of British Columbia was studied by Wan et al. (1995). Both the water and sediment of the farm ditches were sampled. The potential impact of these residues on non-target aquatic organisms is discussed. Similarly, Mogensen and Spliid (1995) investigated pesticide occurrence in Danish watercourses. Samples from soil water, drainage water, stream water and pond water from a sandy and a clayey catchment survey area were analyzed. Pesticide concentration in the clayey, more intensively cultivated area, was found to be higher compared to the sandy, less intensively cultivated area.

Donald and Syrgiannis (1995) determined the concentrations of pesticides in Saskatchewan prairie lakes following severe drought and compared the results with values set for the protection of aquatic life. When the lakes were grouped by salinity, detection frequencies of pesticides were significantly higher in brackish lakes, which tended to be semi-permanent, than in saline lakes, which tended to be permanent. However, with one exception, the concentrations in the lakes were below those levels that might be deleterious to aquatic life.

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**1134. Pesticides and herbicides.**

Ro, K. S.; Chung, K. H.; Chung, Y. C.; and Tsai, F. J.

*Water Environment Research* 69 (4):

664-667. (1997)

NAL Call #: TD419.R47;

ISSN: 1047-7624

This citation is provided courtesy of CAB International/CABI Publishing.

**1135. Pesticides and Herbicides.**

Chung, Kyuhyuck; Starrett, S.; Chung, Yunchul; and Ro, Kyoung S.

*Water Environment Research* 70 (4): 693-698. (1998)

NAL Call #: TD419.R47;

ISSN: 1061-4303

*Descriptors:* Pesticides/ Herbicides/ Leaching/ Groundwater Pollution/ Monitoring/ Contamination/ Water Pollution Sources/ Literature Review/ Wells/ Atrazine/ Insecticides/ Freshwater pollution/ Aquifers/ Water wells/ alachlor/ fenitrothion/ Anguilla anguilla/ Nebraska/ Recharge Lake/ Sources and fate of pollution/ Freshwater pollution/ United States  
*Abstract:* Wood and Anthony (1997) investigated herbicide leaching using a series of natural springs draining small surficial aquifers. The herbicides were detected at the level of nanograms per liter. Monitoring herbicides in Recharge Lake in York, Nebraska, was performed. Herbicide concentrations rose rapidly in the spring and diminished gradually over a few months. Atrazine half-life was determined to be approximately 223 days. Sancho et al. (1997) reported that the insecticide fenitrothion showed a strong tendency to bioconcentrate into the brain of the European eel (*Anguilla anguilla*). Herbicide contamination of shallow groundwater beneath claypan soils was studied. Spatial variability was determined to be larger than the effects of atrazine and alachlor application rates. Atrazine and alachlor were detected in 7.2 and 0.4%, respectively, of the samples taken from approximately 75 monitoring wells.

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**1136. Pesticides and herbicides.**

Starrett, S.; Bhandari, A.; and Xia, K.

*Water Environment Research* 71 (5): 853-860. (Aug. 1999)

NAL Call #: TD419.R47;

ISSN: 1061-4303 [WAERED]

*Descriptors:* pesticides/ herbicides/ pesticide residues/ herbicide residues/ groundwater pollution/ water pollution/ runoff/ agricultural land/ leaching/ literature reviews

This citation is from AGRICOLA.

**1137. Pesticides and the future: Minimizing chronic exposure of humans and the environment.**

Kuhr, Ronald J. and Motoyama, Naoki.

Amsterdam; Washington, D.C.: IOS Press; viii, 332 p.: ill. (1998)

*Notes:* Papers from a joint United States-Japan seminar held on May 26-30, 1997 in Kisarazu, Japan. Also issued as v. 2, nos. 1-4 of the journal *Reviews in Toxicology*. Includes bibliographical references and index.  
 NAL Call #: RA1270.P4-P47-1998;  
 ISBN: 9051993889

*Descriptors:* Pesticides---Toxicology/ Pesticides---Environmental aspects  
 This citation is from AGRICOLA.

**1138. Pesticides in domestic wells.**

Chittaranjan, R.

St. Joseph, MI: American Society of Agricultural Engineers. (2003)

*Notes:* Available through fee-based ASAE Technical Library;  
 ISBN: 1892769298

*Descriptors:* Water---Pesticide content---United States/ Pesticides---Environmental aspects---United States/ Groundwater---Pollution---United States

**1139. Pesticides in ground water: Current understanding of distribution and major influences.**

Geological Survey (U.S.).

Sacramento, CA: USGS; Series: Fact sheet (Geological Survey (U.S.)) FS-95-244. (1996)

*Notes:* Title from caption. Includes bibliographical references.

NAL Call #: TD427.P35P474-1996  
<http://ca.water.usgs.gov/pnsp/gw/>

*Descriptors:* Pesticides---Environmental aspects---United States/ Groundwater---Pollution---United States

This citation is from AGRICOLA.

**1140. Pesticides in ground water: Distribution, trends, and governing factors.**

Barbash, J. E. and Resek, E. A. Chelsea, Michigan: Ann Arbor Press; 588 p. (1996)

NAL Call #: TD427.P35B37--1996;  
 ISBN: 1575040050

*Descriptors:* Pesticides---Environmental aspects---United States/ Groundwater---Pollution---United States

This citation is from AGRICOLA.

**1141. Pesticides in ground water of the United States, 1992-1996.**

Kolpin, D. W.; Barbash, J. E.; and Gilliom, R. J.

*Ground Water* 38 (6): 858-863. (2000)

NAL Call #: TD403.G7;

ISSN: 0017-467X [GRWAAP]

*Descriptors:* groundwater pollution/ pesticide residues/ surveys/ agricultural land/ urban areas/ rural areas/ high water tables/ United States/ shallow groundwater  
 This citation is from AGRICOLA.

**1142. Pesticides in stream sediment and aquatic biota: Current understanding of distribution and major influences.**

U.S. Dept. of the Interior, U. S. Geological Survey.

U.S. Geological Survey, 2000

NAL Call #: TD427.P35 P476 2000

<http://ca.water.usgs.gov/shelbayreports/sediment/pesticides%5Fin%5Fstream%5Fsediment.s.pdf>

*Descriptors:* Pesticides---Environmental aspects---United States/ Organochlorine compounds---Environmental aspects---United States/ Water---Pollution---United States/ Contaminated sediments---United States  
 This citation is from AGRICOLA.

**1143. Pesticides in stream sediment and aquatic biota: Distribution, trends, and governing factors.**

Nowell, L. H.; Capel, P. D.; and Dileanis, P. D.

Boca Raton, Florida: Lewis Publishers; 1001 p. (1999)

*Notes:* Includes bibliographical references (p. 867-946) and index.

NAL Call #: TD427.P35-N68-1999;  
 ISBN: 1566704693

*Descriptors:* Pesticides---Environmental aspects---United States/ Organochlorine compounds---Environmental aspects---United States/ Water---Pollution---United States/ Contaminated sediments---United States/ Aquatic organisms  
 Effect of water pollution on---United States  
 This citation is from AGRICOLA.

**1144. Pesticides in streams of the United States: Initial results from the National Water-Quality Assessment Program.**

Larson, S. J.; Gilliom, R. J.; Capel, P. D.; and Geological Survey (U.S.). Sacramento, Calif.: U.S. Dept. of the Interior, U.S. Geological Survey, 1999. 92 p.

*Notes:* "National Water-Quality Assessment Program"--Cover.

*NAL Call #:* GB701.W375-no.98-4222

<http://ca.water.usgs.gov/pnsp/rep/wrir/984222/>

*Descriptors:* Water---Pollution---United States/ Pesticides---Environmental aspects---United States

This citation is from AGRICOLA.

**1145. Pesticides in surface and ground water.**

Wauchope, R. D.

Ames, Iowa: Council for Agricultural Science and Technology; Issue paper 2, 1994.

*Notes:* Caption title.

[http://www.cast-science.org/cast-science.lh/pwq\\_ip.htm](http://www.cast-science.org/cast-science.lh/pwq_ip.htm)

*Descriptors:* pesticides/ groundwater/ surface water

This citation is from AGRICOLA.

**1146. Pesticides in surface water of the Mid-Atlantic region.**

Ferrari, Matthew J.; Geological Survey (U.S.); United States. Environmental Protection Agency; and Mid Atlantic Integrated Assessment Region.

Baltimore, Md.: U.S. Geological Survey; 12 p.: col. ill., col. maps; Series: Water-resources investigations report 97-4280. (1997)

*Notes:* Caption title. "Mid-Atlantic Integrated Assessment (MAIA) Region" "WRIR 97-4280"--P. [12]. Includes bibliographical references (p. [12]). DW14937692-01-0.

*NAL Call #:* GB701.W375--no.97-4280

*Descriptors:* Pesticides---Environmental aspects---Middle Atlantic States/ Water---Pollution---Middle Atlantic States/ Pesticides---Environmental aspects---South Atlantic States/ Pesticides---Environmental aspects---West Virginia

This citation is from AGRICOLA.

**1147. Pesticides in Surface Waters: Distribution, Trends, and Governing Factors.**

Larson, S. J.; Capel, P. D.; and Majewski, M. S.

Chelsea, MI: Ann Arbor Press, Inc.; Series: Pesticides in the Hydrologic System 3; 373 p. (1997)

*NAL Call #:* TD427.P35L34--1997; *ISBN:* 1-57504-006-9

*Descriptors:* surface water/ contamination/ pesticides/ distribution / statistical analysis/ water pollution/ literature review/ agricultural runoff/ pollution dispersion/ pollution surveys/ public health/ United States/ Sources and fate of pollution/ Freshwater pollution

*Abstract:* The use of pesticides in the United States has increased dramatically during the last several decades. Hundreds of different chemicals have been developed for use in agricultural and non-agricultural settings. Concerns about the potential adverse effects of pesticides on the environmental and human health have spurred an enormous amount of research into their environmental behavior and fate. Much of this concern has focused on the potential for contamination of the hydrologic system, including surface waters. Pesticides in Surface Waters is a summary of research on the occurrence, distribution, and significance of pesticides in surface waters of the United States. The primary goal of this book is to assess the current understanding of the occurrence and behavior of pesticides in surface waters. To accomplish this, the authors have compiled and evaluated most of the published studies in which pesticide concentrations in surface waters of the United States have been measured. The primary focus of the literature search was on studies published in the peer-reviewed scientific literature and in reports of government agencies. The literature search covered studies published up to 1993, but many articles and reports published after 1993 were included as they became available. A number of studies--including laboratory studies and studies using microcosms and artificial streams and ponds--also were included in which factors affecting the behavior and fate of pesticides in the environment were investigated. Pertinent studies listed in a series of tables provide concise summaries of study sites, targeted

pesticides, and results. Information obtained from these studies is used to develop an overview of the existing knowledge of pesticide contamination of surface waters. Pesticides in Surface Waters is intended to serve as a resource, text, and reference to a wide spectrum of scientists, students, and water managers, ranging from those primarily interested in the extensive compilations of references, to those looking for interpretive analyses and conclusions. For those unfamiliar with the studies of pesticides in surface waters, it can serve as a comprehensive introduction.

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**1148. Pesticides in the atmosphere: Current understanding of distribution and major influences.**

Geological Survey (U.S.).

Sacramento, CA: USGS; Series: Fact sheet (Geological Survey (U.S.)) FS-95-152. (1995)

*Notes:* USGS--pesticide in the atmosphere; Title from caption.

Includes bibliographical references. *NAL Call #:* TD887.P45P47-1995

<http://ca.water.usgs.gov/pnsp/atmos/>

*Descriptors:* Pesticides---Environmental aspects---United States/ Air---Pollution---United States/ Atmospheric deposition---United States/ Water---Pollution---United States

This citation is from AGRICOLA.

**1149. Pesticides in the atmosphere: Distribution, trends, and governing factors.**

Majewski, M. S.; Capel, P. D.; and National Water Quality Assessment Program (U.S.).

Sacramento, Calif. U.S. Geological Survey. (1995)

*Notes:* "National Water-Quality Assessment Program"

*NAL Call #:* TD196.P38M35--1995

*Descriptors:* Pesticides---Environmental aspects---United States/ Air---Pollution---United States/ Atmospheric diffusion---United States  
This citation is from AGRICOLA.

**1150. Pesticides in the Hydrologic System: What Do We Know and What's Next?**

Gilliom, R. J.

*Hydrological Processes* 15 (16): 3197-3201. (2001)

*NAL Call #:* GB651.H93; *ISSN:* 0885-6087.

*Notes:* Special Issue: Canadian Geophysical Union - Hydrology Section; DOI: 10.1002/hyp.501  
*Descriptors:* Water Pollution/ Pesticides/ Path of Pollutants/ Water Pollution Effects/ Hydrologic Systems/ Literature Review/ Research Priorities/ Pesticide environmental pollution/ Pesticides in surface waters/ Pollution effects / Water quality/ Drinking water/ Hydrology/ Aquatic organisms/ Food chains/ Hydrosphere/ Literature reviews/ Sources and fate of pollution/ Surface Water Hydrology/ Freshwater pollution

*Abstract:* Even though the occurrence and behaviour of pesticides in the environment have been studied for decades, water-quality managers and the public still demand more complete and consistent information, and there are many unanswered questions for environmental scientists. In many respects, the greatest potential for unintended adverse effects of pesticides is through contamination of the hydrologic system, which supports aquatic life and related food chains and is used for recreation, drinking water, and many other purposes. The movement of water is one of the primary mechanisms by which pesticides are transported from targeted application areas to other parts of the environment; thus, there is potential for movement into and through all components of the hydrologic system. Extensive reviews of existing information on pesticides in the hydrologic system, including the atmosphere, ground water, surface water, and fluvial sediments and aquatic biota, uncovered volumes of useful information, but also noted critical information gaps. For example: (a) relatively few pesticides have been thoroughly studied, particularly transformation products; (b) most data have been collected for small-scale site and field studies in agricultural areas; (c) urban areas have received little attention for monitoring or research; (d) the geographic and temporal distributions of data collection have been highly uneven; and (e) comparing and synthesizing results from most studies is difficult because of inconsistent approaches to data collection and chemical analysis.

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**1151. Pesticides: Managing risks and optimizing benefits.**

Ragsdale, Nancy N. and Seiber, James N.  
 Washington, DC: American Chemical Society; Series: ACS symposium series 734; ix, 286 p.: ill., map. (1999)  
*Notes:* Distributed by Oxford University Press  
*NAL Call #:* QD1-.A45-no.-734;  
*ISBN:* 084123616X  
*Descriptors:* Pesticides---United States---Congresses/ Pesticides---Environmental aspects---United States---Congresses  
 This citation is from AGRICOLA.

**1152. Pharmaceutical antibiotic compounds in soils: A review.**

Thiele-Bruhn, S.  
*Journal of Plant Nutrition and Soil Science / Zeitschrift für Pflanzenernahrung und Bodenkunde* 166 (2): 145-167. (Feb. 2003)  
*NAL Call #:* 384 Z343A;  
*ISSN:* 1436-8730.  
*Notes:* Number of References: 200  
*Descriptors:* Agriculture/ Agronomy/ performance liquid chromatography/ tandem mass spectrometry/ solid phase extraction/ fungus gloeophyllum striatum/ waste water bacteria/ antibacterial agents/ marine sediments/ fluoroquinolone enrofloxacin/ tetracycline antibiotics/ antimicrobial resistance  
*Abstract:* Antibiotics are highly effective, bioactive substances. As a result of their consumption, excretion, and persistence, they are disseminated mostly via excrements and enter the soils and other environmental compartments. Resulting residual concentrations in soils range from a few µg up to g kg<sup>-1</sup> and correspond to those found for pesticides. Numerous antibiotic molecules comprise of a non-polar core combined with polar functional moieties. Many antibiotics are amphiphilic or amphoteric and ionize. However, physicochemical properties vary widely among compounds from the various structural classes. Existing analytical methods for environmental samples often combine an extraction with acidic buffered solvents and the use of LC-MS for determination. In soils, adsorption of antibiotics to the organic and mineral exchange sites is mostly due to charge transfer and ion interactions and not to hydrophobic partitioning. Sorption is strongly influenced by the pH of the medium and governs the mobility and

transport of the antibiotics. In particular for the strongly adsorbed antibiotics, fast leaching through soils by macropore or preferential transport facilitated by dissolved soil colloids seems to be the major transport process. Antibiotics of numerous classes are photodegraded. However, on soil surfaces this process if of minor influence. Compared to this, biotransformation yields a more effective degradation and inactivation of antibiotics. However, some metabolites still comprise of an antibiotic potency. Degradation of antibiotics is hampered by fixation to the soil matrix; persisting antibiotics were already determined in soils. Effects on soil organisms are very diverse, although all antibiotics are highly bioactive. The absence of effects might in parts be due to a lack of suitable test methods. However, dose and persistence time related effects especially on soil microorganisms are often observed that might cause shifts of the microbial community. Significant effects on soil fauna were only determined for anthelmintics. Due to the antibiotic effect, resistance in soil microorganisms can be provoked by antibiotics. Additionally, the administration of antibiotics mostly causes the formation of resistant microorganisms within the treated body. Hence, resistant microorganisms reach directly the soils with contaminated excrements. When pathogens are resistant or acquire resistance from commensal microorganisms via gene transfer, humans and animals are endangered to suffer from infections that cannot be treated with pharmacotherapy. The uptake into plants even of mobile antibiotics is small. However, effects on plant growth were determined for some species and antibiotics.

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**1153. Phosphate rocks and partially-acidulated phosphate rocks as controlled release P fertilizers.**

Hagin, J and Harrison, R  
*Fertilizer Research* 35 (1-2): 25-3. (1993)  
*NAL Call #:* S631.F422;  
*ISSN:* 0167-1731  
*Descriptors:* phosphate/ phosphorus/ plant (Plantae Unspecified)/ Angiospermae (Angiospermae)/ angiosperms/ plants/ spermatophytes/

vascular plants/ agriculture/ minerals/ phosphorus/ soil

**Abstract:** Properties of phosphate rocks (PRs) and partially acidulated phosphate rocks (PAPRs) which affect the pattern of P dissolution and thus the potential for manipulating the rate of P release are reviewed. The effects of soil and plant properties are also considered.

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**1154. Phosphogypsum in agriculture: A review.**

Alcorido, I. S. and Rechcigl, J. E.

*Advances in Agronomy* 49: 55-118. (1993)

NAL Call #: 30-Ad9;

ISSN: 0065-2113 [ADAGA7]

**Descriptors:** phosphogypsum/ physicochemical properties/ production/ utilization/ reclamation/ soil amendments/ sulfur/ calcium/ agricultural wastes/ environmental impact/ literature reviews / pollution

This citation is from AGRICOLA.

**1155. The phosphorus index: Background and status.**

Daneil, T. C.; Jokela, W. E.; Moore, P. A. Jr.; Sharpley, A. N.; and Gburek, W. J.

In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.

NAL Call #: TD930.2-.W45-2002

**Descriptors:** Agricultural wastes--- Environmental aspects--- United States

**1156. Phosphorus indexing for cropland: Overview and basic concepts of the Iowa phosphorus index.**

Mallarino, A. P.; Stewart, B. M.; Baker, J. L.; Downing, J. D.; and Sawyer, J. E.

*Journal of Soil and Water Conservation* 57 (6): 440-447. (Nov. 2002-Dec. 2002)

NAL Call #: 56.8-J822;

ISSN: 0022-4561 [JSWCA3].

**Notes:** Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001,

Myrtle Beach, South Carolina and Charlotte, North Carolina. Includes references.

**Descriptors:** phosphorus/ losses from soil/ indexes/ soil fertility/ agricultural soils/ agricultural land/ risk assessment/ phosphorus fertilizers/ transport processes/ sheet erosion/ rill erosion/ water erosion/ water pollution/ drainage/ animal manures/ runoff/ broadcasting/ incorporation/ Iowa

This citation is from AGRICOLA.

**1157. Phosphorus loss from land to water: Integrating agricultural and environmental management.**

Sharpley, A. N.; McDowell, R. W.; and Kleinman, P. J. A.

*Plant and Soil* 237 (2): 287-307. (Dec. 2001)

NAL Call #: 450-P696;

ISSN: 0032-079X [PLSOA2].

**Notes:** Special issue: International symposium on phosphorus cycling in the soil-plant continuum / edited by Z. Rengel. Paper presented at a symposium held September 17-23, 2000, Beijing, China.

Includes references.

**Descriptors:** phosphorus/ eutrophication/ surface water/ water pollution/ soil fertility/ fertilizers/ manures/ runoff/ water quality/ phosphorus fertilizers/ feeds/ erosion/ literature reviews

This citation is from AGRICOLA.

**1158. Phosphorus loss in agricultural drainage: Historical perspective and current research.**

Sims, J T; Simard, R R; and Joern, B C

*Journal of Environmental Quality* 27 (2): 277-293. (1998)

NAL Call #: QH540.J6;

ISSN: 0047-2425

**Descriptors:** phosphorus: export, leaching, loss/ agricultural drainage/ conservation practices/ environmental impact/ eutrophication/ historical perspective/ nonpoint source pollution/ overfertilization/ resource management/ soil organic matter/ source reduction/ subsurface runoff

**Abstract:** The importance of P originating from agricultural sources to the nonpoint source pollution of surface waters has been an environmental issue for decades because of the well-known role of P in eutrophication. Most previous research and nonpoint source control efforts have emphasized P losses by surface erosion and runoff because of

the relative immobility of P in soils. Consequently, P leaching and losses of P via subsurface runoff have rarely been considered important pathways for the movement of agricultural P to surface waters. However, there are situations where environmentally significant export of P in agricultural drainage has occurred (e.g., deep sandy soils, high organic matter soils, or soils with high soil P concentrations from long-term overfertilization and/or excessive use of organic wastes). In this paper we review research on P leaching and export in subsurface runoff and present overviews of ongoing research in the Atlantic Coastal Plain of the USA (Delaware), the Midwestern USA (Indiana), and eastern Canada (Quebec). Our objectives are to illustrate the importance of agricultural drainage to nonpoint source pollution of surface waters and to emphasize the need for soil and water conservation practices that can minimize P losses in subsurface runoff.

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**1159. Phosphorus Removal From Everglades Agricultural Area Runoff by Submerged Aquatic Vegetation/Limerock Treatment Technology: An Overview of Research.**

Gu, B.; Debusk, T. A.; Dierberg, F. E.; Chimney, M. J.; Pietro, K. C.; and Aziz, T.

*Water Science and Technology* 44 (11-12): 101-108. (2001)

NAL Call #: TD420.A1P7;

ISSN: 0273-1223.

**Notes:** Conference: 7. International Conference on Wetland Systems for Water Pollution Control 2000, Lake Buena Vista, FL [USA], 11-16 Nov 2000; Source: Wetland Systems for Water Pollution Control 2000; ISBN: 1843394073

**Descriptors:** United States, Florida, Everglades/ Water Pollution Control/ Nonpoint Pollution Sources/ Agricultural Runoff/ Advanced Wastewater Treatment/ Wetlands/ Phosphorus Removal/ Submerged Plants/ Accumulation/ Feasibility Studies/ Experimental Data/ Performance Evaluation/ Pollution (Nonpoint sources)/ Runoff (Agricultural)/ Advanced treatment/ Aquatic macrophytes/ Aquatic plants/ Vegetation/ Lime/ Macrophytes/ artificial wetlands/ United States, Florida, Everglades/ Water quality control/ Water Treatment/ Freshwater

pollution/ Water Pollution: Monitoring, Control & Remediation

**Abstract:** The 1994 Everglades Forever Act mandates the South Florida Water Management District and the Florida Department of Environmental Protection to evaluate a series of advanced treatment technologies to reduce total phosphorus (TP) in Everglades Agricultural Area runoff to a threshold target level. A submerged aquatic vegetation/limerock (SAV/LR) treatment system is one of the technologies selected for evaluation. The research program consists of two phases. Phase I examined the efficiency of SAV/LR treatment system for TP removal at the mesocosm scale. Preliminary results demonstrate that this technology is capable of reducing effluent TP to as low as 10 µg/L under constant flows. The SAV component removes the majority of the influent soluble reactive P, while the limerock component removes a portion of the particulate P. Phase II is a multi-scale project (i.e., microcosms, mesocosms, test cells and full-size wetlands). Experiments and field investigations using various environmental scenarios are designed to (1) identify key P removal processes; (2) provide management and operational criteria for basin-scale implementation; and (3) provide scientific data for a standardized comparison of performance among advanced treatment technologies.  
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**1160. Phosphorus research strategies to meet agricultural and environmental challenges of the 21st century.**

Sharpley, A. and Tunney, H.  
*Journal of Environmental Quality* 29 (1): 176-181. (2000)  
NAL Call #: QH540.J6;  
ISSN: 0047-2425 [JEVQAA].  
**Notes:** Paper presented at the Organization for Economic Cooperation and Development (OECD) sponsored conference on "Practical and Innovative Measures for the Control of Agricultural Phosphorus Losses to Water," held June 16-19, 1998, Antrim, Northern Ireland.  
**Descriptors:** phosphorus/ losses from soil/ pollution control/ research  
**Abstract:** The accumulation, management, and transfer of P in

intensive farming systems has increased P export from agricultural watersheds and accelerated eutrophication of surface waters. Even though much research on P has been done in the last 20 years, there are still too few answers to the many questions now being asked regarding agricultural production and environmental quality. To address these concerns, four areas of research are suggested: (i) Soil P testing for environmental risk assessment--What losses are acceptable and can these losses be determined by plot-scale or watershed-scale studies? Threshold P levels in soil and water should be established in combination with an assessment of site vulnerability to P loss. (ii) Pathways of P transport--An analysis of the relative importance of different flow pathways is needed at a watershed scale. (iii) Best Management Practice (BMP) development and implementation--Overall, BMPs must attempt to bring P inputs and outputs into closer balance and should be targeted first to critical source areas within a watershed. Alternative management recommendations, uses, and market demand for manures must be developed. (iv) Strategic initiatives to manage P--To initiate lasting changes, research should focus on consumer-supported programs that encourage farmer performance and steward-ship to achieve agreed-upon environmental goals.  
This citation is from AGRICOLA.

**1161. Phosphorus restrictions for land application of biosolids: Current status and future trends.**

Shober, A. L. and Sims, J. T.  
*Journal of Environmental Quality* 32 (6): 1955-1964. (2003)  
NAL Call #: QH540.J6;  
ISSN: 0047-2425  
**Descriptors:** Environment/ Ecology/ sewage sludge/ amended soils/ United States/ water quality/ sandy soils/ site index/ runoff/ manure/ losses/ availability  
**Abstract:** The application of biosolids (sewage sludge) to agricultural soils provides P in excess of crop needs when applied to meet the N needs of most agronomic crops. These overapplications can result in the buildup of P in soils to values well above those needed for optimum crop yields and also may increase risk of P

losses to surface and ground waters. Because of concerns regarding the influence of P on water quality in the USA, many state and federal agencies now recommend or require P-based nutrient management plans for animal manures. Similar actions are now under consideration for the land application of biosolids. We reviewed the literature on this subject and conducted a national survey to determine if states had restrictions on P levels in biosolids-amended soils. The literature review indicates that while the current N-based approach to biosolids management does result in increases of soil P, some properties of biosolids may mitigate the environmental risk to water quality associated with land application of P in biosolids. Results of the survey showed that 24 states have regulations or guidelines that can be imposed to restrict land application of biosolids based on P. Many of these states use numerical thresholds for P in biosolids-amended soils that are based on soil test phosphorus (STP) values that are much greater than the values considered to be agronomically beneficial. We suggest there is the need for a comprehensive environmental risk assessment of biosolids P. If risk assessment suggests the need for regulation of biosolids application, we suggest regulations be based on the P Site Index (PSI), which is the method being used by most states for animal manure management.  
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**1162. Phosphorus Retention in Streams and Wetlands: A Review.**

Reddy, K. R.; Kadlec, R. H.; Flaig, E.; and Gale, P. M.  
*Critical Reviews in Environmental Science and Technology* 29 (1): 83-146. (1999)  
NAL Call #: QH545.A1C7;  
ISSN: 1064-3389  
**Descriptors:** Phosphorus/ Nutrients/ Retention/ Streams/ Wetlands/ Reviews/ Kinetics/ Biogeochemical cycle/ Rivers/ Nutrient cycles/ Residence time/ Biogeochemistry/ Sources and fate of pollution/ Ecosystems and energetics/ Composition of water/ Behavior and fate characteristics/ Freshwater pollution/ Chemical processes  
**Abstract:** Wetlands and streams buffer the interactions among uplands and adjacent aquatic systems. Phosphorus (P) is often the key

nutrient found to be limiting in both estuarine and freshwater ecosystems. As such, the ability of wetlands and streams to retain P is key to determining downstream water quality. This article reviews the processes and factors regulating P retention in streams and wetlands and evaluates selected methodologies used to estimate P retention in these systems. Phosphorus retention mechanisms reviewed include uptake and release by vegetation, periphyton and microorganisms; sorption and exchange reactions with soils and sediments; chemical precipitation in the water column; and sedimentation and entrainment. These mechanisms exemplify the combined biological, physical, and chemical nature of P retention in wetlands and streams. Methodologies used to estimate P retention include empirical input-output analysis and mass balances, and process kinetics applied at various scales, including micro- and mesocosms to full-scale systems. Although complex numerical models are available to estimate P retention and transport, a simple understanding of P retention at the process level is important, but the overall picture provided by mass balance and kinetic evaluations are often more useful in estimating long-term P retention.  
© Cambridge Scientific Abstracts (CSA)

**1163. Phosphorus utilization and excretion in pig production.**

Poulsen HD  
*Journal of Environmental Quality* 29 (1): 24-27; 20 ref. (2000)  
NAL Call #: QH540.J6  
This citation is provided courtesy of CAB International/CABI Publishing.

**1164. Physical impact assessment of USDA water quality projects.**

Meals, D. W.; Sutton, J. D.; and Griggs, R. H.  
In: Clean water, clean environment: 21st century team agriculture: Working to protect water resources conference proceedings. (Held 5 Mar 1995-8 Mar 1995 at Kansas City, Missouri.) St. Joseph, Mich.: ASAE; pp. 195-198; 1995.  
NAL Call #: TD365.C54-1995;  
ISBN: 0929355601  
*Descriptors:* water pollution/ groundwater pollution/ pollution control/ USDA/ pilot projects/ water quality/ agricultural chemicals/ losses

from soil/ monitoring/ United States/ hydrologic unit area projects/ pollution prevention/ non point source water pollution/ demonstration projects  
This citation is from AGRICOLA.

**1165. The physical properties of compost.**

Agnew, J. M. and Leonard, J. J.  
*Compost Science and Utilization* 11 (3): 238-264. (2003)  
NAL Call #: TD796.5.C58;  
ISSN: 1065-657X  
This citation is provided courtesy of CAB International/CABI Publishing.

**1166. Physiological effects of incomplete root-zone wetting on plant growth and their implications for irrigation management.**

Glenn, D. M.  
*HortScience* 35 (6): 1041-1043. (Oct. 2000)  
NAL Call #: SB1.H6;  
ISSN: 0018-5345 [HJHSAR].  
*Notes:* Special section: Water management and water relations of horticultural crops. Paper presented at a conference held July 24, 1997, Salt Lake City, Utah. Includes references.  
*Descriptors:* plants/ root systems/ water availability/ plant physiology/ growth/ microirrigation/ water use efficiency/ trickle irrigation/ crop yield/ maximum yield/ root hydraulic conductivity/ water uptake/ water potential/ water transfer/ dry matter distribution/ mortality/ nutrient transport/ literature reviews  
This citation is from AGRICOLA.

**1167. Phytoremediation: An ecological solution to organic chemical contamination.**

Susarla, S.; Medina, V. F.; and McCutcheon, S. C.  
*Ecological Engineering* 18 (5): 647-658. (2002);  
ISSN: 0925-8574.  
*Notes:* Special Issue: Ecology engineering applied to river and wetland restoration  
*Descriptors:* Bioremediation/ Reviews/ Metals/ Hydrocarbons/ Pesticides/ Organochlorine compounds/ Plants/ Economics/ Environmental restoration/ Environment management/ Phytoremediation/ Pollutant removal/ Solvents/ Chemical pollution/ Detoxification/ Phytoremediation/ Pollution control/ Land pollution/ General Environmental Engineering  
*Abstract:* Phytoremediation is a promising new technology that uses

plants to degrade, assimilate, metabolize, or detoxify metals, hydrocarbons, pesticides, and chlorinated solvents. In this review, in situ, in vivo and in vitro methods of application are described for remediation of these compounds. Phytoaccumulation, phytoextraction, phytostabilization, phytotransformation, phytovolatilization and rhizodegradation are discussed and the role of enzymes in transforming organic chemicals in plants is presented. The advantages and constraints of phytoremediation are provided. Our conclusions is that phytoremediation prescriptions must be site-specific; however, these applications have the potential for providing the most cost-effective and resource-conservative approach for remediating sites contaminated with a variety of hazardous chemicals.  
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**1168. Phytoremediation: An overview of metallic ion decontamination from soil.**

Singh, O. V.; Labana, S.; Pandey, G.; Budhiraja, R.; and Jain, R. K.  
*Applied Microbiology and Biotechnology* 61 (5/6): 405-412. (2003);  
ISSN: 0175-7598  
This citation is provided courtesy of CAB International/CABI Publishing.

**1169. Phytoremediation in wetland ecosystems: Progress, problems, and potential.**

Williams, J. B.  
*Critical Reviews in Plant Sciences* 21 (6): 607-635. (2002)  
NAL Call #: QK1.C83;  
ISSN: 0735-2689 [CRPSD3].  
*Notes:* Special issue: Phytoremediation II / edited by B.V. Conger. Includes references.  
*Descriptors:* wetlands / bioremediation/ seasonal variation/ plant succession/ site factors/ heavy metals/ litter plant/ waste disposal/ rhizosphere/ indicator species/ temporal variation/ toxicity/ organic compounds/ herbicides/ pesticides/ explosives/ soil pollution/ evapotranspiration/ petroleum/ petroleum hydrocarbons / plant communities/ monitoring/ literature reviews  
This citation is from AGRICOLA.

**1170. Pitfalls of passive mine water treatment.**

Johnson, D Barrie and Hallberg, Kevin B  
*Reviews in Environmental Science and Biotechnology* 1 (4): 335-343. (2002);  
 ISSN: 1569-1705  
*Descriptors:* heavy metals: pollutant/ iron: oxidation/ acid mine drainage/ remediation/ wetland  
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**1171. Planning a project: Selection and acquisition of woody and herbaceous plant species and materials for riparian corridor, shoreline, and wetland restoration and enhancement.**

Hoag, J. Chris.; Plant Materials Center; and Interagency Riparian-Wetland Plant Development Project Aberdeen, ID: Interagency Riparian-Wetland Plant Development Project, USDA-Natural Resources Conservation Service, Plant Materials Center; Series: Riparian/Wetland Project information series no. 2. (1997)

*Notes:* Title from web page. "December, 1997." Description based on content viewed April 16, 2002. Includes bibliographical references.  
 NAL Call #: aQK938.M3-H64-1997  
<http://plant-materials.nrcs.usda.gov/pubs/idpmcarwproj2.pdf>

*Descriptors:* Wetland plants/ Woody plants/ Perennials/ Wetland restoration/ Riparian areas  
 This citation is from AGRICOLA.

**1172. Plant biodiversity and environmental stress.**

Markert, B. A.; Breure, A. M.; and Zechmeister, H. G.  
 In: Bioindicators and biomonitors: Principles, concepts and applications/ Markert, B. A.; Breure, A. M.; and Zechmeister, H. G., 2003; pp. 501-525.  
 ISBN: 0-08-044177-7  
 This citation is provided courtesy of CAB International/CABI Publishing.

**1173. Plant disease incidence as influenced by conservation tillage systems.**

Watkins, J. E. and Boosalis, M. G.  
 In: Managing agricultural residues/ Unger, P. W.  
 Boca Raton, Fla.: Lewis Publishers, 1994; pp. 261-283.  
 ISBN: 0-87371-730-9  
 This citation is provided courtesy of CAB International/CABI Publishing.

**1174. Plant nutrient management for enhanced productivity in intensive grain production systems of the United States and Asia.**

Dobermann, A. and Cassman, K. G.  
*Plant and Soil* 247 (1): 153-175. (Nov. 2002)  
 NAL Call #: 450-P696;  
 ISSN: 0032-079X [PLSOA2].  
*Notes:* Special issue: Progress in plant nutrition: Plenary lectures of the XIV International Plant Nutrition Colloquium / edited by W.J. Horst, A. Burkert, N. Claassen, H. Flessa, W.B. Frommer, H. Goldbach, W. Merbach, H.W. Olf, V. Romheld, B. Sattelmacher, U. Schmidhalter, M.K. Schenk, and N. Wiren. Includes references.  
*Descriptors:* grain crops/ zea mays/ oryza sativa/ nutrient availability/ fertilizers/ application rates/ intensive production/ crop management/ crop yield/ irrigation/ cropping systems/ maximum yield/ genetic improvement/ soil fertility/ profitability/ environmental protection/ literature reviews/ United States/ Asia  
 This citation is from AGRICOLA.

**1175. Plant resistance to insects: A resource available for sustainable agriculture.**

Stoner, K. A.  
*Biological Agriculture and Horticulture* 13 (1): 7-38. (1996)  
 NAL Call #: S605.5.B5;  
 ISSN: 0144-8765 [BIAHDP]  
*Descriptors:* crops/ insect pests/ insect control/ genetic resistance/ plant breeding/ genetic engineering/ gene transfer/ transgenic plants/ history/ efficacy/ integrated pest management/ farming systems/ sustainability/ literature reviews  
 This citation is from AGRICOLA.

**1176. Plant succession and greentree reservoir management: Implications for management and restoration of bottomland hardwood wetlands.**

King, Sammy L and Allen, James A  
*Wetlands* 16 (4): 503-511. (1996)  
 NAL Call #: QH75.A1W47;  
 ISSN: 0277-5212  
*Descriptors:* plants (Plantae Unspecified)/ Plantae (Plantae Unspecified)/ plants/ bottomland hardwood wetlands/ conservation/ greentree reservoir management/ plant succession/ vegetation establishment/ wetlands management/ wetlands restoration  
*Abstract:* Bottomland hardwood

forests are distributed along rivers and streams throughout the central and eastern United States, with the greatest concentration in the Southeast. Past and projected losses of bottomland hardwoods and degradation of remaining stands suggest that habitat management and/or restoration strategies that target multiple species and multiple uses will be necessary to maintain, enhance, and restore flora and fauna within bottomland hardwood wetlands. A greentree reservoir is a current management strategy that entails manipulating water regimes to provide habitat for wintering waterfowl. We conducted a literature review and synthesis to determine the potential impacts of greentree reservoir management on plant succession within bottomland hardwood wetlands. Greentree reservoirs can impact vegetation establishment through several processes. Despite shortcomings of greentree reservoirs, designs similar to them could be very beneficial in restoring bottomland hardwood plant and animal communities from degraded forests provided water-level control and maintenance are substantially improved. Emulation of natural hydrologic regimes, including natural variability, could produce diverse bottomland hardwood plant communities and provide habitat for a variety of wildlife species.  
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**1177. Plant toxic proteins with insecticidal properties. A review on their potentialities as bioinsecticides.**

Carlini, Celia R and Grossi de Sa Maria, Fatima  
*Toxicon* 40 (11): 1515-1539. (2002);  
 ISSN: 0041-0101  
*Descriptors:* Bacillus thuringiensis entomotoxic proteins/ arcelins: insecticide/ chitinases: insecticide/ environmentally aggressive chemicals/ enzyme inhibitors: insecticide/ lectins: insecticide/ modified storage proteins: insecticide/ plant toxic proteins: insecticide/ ribosome inactivating proteins: insecticide/ ureases: insecticide/ Bacillus thuringiensis (Endospore forming Gram Positives): pest/ plant (Plantae): crop/ Bacteria/ Eubacteria/ Microorganisms/ Plants/ defense mechanism/ world population expansion

**Abstract:** To meet the demands for food of the expanding world population, there is need of new ways for protecting plant crops against predators and pathogens while avoiding the use of environmentally aggressive chemicals. A milestone in this field was the introduction into crop plants of genes expressing *Bacillus thuringiensis* entomotoxic proteins. In spite of the success of this new technology, however, there are difficulties for acceptance of these 'anti-natural' products by the consumers and some concerns about its biosafety in mammals. An alternative could be exploring the plant's own defense mechanisms, by manipulating the expression of their endogenous defense proteins, or introducing an insect control gene derived from another plant. This review deals with the biochemical features and mechanisms of actions of plant proteins supposedly involved in defense mechanisms against insects, including lectins, ribosome-inactivating proteins, enzymes inhibitors, arcelins, chitinases, ureases, and modified storage proteins. The potentialities of genetic engineering of plants with increased resistance to insect predation relying on the repertoire of genes found in plants are also discussed. Several different genes encoding plant entomotoxic proteins have been introduced into crop genomes and many of these insect resistant plants are now being tested in field conditions or awaiting commercialization.

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**1178. Plants in wetlands.**

Redington, Charles B.  
Dubuque, Iowa: Kendall/Hunt Pub. Co.; xxi, 394 p.: ill.; Series: Redington field guides to biological interactions. (1994)

**Notes:** Includes bibliographical references (p. 331-332) and index.

**NAL Call #:** QK938.M3R44--1994;  
**ISBN:** 0840389833

**Descriptors:** Wetland plants---United States---Identification/ Marsh plants---United States---Identification/ Swamp plants---United States---Identification/ Wetlands---United States  
This citation is from AGRICOLA.

**1179. Polluted river systems: Monitoring and assessment of ecotoxicological risks.**

Velde, G. van der and Leuven, R S E W  
*Acta Hydrochimica et Hydrobiologica* 27 (5): 251-256. (1999);  
**ISSN:** 0323-4320

**Descriptors:** biomonitoring/ chemical monitoring/ ecotoxicology/ mixture toxicity/ quantitative structure activity relationships/ risk assessment / risk management/ river pollution/ sediment quality/ water quality

**Abstract:** In the past chemical, ecological, and toxicological research was carried out in a separate way. Nowadays, more and more studies are undertaken considering these three approaches in an integrated way (triad studies). A sophisticated combination of chemical and biological monitoring and bioassays can improve water quality management of polluted rivers. Application of quantitative structure-activity relationships (QSARs), algorithms for mixture toxicity of known substances, chemical group parameters, and response-oriented sum parameters, may reduce uncertainties in ecotoxicological risk management.

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**1180. Pollution filtration by plants in wetland-littoral zones.**

Mickle, A. M.  
*Proceedings of the Academy of Natural Sciences of Philadelphia* 144: 282-290. (1993)

**NAL Call #:** 500-P53;  
**ISSN:** 0097-3157 [PANPA5].

**Notes:** Literature review. Includes references.

**Descriptors:** aquatic plants/ bog plants/ filtration/ purification/ waste water/ waste water treatment/ wetlands/ coastal areas/ literature reviews

This citation is from AGRICOLA.

**1181. Polyacrylamide preparations for protection of water quality threatened by agricultural runoff contaminants.**

Entry, J. A.; Sojka, R. E.; Watwood, M.; and Ross, C.  
*Environmental Pollution* 120 (2): 191-200. (2002)

**NAL Call #:** QH545.A1E52;  
**ISSN:** 0269-7491 [ENPOEK]

**Descriptors:** pollution control/ calcium oxide/ aluminum sulfate/ pollutants/ wastewater

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**1182. Polyacrylamide quantification methods in soil conservation studies.**

Lu, J. and Wu, L.  
*Journal of Soil and Water Conservation* 58 (5): 270-275. (2003)  
**NAL Call #:** 56.8 J822;  
**ISSN:** 0022-4561

**Descriptors:** polyacrylamide/ soil conservation/ analytical methods/ water pollution/ irrigation water

**1183. Polyacrylamide review: Soil conditioning and environmental fate.**

Seybold, C. A.  
*Communications in Soil Science and Plant Analysis* 25 (11/12): 2171-2185. (1994)

**NAL Call #:** S590.C63;  
**ISSN:** 0010-3624 [CSOSA2]

**Descriptors:** soil stabilization/ polyacrylamide/ water erosion/ erosion control/ environmental impact/ toxicity/ soil/ interactions/ reviews

**Abstract:** The adoption of polyacrylamide (PAM) in reducing irrigation induced erosion in California's San Joaquin Valley has been stymied by the lack of information about its toxicity and environmental fate. A review of the literature was conducted to bring to the forefront knowledge of polyacrylamide, its effectiveness in controlling erosion and its environmental fate. Polyacrylamide is a water-soluble, high molecular weight synthetic organic polymer that primarily interacts with the clay fraction of soils. The degree of interaction depends on both the properties of the polymer and properties of the soil. It is effective in stabilizing soil aggregates, reducing soil erosion, and increasing water infiltration, and also has an indirect significant impact upon crop growth and yield. For the most part, polyacrylamide is resistant to microbial attack, and its degradation is mainly through physical breakdown. Polyacrylamide has been shown to be non-toxic to humans, animals, fish, and plants; the only concern has been the toxicity of its residual monomer (acrylamide) content, which is a known neurotoxin to humans. The residual monomer is bio-degradable and does not accumulate in soils. The

major source of acrylamide that is released into the environment if from the use of polyacrylamide products, so the FDA regulates the residual monomer content of PAM used in food contact products. If the acrylamide content is kept to a minimum, PAM itself does not pose any environmental threat, and thus, can be used effectively as a soil conditioner.

This citation is from AGRICOLA.

**1184. Pond Fertilization Regimen: State-of-the-Art.**

Das, S. K. and Jana, B. B.  
*Journal of Applied Aquaculture*  
13 (1-2): 35-66. (2003);  
ISSN: 1045-4438

*Descriptors:* Pond culture/ Fish ponds/ Habitat improvement (fertilization)/ Fertilizers/ Manure/ Aquaculture

*Abstract:* Pond fertilization has assumed an important role to supplement nutrient deficiency and augment biological productivity through autotrophic and heterotrophic pathways. This is especially important in the extensive and semi-intensive culture systems by promoting the functioning of natural ecosystems in a benign environment. The composition of inorganic and organic fertilizers forms the basis for selection of dose and quality of fertilizer application. While inorganic fertilizers produce perceptible results within a short period, organic manure is extremely cheap and is of considerable significance in developing countries. Nitrogen demand in fish ponds can be compensated through nitrogen fixation, as well as from accumulated humus from bottom sediments, especially from old fish ponds. The frequency of fertilizer application should be economical, though it is accepted that the lower the frequency, the better the productivity. In aquaculture ponds, the optimum N:P ratio was suggested between 4:1 to 8:1, whereas the optimum C:N ratio for composting was between 20 and 40. The exchange properties and equilibrium phosphorus concentration between soil and water influence water quality, nutrient status, and primary productivity of the pond ecosystem. These act as buffers to stabilize environmental conditions in ponds. Pond soils may exert negative influence on aquaculture production if one or more of their properties are outside the optimum range for

aquaculture. The present study reviews state-of-the art pond fertilization in relation to the role of pond soils; different inorganic fertilizers such as phosphorus (P), nitrogen (N), potassium (K); fertilizer dose and frequency; P:N ratio; organic manure; aquatic food web; optimal manuring; decomposition of organic manures; mineralization; production efficiency; and limitations of organic manures. More studies on pond fertilization in the context of nutrient dynamics and fertilizer-microbial interactions under different agroclimatic regions are necessary for an effective, appropriate, and economic fertilization program. The environmental consequences of overfertilization resulting in pollution and subsequent hazards to public health should be taken into consideration.

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**1185. Pond water aeration systems.**

Boyd, C. E.  
*Aquacultural Engineering* 18 (1): 9-40.  
(July 1998)

NAL Call #: SH1.A66;  
ISSN: 0144-8609 [AQEND6]  
*Descriptors:* ponds/ aeration/ evaluation/ biomass/ equipment/ performance testing/ water flow/ water quality/ feed conversion efficiency/ dissolved oxygen/ mortality/ stress/ literature reviews/ water erosion

*Abstract:* During the past decade, pond aeration systems have been developed which will sustain large quantities of fish and invertebrate biomass. These aeration systems are modifications of standard wastewater aeration equipment. Aeration-performance testing has been important in selecting design features to provide cost-effective yet efficient aquaculture pond aerators. Paddlewheel aerators and propeller-aspirator-pumps are probably most widely used. Amounts of aeration vary from as little as 1-2 kW ha(-1) in some types of fish culture to as much as 15 or 20 kW ha(-1) in intensive culture of marine shrimp. Calculations suggest that about 500 kg additional production of fish or crustaceans can be achieved per kW of aeration. Aerators usually are positioned in ponds to provide maximum water circulation. This practice can result in erosion of pond bottoms and inside slopes of embankments, and accumulation of sediment piles in

central areas of ponds where water currents are weaker. Recent studies suggest that the use of heavy aeration to provide the greatest possible production is less profitable than moderate aeration to improve water quality and enhance feed conversion efficiency. Automatic devices to start and stop aerators in response to daily changes in dissolved oxygen (DO) concentrations are improving, but they are expensive and not completely reliable. Augmentation of natural supplies of DO in ponds often is necessary to prevent stress or mortality of fish and crustaceans when DO concentrations are low. Several procedures have been used in attempts to increase DO concentrations in ponds. These methods include exchanging part of the oxygen-depleted pond water with oxygenated water from a well, pond, or other source, application of fertilizer to stimulate oxygen production by photosynthesis of aquatic plants, additions of compounds which release oxygen through chemical reactions, release of pure oxygen gas into pond waters, and aeration with mechanical devices which either splash water into the air or release bubbles of air into the water. Water circulation devices also enhance DO supplies in ponds by mixing DO supersaturated surface waters with deeper waters of lower DO concentration. This reduces the loss of oxygen from ponds by diffusion. Also, when surface waters are not saturated with DO, water circulation causes surface disturbance and enhances oxygen absorption by the water. Mechanical aeration is by far the most common and usually the most effective means of increasing DO concentrations in ponds. In semi-intensive aquaculture, aeration is applied on an emergency basis. Farmers check DO concentrations, and when low concentrations of DO are expected, aeration is applied. In intensive aquaculture, aeration is applied each night or even continuously. The purpose of this article is to summarize the 'state of the art' of mechanical aeration of aquaculture ponds.

This citation is from AGRICOLA.

**1186. Pore water testing and analysis: The good, the bad, and the ugly.**

Chapman, Peter M; Wang, Feiyue; Germano, Joseph D; and Batley, Graeme

*Marine Pollution Bulletin* 44 (5): 359-366. (2002)

NAL Call #: GC1000.M3;

ISSN: 0025-326X

*Descriptors:* pore water: contamination/ bioaccumulation/ sediment: quality

*Abstract:* The increasingly common practice of collecting and assessing sediment pore water as a primary measure of sediment quality is reviewed. Good features of this practice include: pore water is a key exposure route for some organisms associated with sediments; pore water testing eliminates particle size effects; pore water analyses and tests can provide useful information regarding contamination and pollution. Bad features include: pore water is not the only exposure route; pore water tests lack chemical or biological realism; their "sensitivity" relative to other tests may be meaningless due to manipulation and laboratory artifacts; many sediment and surface dwelling organisms are not directly influenced by pore water. Bad features can become ugly if: other exposure pathways are not considered (for toxicity or bioaccumulation); manipulation techniques are not appropriate; pore water tests are inappropriately linked to population-level effects. Pore water testing and analyses can be effective tools provided their limitations are well understood by researchers and managers.

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**1187. Porphyrins as biomarkers for hazard assessment of bird populations: Destructive and non-destructive use.**

Casini, S.; Fossi, M. C.; Leonzio, C.; and Renzoni, A.

*Ecotoxicology* 12 (1): 297-305. (2003)

NAL Call #: RA565.A1 E27;

ISSN: 0963-9292.

*Notes:* "Review: Porphyrins as biomarkers for hazard assessment of bird populations: Destructive and non-destructive use."

This citation is provided courtesy of CAB International/CABI Publishing.

**1188. Position on Soil Erosion Research Priorities.**

American Society of Agricultural Engineers

*Resource* 10 (9): 16-17. (2003).

*Notes:* ASAE Presents...

*Descriptors:* Soil erosion

**1189. Possibilities for future carbon sequestration in Canadian agriculture in relation to land use changes.**

Dumanski, J; Desjardins, R L; Tarnocai, C; Monreal, C; Gregorich, E G; Kirkwood, V; and Campbell, C A  
*Climatic Change* 40 (1): 81-103. (1998)

NAL Call #: QC980 .C55;

ISSN: 0165-0009

*Descriptors:* carbon dioxide: greenhouse gas, pollutant/ carbon: sequestration/ agriculture/ conservation tillage/ cropping practices/ erosion control/ fertilization/ land use change/ nutrient balance/ soil conservation/ sustainable land management

*Abstract:* Increasing carbon sequestration in agricultural soils in Canada is examined as a possible strategy in slowing or stopping the current increase in atmospheric CO<sub>2</sub> concentrations. Estimates are provided on the amount of carbon that could be sequestered in soils in various regions in Canada by reducing summerfallow area, increased use of forage crops, improved erosion control, shifts from conventional to minimal and no-till, and more intensive use of fertilizers. The reduction of summerfallow by more intensive agriculture would increase the continuous cropland base by 8.1% in western Canada and 6.8% in all of Canada. Although increased organic carbon (OC) sequestration could be achieved in all agricultural regions, the greatest potential gains are in areas of Chernozemic soils. The best management options include reduction of summerfallow, conversion of fallow areas to hay or continuous cereals, fertilization to ensure nutrient balance, and adoption of soil conservation measures. The adoption of these options could sequester about 50-75% of the total agricultural emissions of CO<sub>2</sub> in Canada for the next 30 years. However, increased sequestration of atmospheric carbon in the soil is possible for only a limited time.

Increased efforts must be made to reduce emissions if long-term mitigation is to be achieved.

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**1190. The possible minimum chicken nutrient requirements for protecting the environment and improving cost efficiency.**

Nahm KH and Carlson CW  
*Asian Australasian Journal of Animal Sciences* 11 (6): 755-768; 84 ref. (1998)

NAL Call #: SF55.A78A7

This citation is provided courtesy of CAB International/CABI Publishing.

**1191. Potential environmental benefits of ionophores in ruminant diets.**

Tedeschi, L. O.; Fox, D. G.; and Tylutki, T. P.

*Journal of Environmental Quality* 32 (5): 1591-1602. (2003)

NAL Call #: QH540.J6;

ISSN: 0047-2425

This citation is provided courtesy of CAB International/CABI Publishing.

**1192. Potential environmental effects of corn (*Zea mays* L.) stover removal with emphasis on soil organic matter and erosion.**

Mann, L.; Tolbert, V.; and Cushman, J.

*Agriculture, Ecosystems and Environment* 89 (3): 149-166. (2002)

NAL Call #: S601 .A34;

ISSN: 0167-8809

This citation is provided courtesy of CAB International/CABI Publishing.

**1193. The potential for manipulating crop-pest-natural enemy interactions for improved insect pest management.**

Verkerk, R. H. J.; Leather, S. R.; and Wright, D. J.

*Bulletin of Entomological Research* 88 (5): 493-501. (1998);

ISSN: 0007-4853

*Descriptors:* Crops/ Biological control/ Pest control/ Insecta/ Lepidoptera/ Insects/ Insecta/ Butterflies/ Moths/ Control/ Agricultural & general applied entomology

*Abstract:* This review identifies key ways in which manipulations of the crop environment based on detailed understanding of tritrophic interactions can contribute to improvements in the control of insect pests. Such approaches are likely to be of particular benefit against those pests, notably certain species of Lepidoptera

and aphid, which are difficult to control with insecticides because of insecticide resistance or suppression of natural enemies. Particular attention is given to the compatibility (or otherwise) of partial plant resistance and biological control, citing examples which support contrasting tritrophic theories. Other areas considered and supported with examples include the use or effects of allelochemicals, refugia, intercropping, crop backgrounds, fertilization regimes, parasitoid conditioning (by host plants) and transgenic crops. Examples of manipulations involving use of selective insecticides which show compatibility with biological methods are also included owing to their possible suitability in integrated crop management programmes.  
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**1194. Potential for preferential pathways of phosphorus transport.**

Simard, R. R.; Beauchemin, S.; and Haygarth, P. M.  
*Journal of Environmental Quality* 29 (1): 97-104. (2000)  
NAL Call #: QH540.J6;  
ISSN: 0047-2425  
This citation is provided courtesy of CAB International/CABI Publishing.

**1195. Potential health risks associated with the persistence of Escherichia coli O157 in agricultural environments.**

Jones, D. L.  
*Soil Use and Management* 15 (2): 76-83. (June 1999)  
NAL Call #: S590.S68;  
ISSN: 0266-0032 [SUMAEU]  
*Descriptors:* public health/ escherichia coli/ pathogens/ persistence/ survival/ soil/ cattle dung/ cattle manure/ cattle slurry/ application to land/ vegetation/ water/ transmission/ health hazards/ UK  
*Abstract:* Escherichia coli serotype O157 is a virulent human pathogen the global incidence of which has increased. It has been demonstrated that cattle are the primary reservoir of this pathogen. This has serious implications for the land-based disposal of organic wastes such as cattle manure, cattle slurry and abattoir waste. Further, it also has serious ramifications for the protection of surface and groundwater drinking supplies and public access to pasture land. However, while soil and

vegetation can be expected to directly influence the survival of this pathogen, there is a paucity of information concerning the behaviour and survival of E. coli O157 in agricultural environments. It appears that E. coli O157 presently contaminates between 1 to 15% of UK cattle herds, depending on region, and that faecal excretion of the bacterium shows a distinct seasonality which also reflects the incidence of human infections. E. coli O157 can remain viable in soil for greater than 4 months and appears to be a highly resilient pathogen possessing the capability to adapt easily to environmental stresses. While most human cases of E. coli O157 related food poisoning have been associated with the consumption of contaminated meat and dairy products, there is also evidence that human infection has occurred through the ingestion of contaminated soil, fruit and vegetables and drinking water. In this review the potential threat to human health posed by the application of contaminated organic wastes to soil and possible strategies for reducing the amount of pathogen entering the food chain are highlighted.  
This citation is from AGRICOLA.

**1196. Potential impact model to assess agricultural pressure to landscape ecological functions.**

Freyer, B.; Reischer, Y.; and Zuberbühler, D.  
*Ecological Modelling* 130 (1/3): 121-129. (2000)  
NAL Call #: QH541.15.M3E25;  
ISSN: 0304-3800  
This citation is provided courtesy of CAB International/CABI Publishing.

**1197. The potential impact of imposing best management practices for nutrient management on the US broiler industry.**

McIntosh, C S; Park, T A; and Karnum, C  
*Journal of environmental management* 60 (2): 145-154. (2000)  
NAL Call #: HC75.E5J6;  
ISSN: 0301-4797  
*Descriptors:* broiler chicken (Galliformes)/ Animals/ Birds/ Chordates/ Nonhuman Vertebrates/ Vertebrates/ best management practices/ BMPs/ cost increasing events/ economic impact/ environmental impact/ nutrient management/ poultry litter/ production

levels/ wholesale prices  
*Abstract:* The imposition of nutrient management plans for disposal of poultry litter will increase broiler production costs. This research examines the potential impacts of these cost increasing events on the US broiler industry. The results show that for 8, 40 and 80% increases in costs, wholesale prices eventually return to previous levels, and production levels stabilize at slightly lower levels.  
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**1198. The potential impact of veterinary and human therapeutic agents in manure and biosolids on plants grown on arable land: A review.**

Jjemba, P. K.  
*Agriculture, Ecosystems and Environment* 93 (1/3): 267-278. (Dec. 2002)  
NAL Call #: S601-.A34;  
ISSN: 0167-8809 [AEENDO]  
*Descriptors:* agricultural land/ manures/ drugs/ drug residues/ veterinary products/ pollutants/ metabolites/ excretion/ feedlots/ bioavailability/ soil organic matter/ soil ph/ literature reviews  
*Abstract:* The fate of human and veterinary therapeutic agents has aroused attention in recent years as a potential pollutant of the environment. Prescription drugs are a US\$ 91 billion industry in the United States alone and a major part of the economy in other developed countries. Substantial quantities of these compounds and their metabolites are excreted, flushed down the drain, discarded as waste, or left over in animal feedlots. When they enter the sewer, several of these compounds are not adequately eliminated by the methods that are currently used in sewage treatment. Substantial quantities of biosolids and livestock manure end up on agricultural land. In laboratory studies, the growth and development of Phaseolus vulgaris L., Glycine max, Medicago sativa, Zea mays, and several other plants are affected by some commonly used therapeutic agents. However, most of the phytotoxicity studies have been conducted in vitro. The few studies conducted in soil suggest that phytotoxicity varies between species. The bioavailability of these compounds is greatly dependent on the sorption kinetics of the respective

compound, soil organic matter, and soil pH. Some research needs, such as establishing concentrations that prevail in soil, potential effects to microbial processes in soil, and effects on crops under field conditions, are highlighted. This citation is from AGRICOLA.

**1199. Potential of biopesticides in agriculture.**

Rodgers, P. B.

*Pesticide Science* 39 (2): 117-129. (1993)

NAL Call #: SB951.P47;

ISSN: 0031-613X [PSSCBG].

Notes: Paper presented at the symposium, "Natural Products as a Source for New Agricultural Chemicals II," December, 1-2, 1992, London, UK. Includes references.

Descriptors: pesticides/ research/ biological control agents/ biological control/ plant protection/ technical progress/ trends/ literature reviews

Abstract: All living organisms are subject to predation, parasitism or competition from other organisms. The study of these interactions has led to the identification of many potential opportunities for the use of living organisms as biopesticides to protect agricultural crops against insect pests, fungal, bacterial and viral diseases, weeds, nematodes and mollusc pests. A range of biopesticide products (including as active agents bacteria, fungi, nematodes, protozoa, viruses and beneficial insects) are now available commercially for control of insect pests, fungal and bacterial diseases and weeds. However, world biopesticide sales in 1990 were estimated to be \$120 million, representing less than 0.5% of the world agrochemical market. Over 90% of biopesticide sales are represented by a single product type, containing *Bacillus thuringiensis* Berl., for control of insect pests. Nevertheless, biopesticide sales are estimated to be increasing at 10-25% per annum whilst the world agrochemical market is static or even shrinking. There has been a significant renewal of commercial interest in biopesticides as evidenced by the substantial number of alliances forged between major agrochemical companies and biotechnology companies which allow these major companies access to marketing rights to novel biopesticides. This paper reviews the current commercial status of biopesticides and discusses the

technical and commercial constraints which have impeded development of biopesticides in the past. Novel developments in R&D, which may enable some of these constraints to be overcome, are examined by reference to a number of specific examples (some of which arise from the author's own experience in a biotechnology company). The future prospects for biopesticides are discussed in the light of technical advances and commercial and regulatory requirements. This citation is from AGRICOLA.

**1200. Potential of forages to diversify cropping systems in the Northern Great Plains.**

Entz, M. H.; Baron, V. S.; Carr, P. M.; Meyer, D. W.; Smith, S. R. Jr.; and McCaughey, W. P.

*Agronomy Journal* 94 (2): 240-250. (2002)

NAL Call #: 4-AM34P;

ISSN: 0002-1962

This citation is provided courtesy of CAB International/CABI Publishing.

**1201. The potential of rapid assessment techniques as early warning indicators of wetland degradation: A review.**

Van Dam, R. A.; Camilleri, C.; and Finlayson, C. M.

*Environmental Toxicology and Water Quality* 13 (4): 297-312. (1998)

NAL Call #: RA1221.T69;

ISSN: 1053-4725 [ETWQEZ].

Notes: In the special issue: 8th International Symposium on Toxicity Assessment / edited by Y. Tsvetnenko and L. Evans. Includes references.

Descriptors: wetlands/ pollutants/ environmental degradation/ environmental impact/ toxicity/ indicators/ biological indicators/ bacteria/ phytoplankton/ invertebrates/ vertebrates/ risk assessment/ monitoring/ rapid methods/ bioassays/ literature reviews/ Australia/ ecotoxicology/ physicochemical indicators/ macrophytes

Abstract: In recent years, the need to develop assessment techniques that could provide advanced warning of significant wetland stress or degradation has been recognized. The goal of this paper is to identify rapid, yet realistic and reliable methods for the early detection of pollutant impacts on wetland ecosystems, particularly those in the wet-dry tropics of northern Australia.

In doing so, it describes the ideal attributes of early warning indicators and their subsequent selection for wetland research. It then evaluates the potential of existing methods of assessment as early warning indicators of wetland degradation due to pollutant impacts. Particular attention is paid to rapid assessment techniques, covering a range of trophic levels and levels of biological organization. Due to a number of favorable characteristics, phytoplankton were considered to be potentially the most promising indicators of wetland degradation, and thus the scope of application of toxicity assessment and monitoring methods warrants further investigation. Rapid toxicity bioassays using invertebrates and vertebrates were also considered to be an essential part of an early detection program for wetlands, while biomarkers represented a promising tool for achieving true "early warning" of potential pollutant impacts. Given further refinement and development, rapid methods of monitoring aquatic community assemblages were also considered potentially useful tools for the early detection of wetland degradation. Finally, to gain effective use from an early warning system for wetlands, its incorporation into an ecological risk assessment framework was recommended. This citation is from AGRICOLA.

**1202. Potential use of Populus for phytoremediation of environmental pollution in riparian zones.**

Dix, M. E.; Klopfenstein, N. B.; Zhang, J. W.; Workman, S. W.; and Kim, M. S.

In: Micropropagation, genetic engineering, and molecular biology of *Populus*; Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station (Series: General technical report RM 297), 1997. pp. 206-211

NAL Call #: aSD11.A42-no.297

Descriptors: populus/ riparian vegetation/ pollution/ biodegradation/ nitrates/ tolerance/ immobilization/ absorption/ heavy metals/ soil flora/ soil chemistry/ literature reviews/ bioremediation

This citation is from AGRICOLA.

**1203. Potential uses for geographic information system-based planning and decision support technology in intensive food animal production.**

Colby, M. M. and Johnson, Y. J.  
*Animal Health Research Reviews*  
3 (1): 31-42. (2002);  
ISSN: 1466-2523

This citation is provided courtesy of CAB International/CABI Publishing.

**1204. Potentiality of poultry droppings in livestock feeding: A review.**

Paul BN; Gupta BS; Srivastava A; and Chaudhary LC

*Indian Journal of Dairy Science*  
48 (2): 92-97; 49 ref. (1995)

This citation is provided courtesy of CAB International/CABI Publishing.

**1205. Potentially beneficial uses of inland saline waters in the Southwestern USA.**

Miyamoto, S.

*Tasks for Vegetation Science*  
(28): 407-422. (1993)

NAL Call #: QK1.T37;

ISSN: 0167-9406.

Notes: In the series analytic: Towards the rational use of high salinity tolerant plants. 2. Agriculture and forestry under marginal soil water conditions / edited by H. Lieth and A.A. Al Masoom. Proceedings of the 1st ASWAS Conference held December 8-15, 1990, Al Ain, United Arab Emirates. Literature review. Includes references.

Descriptors: crop production/ gossypium hirsutum/ halophytes/ irrigation/ irrigation water/ saline water/ salinity/ salt tolerance/ aquaculture/ literature reviews/ Texas/ New Mexico/ Arizona/ California/ Utah  
This citation is from AGRICOLA.

**1206. Poultry integrated pest management: Status and future.**

Axtell, R. C.

*Integrated Pest Management Reviews*  
4 (1): 53-73. (1999)

NAL Call #: SB950.9.I572;

ISSN: 1353-5226 [IPMRF5]

Descriptors: arthropod pests/ ectoparasites/ rodents/ integrated pest management/ poultry/ intensive livestock farming/ literature reviews  
Abstract: Modern commercial poultry production under large companies is expanding worldwide with similar methods and housing, and the accompanying arthropod and rodent pest problems. The pests increase the cost of production and are factors in

the spread of avian diseases. The biology, behavior and control of ectoparasites and premise pests are described in relation to the different housing and production practices for broiler breeders, turkey breeders, growout (broilers and turkeys), caged-layers, and pullets. Ectoparasites include Ornithonyssus fowl mites, Dermanyssus chicken mites, lice, bedbugs, fleas, and argasid fowl ticks. Premise pests include Alphetobius darkling beetles, Dermestes hide beetles, the house fly and several related filth fly species, calliphorid blow flies, moths, cockroaches, and rodents. Populations of these pests are largely determined by the housing, waste, and flock management practices. An integrated pest management (IPM) approach, tailored to the different production systems, is required for satisfactory poultry pest control. Biosecurity, preventing the introduction of pests and diseases into a facility, is critical. Poultry IPM, based on pest identification, pest population monitoring, and methods of cultural, biological, and chemical control, is elucidated. The structure of the sophisticated, highly integrated poultry industry provides a situation conducive to refinement and wider implementation of IPM.  
This citation is from AGRICOLA.

**1207. Poultry litter as fuel.**

Dagnall, S P

*World's Poultry Science Journal*  
49 (2): 175-177. (1993)

NAL Call #: 47.8-W89;

ISSN: 0043-9339

Descriptors: bird (Aves Unspecified)/ chicken (Galliformes)/ animals/ birds/ chordates/ nonhuman vertebrates/ vertebrates/ electricity/ energy/ waste management

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**1208. Poultry manure: Source of fertilizer, fuel and feed.**

Henuk, Y. L. and Dingle, J. G.

*World's Poultry Science Journal*  
59 (3): 350-360. (2003)

NAL Call #: 47.8-W89;

ISSN: 0043-9339

This citation is provided courtesy of CAB International/CABI Publishing.

**1209. Poultry waste management: Agricultural and environmental issues.**

Sims, J. T. and Wolf, D. C.

*Advances in Agronomy*  
52: 1-83. (1994)

NAL Call #: 30-Ad9;

ISSN: 0065-2113 [ADAGA7]

Descriptors: poultry manure/ poultry droppings/ nitrogen/ phosphorus/ chemical reactions/ waste treatment/ application to land/ nitrogen cycle/ cycling/ mineralization/ literature reviews

This citation is from AGRICOLA.

**1210. Poultry waste management handbook.**

Collins, Eldridge and Natural Resource, Agriculture and Engineering Service. Cooperative Extension.

Ithaca, N.Y. Natural Resource, Agriculture, and Engineering Service, Cooperative Extension; 64 p. (1999)

Notes: Includes bibliographical references (p. 62).

NAL Call #: S675-.N72-no.-132;

ISBN: 0935817425 (pbk.)

Descriptors: Poultry industry---Waste disposal---Handbooks, manuals, etc  
Abstract: Waste management has been a concern in poultry operations for many years. Problems with proper storage, handling, management, and utilization of byproducts of production have come to the forefront in planning, establishing, and operating poultry farms. In addition, growers have become sensitive to the potential for nuisance litigation should their farms generate odors, insects and vermin, or runoff that offends neighbors. This publication covers all aspects of solid, semisolid, and liquid poultry waste management, including: manure production and characteristics, environmental regulations and hazards, poultry housing design and waste management, manure storage systems, waste treatment (including composting, anaerobic/facultative lagoons, anaerobic digestion, and incineration), nutrient management, application equipment, dead bird management, and alternative uses for manure (for example, in fertilizers, as ruminant feed, and in compost for growing mushrooms).

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**1211. Practical and innovative measures for the control of agricultural phosphorus losses to water: An overview.**

Sharpley, A.; Foy, B.; and Withers, P. *Journal of Environmental Quality* 29 (1): 1-9. (2000)

NAL Call #: QH540.J6;

ISSN: 0047-2425 [JEVQAA].

Notes: Paper presented at the Organization for Economic Cooperation and Development (OECD) sponsored conference on "Practical and Innovative Measures for the Control of Agricultural Phosphorus Losses to Water," held June 16-19, 1998, Antrim, Northern Ireland.

Descriptors: phosphorus fertilizers/ runoff/ water pollution/ pollution control/ conferences

Abstract: Inputs of P are essential for profitable crop and livestock production. However, its export in watershed runoff can accelerate the eutrophication of receiving fresh waters. The specialization of crop and livestock farming has created regional imbalances in P inputs in feed and fertilizer and output in farm produce. In many areas, soil P exceeds crop needs and has enriched surface runoff with P. This paper provides a brief overview of P management strategies to maintain agricultural production and protect water quality that were discussed at the conference, "Practical and Innovative Measures for the Control of Agricultural Phosphorus Losses to Water," sponsored by the Organization for Economic Cooperation and Development and held in Antrim, Northern Ireland, June 1998. The purpose of the conference was to assess current strategies for reducing the loads and concentrations of P from agricultural land to surface waters. Topics discussed at the interdisciplinary conference and reviewed here included sustainable P management in productive agriculture; assessing land application of P; evaluating and modeling P transport and transformations in soil, runoff, streams, and lakes; and implementation of integrated best management practices (BMPs). From these discussions, measures to control agricultural P transfer from soil to water may be brought about by optimizing fertilizer P use-efficiency, refining animal feed rations, using feed additives to increase P absorption by the animal, moving manure from surplus to deficit areas,

and targeting conservation practices, such as reduced tillage, buffer strips, and cover crops, to critical areas of P export from a watershed.

This citation is from AGRICOLA.

**1212. Practical application of 25 years' research into the management of shallow lakes.**

Phillips, Geoff; Bramwell, Alison; Pitt, Jo; Stansfield, Julia; and Perrow, Martin

*Hydrobiologia* 395-396 (0): 61-76. (1999)

NAL Call #: 410 H992;

ISSN: 0018-8158

Descriptors: phosphorus: pollutant/ biomanipulation/ eutrophication/ lake restoration/ sediment release/ sediment removal

Abstract: The Norfolk Broads are a series of shallow, man-made lakes dug in medieval times for peat extraction, in Eastern England. Their eutrophic state has been well-documented and, since the early 1980s, their restoration has been attempted using a variety of techniques. The restoration began with the removal of point sources of phosphorus from sewage treatment works, which then revealed the role of sediment release when lake phosphorus levels failed to decline following inflow phosphorus levels. Small-scale removal of sediment layers in isolated broads demonstrated the feasibility, both technical and economic, of this technique, but experience then showed that sediment removal alone could not provide long-term restoration. Biomanipulation following sediment removal now offers the most reliable route to restoration, but the mechanisms by which a stable submerged plant community can be maintained after biomanipulation are still not clear.

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**1213. Practical handbook for wetland identification and delineation.**

Lyon, John Grimson.

Boca Raton, FL: CRC Press; 157 p.: ill. (1993)

NAL Call #: QH104.L95-1993;

ISBN: 087371590X

Descriptors: Wetlands---United States Classification/ Land use---United States Planning/ Wetland

conservation---United States/ Wetland ecology---United States/ Wetland flora---United States

This citation is from AGRICOLA.

**1214. The practical handbook of compost engineering.**

Haug, Roger Tim.

Boca Raton, Fla.: Lewis Publishers; 717 p.: ill. (1993)

NAL Call #: TD796.5.H39-1993;

ISBN: 0873713737 (acid-free paper)

Descriptors: Compost/ Refuse and refuse disposal---Biodegradation

This citation is from AGRICOLA.

**1215. Practical Realities of Conjunctive Management: The Middle Rio Grande as an Example.**

Dumars, C.

Las Cruces, NM: New Mexico Water Resources Research Institute, New Mexico State University. (1995)

Notes: Conference: 39. Annual New Mexico Water Conference, Albuquerque, NM (USA), 3-4 Nov 1994; Source: The Future of Albuquerque and Middle Rio Grande Basin. Proceedings of the 39th Annual New Mexico Water Conference., New Mexico Water Resources Research Institute, New Mexico State University, Box 30001, Dept. 3167, Las Cruces, NM 88003 (USA), 1995, Pp. 119-122, Tech. Rep. New Mex. Water Resour. Res. Inst., Vol. 290

Descriptors: United States, New Mexico, Rio Grande River/ water rights/ management planning/ water resources/ water supply/ water management/ legal aspects/ riparian rights/ legal review/ conjunctive use/ river basin management/ regional planning/ multiple use of resources/ Techniques of planning/ Environmental action/ Conservation, wildlife management and recreation © Cambridge Scientific Abstracts (CSA)

**1216. Practical use of the mycorrhizal fungal technology in forestry, reclamation, arboriculture, agriculture, and horticulture.**

Marx, D. H.; Marrs, L. F.; and Cordell, C. E.

*Dendrobiology* 47: 27-40. (2002);

ISSN: 1641-1307

This citation is provided courtesy of CAB International/CABI Publishing.

**1217. Prairie conservation in North America.**

Samson, F. and Knopf, F.  
*Bioscience* 44: 418-421 (1994)  
 NAL Call #: 500 Am322A  
 Descriptors: Supporting science  
 Abstract: Discussed the degradation of native prairies and possible management solutions.

**1218. Prairie wetland ecology: The contribution of the Marsh Ecology Research Program.**

Murkin, Henry R.; Valk, Arnoud van der; Clark, William R.; and Marsh Ecology Research Program.  
 Ames: Iowa State University Press; xiv, 413 p.: ill., maps. (2000)  
 Notes: 1st ed.; Includes bibliographical references (p. 395-401) and index.  
 NAL Call #: QH541.5.M3-P73-2000;  
 ISBN: 0813827523  
 Descriptors: Wetland ecology/ Prairies  
 This citation is from AGRICOLA.

**1219. Precipitation use efficiency as affected by cropping and tillage systems.**

Peterson, G. A.; Schlegel, A. J.; Tanaka, D. L.; and Jones, O. R.  
*Journal of Production Agriculture* 9 (2): 180-186. (1996)  
 NAL Call #: S539.5.J68;  
 ISSN: 0890-8524  
 This citation is provided courtesy of CAB International/CABI Publishing.

**1220. Precision agriculture and environmental quality: Challenges for research and education.**

Hatfield, Jerry L.; United States. National Resources Conservation Service; United States. Agricultural Research Service; and National Arbor Day Foundation.  
 United States: USDA National Resources Conservation Service: USDA Agricultural Research Service; 18 p. (2000)  
 Notes: Cover title. "Prepared for the National Arbor Day Foundation." "July 2000." Includes bibliographical references (p. 11-13).  
 NAL Call #: aS494.5.P73-H38-2000  
 Descriptors: Precision farming---Environmental aspects/ Precision farming---Research/ Agricultural pollution/ Environmental monitoring  
 This citation is from AGRICOLA.

**1221. Predation and Ring-Necked Pheasant Population Dynamics.**

Riley, TZ and Schulz, JH  
*Wildlife Society Bulletin* 29 (1): 33-38. (2001)  
 NAL Call #: SK357.A1W5;  
 ISSN: 0091-7648  
 Descriptors: Wildlife management/ Predation/ Population dynamics/ Recruitment/ Phasianus colchicus/ Ring necked pheasant/ Management  
 Abstract: Because ring-necked pheasants (*Phasianus colchicus*) are an important wildlife resource in agricultural ecosystems, we reviewed the role of predators on pheasant population dynamics and suggest management options to ameliorate predation. Predator reduction programs have the potential to increase survival and recruitment, but these parameters decrease once predator control ceases. Extensive application of predator reductions may be ethically questionable, and habitat management directed at moderating the effects of predators at the landscape scale is expensive. An extensive distribution of cover during the nesting and brood-rearing periods can increase pheasant recruitment. Federal agricultural and conservation programs can be used to accomplish many of these landscape habitat improvements, but federal and state agencies must provide the technical assistance to deliver the program options to producers. New federal farm programs aimed at improving avian survival and recruitment must have an evaluation and monitoring component built in to determine their effectiveness.  
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**1222. Predicting long-term wetland hydrology from hydric soil field indicators.**

Vepraskas, Michael J. and Water Resources Research Institute of the University of North Carolina.  
 Raleigh, N.C.: Water Resources Research Institute of the University of North Carolina; xv, 55 p.: ill., maps; Series: Report (Water Resources Research Institute of the University of North Carolina); no. 342. (2002)  
 Notes: "UNC-WRRI-2002-342." "August 2002." Includes bibliographical references (p. 53-55). Funded by through the Water Resources Research Institute of the University of North Carolina. WRRRI project no. 70175.

NAL Call #: TD201-.N6-no.-342

Descriptors: Wetlands---Hydrology---North Carolina/ Soil absorption and adsorption---Research---North Carolina/ Sewage lagoons---North Carolina---Hydrodynamics  
 This citation is from AGRICOLA.

**1223. Predicting Salmonid Habitat-Flow Relationships for Streams from Western North America.**

Hatfield, T. and Bruce, J.  
*North American Journal of Fisheries Management* 20 (4): 1005-1015. (2000)  
 NAL Call #: SH219.N66;  
 ISSN: 0275-5947  
 Descriptors: Water flow/ Streams/ Wildlife management/ North America/ Habitat/ Microhabitats/ Stream flow/ Stocking (organisms)/ Fish culture/ Rivers/ Fishery management/ Salmonidae/ Oncorhynchus mykiss/ West/ Salmonids/ habitat flow relationships/ Rainbow trout/ Management/ Habitat community studies/ Fish culture/ United States  
 Abstract: One of the most widely applied methodologies for developing instream flow recommendations is the instream flow incremental methodology (IFIM) and its component microhabitat model, physical habitat simulation (PHABSIM). In this paper we reviewed over 1,500 habitat-flow curves obtained from 127 PHABSIM studies from western North America to develop predictions for flow needs for salmonids in this region and to test whether habitat-flow relationships for salmonids were related to watershed characteristics and geographic location. We present regressions that predict PHABSIM optima for four life history stages of four salmonid species and for all salmonid species in the database as a group, and we quantify the uncertainty in these estimates. Mean annual discharge (MAD) was the best predictor of optimum flow. The general form of the regressions was  $\log \text{sub}(e)(\text{optimum flow}) = A \times \log \text{sub}(e)(\text{MAD})$ , where  $A < 1$ . Minor improvement in predictive power was sometimes possible with addition of latitude and longitude coordinates to the regression. This relationship is asymptotic and differs considerably from the fixed flow percentages recommended by Tennant. Our results are presented as a planning tool to (1) allow managers and project proponents to conduct a preliminary assessment of proposed

water-use development projects, (2) optimize research efforts for instream flow studies and experiments, and (3) set experimental boundaries for adaptive management of stream flow.  
© Cambridge Scientific Abstracts (CSA)

**1224. Predicting soil erosion by water: A guide to conservation planning with the revised universal soil loss equation (RUSLE).**

Renard, Kenneth G. and United States. Agricultural Research Service. Washington, D.C.: USDA, Agricultural Research Service; xix, 384 p.: ill., maps; Series: Agriculture handbook (United States. Dept. of Agriculture) no. 703. (1997)

Notes: "Issued January 1997"--P. [iii]. Shipping list no.: 97-0181-P. Includes bibliographical references (p. 367-384). "Supersedes Agriculture handbook no. 537, titled "Predicting rainfall erosion losses: a guide to conservation planning"--P. [iii]. SUDOCs: A 1.76:703.

NAL Call #: 1--Ag84Ah-no.703;  
ISBN: 0160489385

Descriptors: Soil erosion prediction---United States/ Soil erosion---United States/ Geophysical prediction  
This citation is from AGRICOLA.

**1225. Predicting the interaction between the effects of salinity and climate change on crop plants.**

Yeo, A.

*Scientia Horticulturae* 78 (1/4): 159-174. (Jan. 1999)

NAL Call #: SB13.S3;  
ISSN: 0304-4238 [SHRTAH].

Notes: Special issue: Salinity and horticulture / edited by T.J. Flowers. Includes references.

Descriptors: crops/ salinity/ climatic change/ irrigation/ crop yield/ air pollution/ climatic zones/ salinization/ water use efficiency/ growth/ water availability/ evaporation/ air temperature/ evapotranspiration/ leaves/ salt/ plant composition/ photosynthesis/ ion uptake/ transpiration/ stomatal resistance/ literature reviews  
This citation is from AGRICOLA.

**1226. Prediction of Downstream Geomorphological Changes After Dam Construction: A Stream Power Approach.**

Brandt, S. A.

*International Journal of Water Resources Development* 16 (3): 343-367. (2000)

NAL Call #: TD201.I56;  
ISSN: 0790-0627

Descriptors: Prediction/ Downstream/ Geomorphology/ Dam Construction/ Literature Review/ Mathematical Equations/ Sediment Transport/ Regression Analysis/ Alluvial Rivers/ Reservoirs/ Channels/ Dams/ Reviews/ Transport/ Streams (in natural channels)/ Channels/ Ecological impact of water development/ Underground Services and Water Use/ Streamflow and runoff

Abstract: A literature survey on methods of computing stable river-channel geometry, demanding a small amount of work effort and few input data, has been made and is presented. Besides the use of empirical regime equations and the use of an extremal hypothesis in conjunction with a sediment-transport and a flow-friction theory, new regression equations have been formulated which are used together with a sediment-transport equation. These methods may prove efficient when predicting changes, such as after dam and reservoir construction, on an alluvial river. Calculations using the different methods have been exemplified on a natural river.

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**1227. A preliminary synthesis of major scientific results during the SALSA program.**

Chebouni, A.; Goodrich, D. C.; Moran, M. S.; Watts, C. J.; Kerr, Y. H.; Dedieu, G.; Kepner, W. G.; Shuttleworth, W. J.; and Sorooshian, S.

*Agricultural and Forest Meteorology* 105 (1/3): 311-323. (2000)

NAL Call #: 340.8-AG8;  
ISSN: 0168-1923

This citation is provided courtesy of CAB International/CABI Publishing.

**1228. Prescribed fire effects on herpetofauna: Review and management implications.**

Russell, K. R.; Lear, D. H. van.; and Guynn, D. C. Jr.

*Wildlife Society Bulletin* 27 (2): 374-384. (Summer 1999)

NAL Call #: SK357.A1W5;  
ISSN: 0091-7648 [WLSBA6]

Descriptors: prescribed burning/ amphibian/ reptiles/ wildlife management/ mortality  
This citation is from AGRICOLA.

**1229. Prevention and control of losses of gaseous nitrogen compounds in livestock operations: A review.**

Jongebreur, A. A. and Monteny, G. J. *The Scientific World* 1 (S1): 844-851. (2001)

NAL Call #: 472.SCI25;  
ISSN: 1537-744X.

Notes: UID: 2001.01.339; Number of References: 68; From: Optimizing nitrogen management in food and energy production and environmental protection: Proceedings of the 2nd International Nitrogen Conference on Science and Policy 2001 / Potomac, MD, USA, 14-18 October 2001

This citation is provided courtesy of CAB International/CABI Publishing.

**1230. Prevention strategies for field traffic-induced subsoil compaction: A review. Part 1. Machine/soil interactions.**

Alakukku, L.; Weisskopf, P.; Chamen, W. C. T.; Tijink, F. G. J.; Linden, J. P. van der; Pires, S.; Sommer, C.; and Spoor, G.

*Soil and Tillage Research* 73 (1/2): 145-160. (2003)

NAL Call #: S590.S48;  
ISSN: 0167-1987

This citation is provided courtesy of CAB International/CABI Publishing.

**1231. Prevention strategies for field traffic-induced subsoil compaction: A review. Part 2. Equipment and field practices.**

Chamen, T.; Alakukku, L.; Pires, S.; Sommer, C.; Spoor, G.; Tijink, F.; and Weisskopf, P.

*Soil and Tillage Research* 73 (1/2): 161-174. (2003)

NAL Call #: S590.S48;  
ISSN: 0167-1987

This citation is provided courtesy of CAB International/CABI Publishing.

**1232. Primary succession on land: Community development and wildlife conservation.**

Usher, M. B.

*Special Publications Series of the British Ecological Society* (12): 283-293. (1993)

NAL Call #: QH540.S64;  
ISSN: 0262-7027.

Notes: In the series analytic: Primary succession on land / edited by J. Miles and D.W.H. Walton. Proceedings of a symposium held September 5-7, 1989, Liverpool, England. Includes references.

*Descriptors:* plant ecology/ plant succession/ community ecology/ wildlife conservation/ nature reserves/ habitats/ literature reviews/ arthropods/ odonta  
This citation is from AGRICOLA.

**1233. Principles for management of aquatic-breeding amphibians.**

Semlitsch, R. D.  
*Journal of Wildlife Management* 64 (3): 615-631. (2000)  
NAL Call #: 410 J827;  
ISSN: 0022-541X  
*Descriptors:* Wildlife management/ Conservation/ Population dynamics/ Wetlands/ Ecosystem management/ Breeding sites/ Hydrology/ Nature conservation/ Land use/ Amphibial/ Amphibians/ species diversity/ Conservation/ Habitat community studies / Conservation, wildlife management and recreation  
*Abstract:* Coordinated efforts by ecologists and natural resource managers are necessary to balance the conservation of biological diversity with the potential for sustained economic development. Because some amphibians have suffered world-wide declines during the last 20 years, it is important to consider biologically based management strategies that will preserve local and regional populations. This paper provides a brief overview of potential threats to local and regional populations, the state of knowledge on population and landscape processes, and the critical elements needed for an effective management plan for amphibians. Local population dynamics and ecological connectivity of amphibian metapopulations must be considered in effective management plans. There are 3 critical factors to consider in a management plan (1) the number or density of individuals dispersing from individual wetlands, (2) the diversity of wetlands with regard to hydroperiod, and (3) the probability of dispersal among adjacent wetlands or the rescue and recolonization of local populations. Wetland losses reduce the total number of sites where pond-breeding amphibians can reproduce and recruit juveniles into the breeding population. Loss of small, temporary wetlands (<4.0 ha) may be especially harmful to amphibians because of their abundance and high species diversity. Alteration of wetlands, particularly hydrologic cycles, can severely impair completion of larval

metamorphosis through either early pond drying (if hydroperiod is shortened) or through increased predation (if hydroperiod is lengthened or connections made with fish-infested lakes, rivers, or canals). Wetland loss also increases the distance between neighboring wetlands that is critical to metapopulation source-sink processes. Reduction in wetland density reduces the probability that populations will be rescued from extinction by nearby source populations. Local populations cannot be considered independent of source-sink processes that connect wetlands at the landscape or regional level. Further the fragmentation of natural habitats from timber harvesting, agriculture, roads, drainage canals, or urban development impedes or prevents dispersal and decreases the probability of wetland recolonization. If our goal is to maintain or enhance present levels of amphibian diversity, then resource managers must incorporate critical elements into plans that protect population and landscape processes thereby maintaining viable populations and communities of amphibians.  
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**1234. Principles for managing nitrogen leaching.**

Meisinger, J. J. and Delgado, J. A.  
*Journal of Soil and Water Conservation* 57 (6): 485-498. (2002)  
NAL Call #: 56.8-J822;  
ISSN: 0022-4561 [JSWCA3].  
*Notes:* Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina. Includes references.  
*Descriptors:* nitrogen / losses from soil/ leaching/ nitrogen fertilizers/ application rates/ low input agriculture/ pollution control/ cover crops/ rotations/ legumes/ irrigation scheduling/ riparian vegetation/ land banks/ fertilizer requirement determination/ remote sensing/ geographical information systems/ global positioning systems/ soil fertility/ cropping systems/ nutrient management plan  
This citation is from AGRICOLA.

**1235. Probability of Nitrate Contamination of Recently Recharged Groundwaters in the Conterminous United States.**

Nolan, B. T.; Hitt, K. J.; and Ruddy, B. C.  
*Environmental Science and Technology* 36 (10): 2138-2145. (2002)  
NAL Call #: TD420.A1E5;  
ISSN: 0013-936X  
*Descriptors:* Nitrates / Groundwater recharge/ Contamination/ Measuring methods/ Mathematical models/ Risk assessment/ Statistical analysis/ Nitrate/ Recharge/ Contamination/ Determination/ Risk analysis/ Pollution (Groundwater)/ United States / Water Pollution Sources/ Groundwater Pollution/ Risk/ Fertilizers/ United States/ Freshwater pollution/ Water Quality/ Sources and fate of pollution  
*Abstract:* A new logistic regression (LR) model was used to predict the probability of nitrate contamination exceeding 4 mg/L in predominantly shallow, recently recharged groundwaters of the United States. The new model contains variables representing (1) N fertilizer loading ( $p < 0.001$ ), (2) percent cropland--pasture ( $p < 0.001$ ), (3) natural log of human population density ( $p < 0.001$ ), (4) percent well-drained soils ( $p < 0.001$ ), (5) depth to the seasonally high water table ( $p < 0.001$ ), and (6) presence or absence of unconsolidated sand and gravel aquifers ( $p = 0.002$ ). Observed and average predicted probabilities associated with deciles of risk are well correlated ( $r^2 = 0.875$ ), indicating that the LR model fits the data well. The likelihood of nitrate contamination is greater in areas with high N loading and well-drained surficial soils over unconsolidated sand and gravels. The LR model correctly predicted the status of nitrate contamination in 75% of wells in a validation data set. Considering all wells used in both calibration and validation, observed median nitrate concentration increased from 0.24 to 8.30 mg/L as the mapped probability of nitrate exceeding 4 mg/L increased from less than or equal to 0.17 to >0.83.  
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**1236. The problem of irrigated horticulture: Matching the biophysical efficiency with the economic efficiency.**

Stirzaker, R. J.

*Agroforestry Systems* 45 (1/3): 187-202. (1999)

NAL Call #: SD387.M8A3;

ISSN: 0167-4366 [AGSYE6].

Notes: Special issue: Agriculture as a mimic of natural ecosystems / edited by E.C. Lefroy, R.J. Hobbs, M.H. O'Connor and J.S. Pate. Paper presented at a workshop held September 2-6, 1997, Williams, Western Australia, Australia. Includes references.

Descriptors: horticulture/ irrigation/ efficiency/ economic analysis/ water/ leakage/ ecosystems/ eutrophication/ degradation/ farm management/ agriculture/ soil management/ literature reviews

This citation is from AGRICOLA.

**1237. The problems caused by chicken faeces and their resolution (a review).**

Baydan E and Yildiz G

*Lalahan Hayvancilik Arastirma*

*Enstitusu Dergisi* 40 (1): 98-105; 31 ref. (2000)

This citation is provided courtesy of CAB International/CABI Publishing.

**1238. Process for assessing proper functioning condition for Lentic Riparian-Wetland Areas.**

Prichard, Don.; United States. Bureau of Land Management. Denver Service Center; and United States. Bureau of Land Management. Lentic Riparian Wetland Area. Proper Functioning Condition Work Group.

Denver, CO: U.S. Dept. of the Interior, Bureau of Land Management, Service Center; vi, 37 p.: ill., (some col.); Series: Riparian area management. Technical reference (United States. Bureau of Land Management) 1737-11. (1994)

Notes: "Supplement to Riparian area management TR 1737-9"--Report documentation p. Shipping list no.: 94-0393-P. "September 1994"--Report documentation p. "BLM/SC/ST-94/008+1737"--P. [2] of cover. Includes bibliographical references (p. 19).

SUDOCs: I 53.35:1737-11.

NAL Call #: QH541.5.R52P76--1994

Descriptors: Riparian ecology---

United States/ Wetland conservation

---United States/ Stream conservation

---United States

This citation is from AGRICOLA.

**1239. Process, Form and Change in Dryland Rivers: A Review of Recent Research.**

Tooth, S.

*Earth Science Reviews* 50 (1-4): 67-107. (2000);

ISSN: 0012-8252

Descriptors: Australia/ Arid Lands/ Ephemeral Streams/ Rivers/ Research Priorities/ Hydrology/ Sediment Transport/ Fluvial Sediments/ Streamflow and runoff

Abstract: Many of the world's extensive warm dryland regions support numerous, albeit often infrequently flowing, rivers. Dryland rivers are increasingly a focus of scientific and applied interest but empirical research and fluvial theory for drylands need to be strengthened. Recent research in arid central Australia indicates greater diversity in dryland river process, form and change than has hitherto been appreciated, and highlights the need for a global review assessing the present state of knowledge. This review outlines the distinctive characteristics of dryland fluvial environments (hillslope and channel hydrological and sediment transport processes, river pattern and geometry, temporal and spatial aspects of channel change, sedimentary structures and bedforms), many of which contrast with more humid fluvial environments. Although features common to many dryland fluvial environments can be identified (extreme temporal and spatial variability of rainfall, runoff and sediment transport, poor integration between tributary and trunk channels, importance of large floods as a control on channel morphology, lack of equilibrium between process and form), the fluvial diversity that exists within drylands requires recognition of the limitations to these generalisations. In particular, research in central Australia illustrates the need to understand the rivers of this region using empirical relationships, terms, and concepts additional to those defined by earlier work in drylands. Key deficiencies in dryland fluvial research are identified, and relate to three main areas: limited study of some aspects of modern dryland rivers (floodplain characteristics,

influence of vegetation, downstream changes, importance of scale); limited understanding of dryland river behaviour over longer (Cenozoic) timescales; and lack of integration between the results from short-term, process-form studies and studies of the longer term histories of river behaviour. Linking knowledge of past hydrological and channel changes to present-day changes in dryland rivers is suggested as a key research priority. This will help develop a sound theoretical basis for the assessment of future developments in dryland river systems which will contribute to their improved scientific understanding and environmentally sensitive management.

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**1240. Processes controlling ammonia emission from livestock slurry in the field.**

Sommer, S. G.; Générmont, S.;

Cellier, P.; Hutchings, N. J.;

Olesen, J. E.; and Morvan, T.

*European Journal of Agronomy*

19 (4): 465-486. (2003)

NAL Call #: SB13.E97;

ISSN: 1161-0301

This citation is provided courtesy of CAB International/CABI Publishing.

**1241. Processes controlling soil phosphorus release to runoff and implications for agricultural management.**

McDowell, R. W.; Sharpley, A. N.;

Condron, L. M.; Haygarth, P. M.; and

Brookes, P. C.

*Nutrient Cycling in Agroecosystems*

59 (3): 269-284. (2001)

NAL Call #: S631.F422;

ISSN: 1385-1314 [NCAGFC]

Descriptors: agricultural land/ groundwater/ phosphorus/ leaching/ eutrophication/ runoff/ land management/ manures/ erosion/ soil solution/ movement in soil

Abstract: Phosphorus (P) loss from agricultural land to surface waters is well known as an environmental issue because of the role of P in freshwater eutrophication. Much research has been conducted on the erosion and loss of P in sediments and surface runoff. Recently, P loss in sub-surface runoff via agricultural drainage has been identified as environmentally significant. High soil P levels are considered as a potential source of P loss. However, without favourable hydrological conditions P will not

move. In this paper, we review the basis of soil P release into solution and transport in surface and sub-surface runoff. Our objectives are to outline the role of soil P and hydrology in P movement and management practices that can minimize P loss to surface waters. Remedial strategies to reduce the risk of P loss in the short-term are discussed, although it is acknowledged that long-term solutions must focus on achieving a balance between P inputs in fertilizers and feed and P outputs in production systems.  
This citation is from AGRICOLA.

**1242. Processes of fluvial island formation, with examples from Plum Creek, Colorado and Snake River, Idaho.**

Osterkamp, W R  
*Wetlands* 18 (4): 530-545. (1998)  
NAL Call #: QH75.A1W47;  
ISSN: 0277-5212  
*Descriptors:* fluvial island formation: flooding/ riparian habitat/ riparian vegetation  
*Abstract:* A fluvial island is a landform, elevated above and surrounded by stream-channel branches or waterways, that persists sufficiently long to establish permanent vegetation. Natural fluvial islands occur in any part of a drainage network but most commonly in montane, piedmont-valley, and coastal flood-plain environments. Processes, often interactive, by which islands form include avulsion (the sudden separation of land by a flood or by an abrupt change in the course of a stream), rapid and gradual channel incision, channel migration, dissection of both rapidly and slowly deposited bed sediment, and deposition of bed sediment on a vegetated surface or behind a channel obstruction. Products of high-energy conditions, fluvial islands typically lack stability over decades to millennia. Fluvial islands in Plum Creek, Colorado, USA, results of sorting processes following a recent high-magnitude flood, and in the Snake River, Idaho, USA, partly results of the Pleistocene Bonneville Flood, illustrate how islands form, develop, and disappear. The examples consider differing conditions of island shape, size, height, sediment, and vegetation.

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**1243. The processes of species colonisation in wooded landscapes: A review of principles.**

Dolman, P. M. and Fuller, R. J.  
In: *The restoration of wooded landscapes: Proceedings of a conference.* (Held 14 Sep 2000-15 Sep 2000 at Heriot Watt University, Edinburgh, UK.) Humphrey, J.; Newton, A.; Latham, J.; Gray, H.; Kirby, K.; Poulson, E.; and Quine, C. (eds.); pp. 25-36; 2003.  
ISBN: 0-85538-589-8  
This citation is provided courtesy of CAB International/CABI Publishing.

**1244. Producing and using conditioned poultry litter in horticulture: Final report.**

Paulin, R.  
Bentley, WA: Western Australian Dept. of Agriculture; 60 p.: ill.; Series: Miscellaneous publication (Western Australia. Dept. of Agriculture) 01/22. (2001)  
*Notes:* Cover title. "August 2001."  
Includes bibliographical references.  
NAL Call #: S397-.M57-no.-2001/22  
This citation is from AGRICOLA.

**1245. Production of vegetables using cover crop and living mulches: A review.**

Masiunas JB  
*Journal of Vegetable Crop Production* 4 (1): 11-31; 6 pp. of ref. (1998)  
This citation is provided courtesy of CAB International/CABI Publishing.

**1246. Production, purification and properties of microbial phytases.**

Pandey, A.; Szakacs, G.; Soccol, C. R.; Rodriguez Leon, J. A.; and Soccol, V. T.  
*Bioresource Technology* 77 (3): 203-214. (May 2001)  
NAL Call #: TD930.A32;  
ISSN: 0960-8524 [BIRTEB].  
*Notes:* Reviews issue. Includes references.  
*Descriptors:* phytase/ feeds/ animal manures/ pollution control  
This citation is from AGRICOLA.

**1247. Productive water use in rice production: Opportunities and limitations.**

Tuong, T. P.  
*Journal of Crop Production* 2 (2): 241-264. (1999)  
NAL Call #: SB1.J683;  
ISSN: 1092-678X [JCPRF8].  
*Notes:* Special issue: Water use in crop production / edited by M.B. Kirkham. Includes references.

*Descriptors:* oryza sativa/ water use efficiency/ water use/ water availability/ evapotranspiration/ fertilizers/ use efficiency/ labor/ weed control/ evaluation/ irrigation/ flooded rice/ percolation/ water balance/ crop growth stage/ growth period/ crop management/ planting date/ harvesting date/ cultivars/ transplanting/ crop yield/ permeability/ soil pore system/ depth/ duration/ flooding/ literature reviews  
This citation is from AGRICOLA.

**1248. Profitability of Soil and Water Conservation in Canada: A Review.**

Stonehouse, D. P.  
*Journal of Soil and Water Conservation* 50 (2): 215-219. (1995)  
NAL Call #: 56.8 J822;  
ISSN: 0022-4561  
*Descriptors:* Canada/ conservation/ resources management/ agricultural practices/ soil erosion/ fallowing/ wind erosion/ drought/ soil compaction/ erosion control/ pesticide residues/ manure/ fertilizers/ soil conservation/ water conservation/ economics/ resource management/ environmental degradation/ agriculture/ environmental impact/ Watershed protection/ Environmental action/ Conservation, wildlife management and recreation  
*Abstract:* Canada has had a short-lived and low-key experience with agricultural activity-related resource degradation problems because its agricultural production potential began to be realized only during the last 100 years or so. The problems are nevertheless critical, given the small landbase suitable for agriculture and a precarious climate (Dumanski et al.). The bastion of Canadian agriculture in the prairies was opened to farming only early in the 20th century, but severe drought in the 1930s combined with farming activities to produce extensive erosion problems. More moderate climatic conditions and modified farming practices lessened degradation problems until the reemergence of severe drought conditions in the 1980s. Heightened concerns about degradation are associated with organic matter depletion, wind and water-borne erosion, and rising salinity resulting primarily from summer fallowing practices (Cann et al.; Rennie), but also from increasing cultivation of marginal lands, largely instigated by government support programs (Van Kooten and Kennedy).

Elsewhere in western Canada, degradation problems are associated with surfeits of livestock manures in southwestern British Columbia, pesticide residues from intensive fruit farming in the Okanagan Valley, and aquaculture wastes in coastal water bodies (Van Kooten and Kennedy).  
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**1249. Progress and Data Gaps in Quantitative Microbial Risk Assessment.**

Haas, C. N.

*Water Science and Technology*

46 (11-12): 277-284. (2002)

NAL Call #: TD420.A1P7;

ISSN: 0273-1223.

Notes: Conference: Asian Waterqual 2001: IWA Asia-Pacific Regional Conference, Fukuoka [Japan], 12-15 Sep 2001; Source: Water Quality and Environmental Management in Asia; Editors: Kusuda, T. //Utsumi, H.; ISBN: 18433984324

Descriptors: Water Pollution Effects/ Public Health/ Human Population/ Human Diseases/ Exposure/ Pathogens/ Reviews/ Research Priorities/ Microbiological Studies/ Pollution (Water)/ Risk analysis/ Pollution (Microbiological)/ Public health/ Pathogenic organism/ Water pollution/ risk assessment/ Effects of pollution/ Effects of Pollution/ Other water systems

Abstract: Quantitative microbial risk assessment (QMRA) has emerged as a useful tool to develop criteria for human exposures to pathogens. There is opportunity to extend the usefulness of this tool in water and other applications if new fundamental information can be obtained to complement existing data. Such information includes effects of strain and host differences, population level disease dynamics, and ability of animal data to serve as a predictor of human potency. This paper reviews the development of QMRA and outlines the nature of additional data that would be useful for its development.

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**1250. Progress in wetland restoration ecology.**

Zedler, Joy B

*Trends in Ecology and Evolution*

15 (10): 402-407. (2000)

NAL Call #: QH540.T742;

ISSN: 0169-5347

Descriptors: biodiversity/ disturbance regimes/ habitat types/ invasive species/ landscape setting/ seed banks/ soil properties/ spatial scales/ temporal/ topography/ water preservation/ wetland restoration ecology

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**1251. Projecting the bird community response resulting from the adoption of shelterbelt agroforestry practices in Eastern Nebraska.**

Pierce, R A; Farrand, D T; and

Kurtz, W B

*Agroforestry Systems* 53 (3):

333-350. (2001)

NAL Call #: SD387.M8A3;

ISSN: 0167-4366

Descriptors: bird (Aves): community response, landscape variables/ tree (Spermatophyta)/ Animals/ Birds/ Chordates/ Nonhuman Vertebrates/ Plants/ Spermatophytes/ Vascular Plants/ Vertebrates/ agroforestry: shelterbelt plantings

Abstract: Evolving agricultural policies have influenced management practices within agroecosystems, impacting available habitats for many species of wildlife. Enhancing wildlife habitat has become an explicit objective of existing agricultural policy. Thus, there is renewed focus on field borders and the use of shelterbelt agroforestry systems to achieve conservation goals in the Midwest. Two Representative Farms - a 283-ha dryland and 510-ha irrigated farm were created in Saunders County, Nebraska. The Habitat Analysis and Modeling System (HAMS) was used to describe the composition and spatial pattern of the existing farms and surrounding landscape, as well as for the landscapes surrounding selected Breeding Bird Survey (BBS) routes. Simulated land use changes resulting from the implementation of two shelterbelt scenarios, Agricultural and Wildlife, were incorporated on each Representative Farm and surrounding landscape. Landscape variables which influence breeding bird species richness and community composition as determined from BBS routes were measured on simulated farm landscapes. A more heterogeneous landscape results from implementing either scenario. The percent total woods was a significant determinant of bird species richness on the BBS routes and was important in

influencing bird communities at the farm- and landscape-level. Other landscape metrics which influenced the bird community composition on BBS routes were woody edge percentages and edge density values. Policies promoting shelterbelts create edge habitats which ultimately favor birds within the Forest-edge/generalist guild while bird species in need of conservation such as grassland-field species would potentially be negatively affected.

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**1252. Prospect for pathogen reductions in livestock wastewaters: A review.**

Hill, V. R.

*Critical Reviews in Environmental Science and Technology* 33 (2):

187-235. (2003)

NAL Call #: QH545.A1C7;

ISSN: 1064-3389 [CRETEK.]

Descriptors: concentrated animal feeding operations/ excreta/ animal manures/ animal manure management/ disinfection/ constructed wetlands/ waste treatment

This citation is from AGRICOLA.

**1253. Prospects and limitations of phytoremediation for the removal of persistent pesticides in the environment.**

Chaudhry, Qasim; Schroeder, Peter; Werck, Reichhart Daniele; Grajek, Wlodzimierz; and Marecik, Roman  
*Environmental Science and Pollution Research International* 9 (1): 4-17. (2002);

ISSN: 0944-1344

Descriptors: carbamate: pollutant/ organochlorine: pollutant/ organophosphate: pollutant/ plant (Plantae)/ Plants

Abstract: The environmental problems that have arisen from the use of persistent pesticides in the past, and potential sources of further contamination have been discussed. The potential and limitations of phytoremediation for removal of pesticides in the environment have been reviewed. The enzymatic processes in plants that are known to be involved in phytodegradation of pesticides, and possibilities for enhancing them have also been discussed.

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**1254. Prospects for composts and biocontrol agents as substitutes for methyl bromide in biological control of plant diseases.**

De, Ceuster Tom J J and Hoitink, Harry A J  
*Compost Science and Utilization* 7 (3): 6-15. (1999)  
 NAL Call #: TD796.5.C58;  
 ISSN: 1065-657X  
*Descriptors:* methyl bromide: pollutant, soil fumigant/ organic matter/ plant nutrients/ biological control/ composts: disease suppressive effects/ disease control  
*Abstract:* Methyl bromide, an effective soil fumigant for control of soilborne plant pathogens, is scheduled to be phased out by 2005 because of its negative impacts on the environment. Many chemical alternatives to methyl bromide have been proposed but so far, none have proved as effective. Composts have long been recognized to provide a degree of control of diseases caused by soilborne plant pathogens. For this reason, disease-suppressive effects of composts have been investigated intensively over the past two decades. Many compost quality factors must be controlled to obtain consistent effects with these organic amendments. The composition of the organic matter from which the compost is prepared, the composting process itself, the stability or maturity of the compost, the quantity of available plant nutrients provided by the compost, loading rates, time of application, and other factors all must be controlled. These and other factors are reviewed in this paper. Despite these difficulties, the use of compost for disease control is increasing rapidly. The nursery industry for decades has taken advantage of this benefit associated with compost utilization.  
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**1255. Prospects for minimizing phosphorus excretion in ruminants by dietary manipulation.**

Valk, H.; Metcalf, J. A.; and Withers, P. J. A.  
*Journal of Environmental Quality* 29 (1): 28-36. (2000)  
 NAL Call #: QH540.J6;  
 ISSN: 0047-2425  
 This citation is provided courtesy of CAB International/CABI Publishing.

**1256. Prospects for reducing environmental risk at the watershed level from pesticide loss from farm fields using alternative management practices.**

Bagdon, Joe; Plotkin, Steve; Hesketh, Eric; Kellogg, Robert L.; and Wallace, Susan.  
 In: 53rd Annual Soil and Water Conservation Service Conference. (Held 5 Jul 1998-9 Jul 1998 at San Diego, California.)  
 Washington, D.C.: U.S. Dept. of Agriculture, Natural Resources Conservation Service; 1998.  
*Notes:* Title from web page.  
 Description based on content viewed May 16, 2003. "Poster presented at the 53rd annual SWCS Conference, San Diego, California, July 5-9, 1998."  
 NAL Call #: aTD427.P35-P77-1998  
<http://www.nrcs.usda.gov/technical/land/pubs/naptext.html>  
*Descriptors:* Pesticides---Environmental aspects---United States/ Pesticides---Environmental aspects---United States---Measurement/ Pesticides---Toxicology---United States/ Watersheds---Environmental aspects---United States/ Watershed management---United States/ Pesticides Application---United States  
 This citation is from AGRICOLA.

**1257. Prospects for the drainage of clay soils.**

Rycroft, David W.; Amer, M. H.; and Food and Agriculture Organization of the United Nations.  
 Rome: Food and Agriculture Organization of the United Nations; xii, 134 p.: ill., maps; Series: FAO irrigation and drainage paper 51. (1995)  
*Notes:* "M-56."--T.p. verso. Includes bibliographical references (p. 123-134).  
 NAL Call #: S612.I754--no.51;  
 ISBN: 9251036241  
*Descriptors:* Drainage/ Clay soils  
 This citation is from AGRICOLA.

**1258. Prospects for the recovery of phosphorus from animal manures: A review.**

Greaves J; Hobbs P; Chadwick D; and Haygarth P  
*Environmental Technology* 20 (7): 697-708; 69 ref. (1999)  
 NAL Call #: TD1.E59  
 This citation is provided courtesy of CAB International/CABI Publishing.

**1259. Protecting and Restoring America's Watersheds: Status, Trends, and Initiatives in Watershed Management.**

U. S. Environmental Protection Agency, Office of Water Office of Wetlands Oceans and Watersheds. U. S. Environmental Protection Agency [Also available as: EPA-B40-R-00-001], 2001 (application/pdf)  
<http://www.epa.gov/owow/protecting/restore725.pdf>  
*Descriptors:* watershed management/ ecological restoration/ environmental protection/ watershed hydrology/ water pollution/ chemical residues/ nutrient enrichment/ sediments/ runoff/ pathogens/ waterborne diseases/ invasive species/ environmental monitoring/ governmental programs and projects/ environmental education/ citizen participation/ partners (people)/ program planning/ program evaluation/ thermal pollution

**1260. Protecting surface water from pesticide contamination in North Dakota: Recommendations for assessment and management: A review and analysis of scientific literature.**

Seelig, Bruce Duane. and NDSU Extension Service.  
 Fargo, N.D.: NDSU Extension Service; 50 p.: ill., maps; Series: Extension report (NDSU Extension Service) no. 37. (1998)  
*Notes:* Cover title. "April 1998." Includes bibliographical references (p. 19-25).  
 NAL Call #: S451.N9E98-no.37  
*Descriptors:* Pesticides---Environmental aspects---North Dakota/ Pesticides Risk mitigation---North Dakota/ Water---Pollution---Research---North Dakota  
 This citation is from AGRICOLA.

**1261. Protocol for developing pathogen TMDLs.**

United States. Environmental Protection Agency. Office of Water. Washington, D.C.: U.S. Environmental Protection Agency, Office of Water; 1 v. (various pagings): ill. (2001)  
*Notes:* 1st ed.; "January 2001." Includes bibliographical references.  
 NAL Call #: TD427.M53-P76-2001  
[http://www.epa.gov/owow/tmdl/pathogen\\_all.pdf](http://www.epa.gov/owow/tmdl/pathogen_all.pdf)

*Descriptors:* Pathogenic microorganisms---Environmental aspects---United States/ Water---Pollution---Total daily maximum load  
This citation is from AGRICOLA.

**1262. Protocol for developing sediment TMDLs.**

Smith, David W.; Craig, John.; Sediment Protocol Development Team (U.S.); and United States. Environmental Protection Agency. Office of Water. Washington, D.C.: U.S. Environmental Protection Agency, Office of Water; 1 v. (various pagings): ill. (1999)  
*Notes:* 1st ed.; "October 1999." This paper was written by EPA's Sediment Protocol TMDLs Team, led by David W. Smith, with assistance from John Craig. "EPA 841-B-99-004." Includes bibliographical references.  
*NAL Call #:* TD423-.S65-1999  
<http://www.epa.gov/owow/tmdl/sediment/pdf/sediment.pdf>  
*Descriptors:* Water---Pollution---Total maximum daily load/ Sedimentation and deposition---United States  
This citation is from AGRICOLA.

**1263. Public scholarship: Linking weed science with public work.**

Jordan, N.; Gunsolus, J.; Becker, R.; and White, S.  
*Weed Science* 50 (5): 547-554. (Sept. 2002-Oct. 2002)  
*NAL Call #:* 79.8-W41;  
*ISSN:* 0043-1745 [WEESA6]  
*Descriptors:* weeds/ weed control/ sustainability/ agricultural research/ interdisciplinary research/ innovation adoption/ public works/ case studies/ guidelines/ integrated pest management/ literature reviews  
*Abstract:* Weed scientists face complex and difficult challenges. Within our discipline, we must increase the sustainability of current weed management approaches and help respond to invasive plants as a component of global change. There also are major challenges that we share with other agricultural disciplines, such as mounting comprehensive efforts to address the problems of current agriculture. We believe that any effective response to these challenges will require public work, i.e., projects in which a diverse group of people work together-across lines of difference (professional, cultural, etc.)-to produce broad-based, systemic innovations that meet complex challenges. We propose that

weed scientists should join relevant public-work projects by practicing "public scholarship." We define public scholarship as original, creative, peer-evaluated intellectual work that is fully integrated in a public-work project. By full integration we mean that the scholar's work serves to fuel the social (i.e., collective) learning of the public-work group. This condition requires that the scholar be a full participant in the group rather than just being in a consultative or advisory role. We present several case studies of weed scientists practicing public scholarship. These scientists found this mode of scholarship to be a highly effective means by which to address their professional priorities. Barriers to the practice of public scholarship include the lack of relevant guidelines and norms within academic culture, e.g., with regard to quality-assurance standards. But public scholarship offers weed scientists a new way of responding to increasingly urgent demands to show that our work effectively produces public value in return for public investment. We believe that graduate programs in weed science should begin to offer students opportunities to learn skills that are relevant to public scholarship.  
This citation is from AGRICOLA.

**1264. Pulse crop adaptation in the Northern Great Plains.**

Miller, P. R.; McConkey, B. G.; Clayton, G. W.; Brandt, S. A.; Staricka, J. A.; Johnston, A. M.; Lafond, G. P.; Schatz, B. G.; Baltensperger, D. D.; and Neill, K. E.  
*Agronomy Journal* 94 (2): 261-272. (2002)  
*NAL Call #:* 4-AM34P;  
*ISSN:* 0002-1962  
This citation is provided courtesy of CAB International/CABI Publishing.

**1265. The quality of our nation's waters: Nutrients and pesticides.**

Fuhrer, Gregory J. and Geological Survey (U.S.). Reston, Va: U.S. Dept. of the Interior, U.S. Geological Survey. (1999)  
*Notes:* Caption title.;  
*ISBN:* 0607922966  
<http://water.usgs.gov/pubs/circ/circ12/25/>  
*Descriptors:* Nutrient pollution of water---United States/ Pesticides---Environmental aspects---United States/ Water quality---United States  
This citation is from AGRICOLA.

**1266. Quantification of compaction effects on soil physical properties and crop growth.**

Ahuja, L. R. and Hatano, R.  
*Geoderma* 116 (1/2): 107-136. (2003)  
*NAL Call #:* S590.G4;  
*ISSN:* 0016-7061  
This citation is provided courtesy of CAB International/CABI Publishing.

**1267. Quantifying and characterizing contemporary riparian sedimentation.**

Steiger, J.; Gurnell, A. M.; and Goodson, J. M.  
*River Research and Applications* 19 (4): 335-352. (2003)  
*NAL Call #:* TC530 R43;  
*ISSN:* 1535-1459.  
*Notes:* Number of References: 114  
*Descriptors:* Environment/ Ecology/ sediment traps/ sedimentation/ river margins/ riparian wetlands/ floodplains / hydroecology/ fresh water wetlands/ floodplain sedimentation/ salt marsh/ overbank deposition/ inundation forest/ plant communities/ sand deposition/ extreme flood/ taruma mirim/ seed banks  
*Abstract:* Fluvial processes of erosion, sediment transport and deposition determine the changing form and sedimentary structure of naturally adjusting riparian zones. Riparian sediment storage has both scientific and management importance in relation to: (i) the quantities of sediment that are involved; (ii) the quality of the sediment; and (iii) the dispersal of biological materials, notably the vegetation propagules that are transported and deposited in association with the sediment. After discussing the significance of riparian sedimentation processes, this paper reviews methods for quantifying contemporary sediment deposition within water bodies and their margins. Methods for investigating contemporary riparian sedimentation are given particular emphasis, and the extent to which different methods provide comparable estimates and have been used to support the analysis of different physical and chemical properties of the sediment are outlined. The importance of the following are stressed: (i) selecting a sampling method that is suited to the sedimentation environment; (ii) incorporating careful cross-calibration if measurements from different methods are to be combined; and (iii)

replicating measurements to give more robust estimates if small traps are employed. It is concluded that artificial turf mats provide a useful design of sediment trap across a range of environmental conditions because: (i) their surface roughness reduces problems of sediment removal by flood waters or rainfall; (ii) their pliability permits installation on irregular surfaces; (iii) they can be securely attached to the ground with metal pins to resist high shear stresses from river flows; (iv) they are robust and light and so easily manipulated in the field and laboratory; (v) it is possible to fully recover the deposited sediment to accurately determine the amount of sediment deposited and to support a range of other analyses. Results are presented to illustrate how artificial turf mats can be used to estimate the quantity and quality of deposited sediment and to explore the associated deposition of viable seeds. This provides one example of the important hydroecological role of riparian sedimentation processes and of the potential for the development of innovative, interdisciplinary research on riparian sediment dynamics. Copyright (C) 2003 John Wiley Sons, Ltd.  
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**1268. Quantifying phosphorus losses from the agricultural system.**

Lemunyon, J. L. and Daniel, T. C.  
*Journal of Soil and Water Conservation* 57 (6): 399-401. (2002)  
NAL Call #: 56.8-J822;  
ISSN: 0022-4561 [JSWCA3].  
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina. Includes references.  
Descriptors: phosphorus/ losses from soil/ quantitative techniques/ measurement/ agricultural soils/ agricultural land/ water erosion/ sediment yield/ runoff/ leaching/ drainage/ crops/ harvesting  
This citation is from AGRICOLA.

**1269. Quantifying the loss mechanisms of nitrogen.**

Delgado, J. A.  
*Journal of Soil and Water Conservation* 57 (6): 389-398. (2002)  
NAL Call #: 56.8-J822;  
ISSN: 0022-4561 [JSWCA3].  
Notes: Special section: Nutrient management in the United States. Paper presented at a joint symposium of the Soil and Water Conservation Society and the Soil Science Society of America held August 4-8, 2001, Myrtle Beach, South Carolina and Charlotte, North Carolina. Includes references.  
Descriptors: nitrogen fertilizers/ nitrogen/ losses from soil/ nitrate/ leaching/ denitrification/ soil fertility/ measurement/ pollution control/ agricultural soils/ soil properties/ literature reviews/ nutrient management  
This citation is from AGRICOLA.

**1270. A quantitative summary of attitudes toward wolves and their reintroduction (1972-2000).**

Williams, Christopher K; Ericsson, Goran; and Heberlein, Thomas A  
*Wildlife Society Bulletin* 30 (2): 575-584. (2002)  
NAL Call #: SK357.A1W5;  
ISSN: 0091-7648  
Descriptors: Canis [wolf] (Canidae)/ human (Hominidae)/ Animals/ Carnivores/ Chordates/ Humans/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Primates/ Vertebrates/ age/ attitudes towards wolves/ education/ experience/ farming / income/ negative attitudes/ positive attitudes/ ranching/ restoration/ rural residence/ urbanization/ wolf reintroduction  
Abstract: This paper reports an analysis of support for wolves (Canis spp.) reported in 38 quantitative surveys conducted between 1972 and 2000. Of 109 records reported in these surveys, a majority (51%) showed positive attitudes toward wolves and 60% supported wolf restoration. Attitudes toward wolves had a negative correlation with age, rural residence, and ranching and farming occupations, and positive correlation with education and income. Thirty-five percent of ranchers and farmers surveyed had positive attitudes toward wolves. Among surveys of the general population samples, 61% expressed positive attitudes. Surveys of environmental and wildlife groups

showed an average of 69% support. Surveys in the lower 48 states showed higher proportions of positive attitudes than surveys in Scandinavia and Western Europe, where a majority did not support wolves. Among all surveys, 25% of respondents had neutral attitudes toward wolves. Positive attitudes toward wolves did not appear to be increasing over time. Because attitudes toward wolves are often not strong among the general public, they have the potential to change rapidly if linked to other, stronger attitudes and beliefs. We expect that progress in education and urbanization will lead to increasingly positive attitudes over time. Negative attitudes associated with age are probably a cohort effect, and we should not expect the aging populations in the United States and Europe to lead to more negative wolf attitudes. Paradoxically, successful wolf reintroductions are likely to reduce general positive sentiment, since the presence of wolves gives people a more balanced experience with the animals. Traditionally, people with the most positive attitudes toward wolves have been those with the least experience.  
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**1271. Rainfall Intensity-Kinetic Energy Relationships: A Critical Literature Appraisal.**

Van Dijk, Aijm; Bruijnzeel, L. A.; and Rosewell, C. J.  
*Journal of Hydrology* 261 (1-4): 1-23. (2002)  
NAL Call #: 292.8 J82;  
ISSN: 0022-1694  
Descriptors: Erosion/ Rainfall Intensity/ Kinetic Energy/ Prediction/ Mathematical Equations/ Literature Review/ Comparison Studies/ Performance Evaluation/ Precipitation (Atmospheric)/ Kinetics/ Mathematical analysis/ Soil erosion/ Rainfall erosion/ Australia/ Erosion and sedimentation/ Water Resources and Supplies/ Intensity of precipitation/ Intensity  
Abstract: Knowledge of the relationship between rainfall intensity and kinetic energy and its variations in time and space is important for erosion prediction. However, between studies considerable variations exist in the reported shape and coefficients of this relationship. Some differences can be explained by methods of measurement and interpretation and sample size, range and bias, while

part of the variability corresponds to actual differences in rainfall generating mechanisms. The present paper critically reviews published studies of rainfall intensity and kinetic energy with a view to derive a general predictive equation of an exponential form. The performance of this general equation is compared to that of existing equations using measured rainfall intensity and kinetic energy data for a site in southeastern Australia. It appeared that the energy of individual storms could only be predicted with limited accuracy because of natural variations in rainfall characteristics. By and large, the general equation produced energy estimates that were within 10% of predictions by a range of parameterisations of the exponential model fitted to specific data-sets. Recalculation of rainfall erosivity factors as obtained by the older and revised USLE approaches does not seem warranted for most locations. However, in regions experiencing strong oceanic influence or at high elevations, overall rainfall energy appears to be considerably lower than predicted by the general or USLE equations. Conversely, data collected at semi-arid to sub-humid locations suggest that rainfall energy may be higher than expected under those conditions. Standardised measurements are needed to evaluate rainfall intensity-kinetic energy relationships for such areas.  
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**1272. Rangeland cover types of the United States: Forest cover types of the United States and Canada.** Shiflet, Thomas N. and Society for Range Management. Denver, Colo.: Society for Range Management; xii, 152 p. (1994)  
*Notes:* 1st ed.; "'Companion' publication to the 'Forest cover types of the United States and Canada (1980)'"--P. ix. Includes bibliographical references (p. [142]-152).  
*NAL Call #:* QK115.R36--1994;  
*ISBN:* 1884930018  
*Descriptors:* Range plants---United States/ Rangelands---United States/ Range management---United States/ Range ecology---United States  
This citation is from AGRICOLA.

**1273. Rangeland desertification.** Olafur Arnalds. and Archer, Steve. Dordrecht; Boston: Kluwer Academic Publishers; x, 209 p.: ill., maps; Series: Advances in vegetation science 19. (2000)  
*NAL Call #:* QK1-.A48-v.-19;  
*ISBN:* 0792360710 (HB: alk. paper)  
*Descriptors:* Rangelands/ Desertification/ Range ecology  
This citation is from AGRICOLA.

**1274. Rangeland ecology and management.** Heady, Harold F.; Child, R. Dennis; and Heady, Harold F. Boulder: Westview Press; xvi, 519 p.: ill.; 24 cm. (1994)  
*Notes:* Rev. ed. of: Rangeland management. 1975. Includes bibliographical references and index.  
*NAL Call #:* SF85.H39--1994;  
*ISBN:* 0813320526 (alk. paper);  
*Descriptors:* Range management/ Range ecology  
This citation is from AGRICOLA.

**1275. Rangeland handbook for British Columbia.** Campbell, C. W.; Bawtree, A. H.; and British Columbia Cattlemen's Association. Kamloops, BC: British Columbia Cattlemen's Association; 203 p.: ill. (some col.), col. maps. (1998)  
*Notes:* "December 1998." Includes bibliographical references.  
*NAL Call #:* SF85.4.C2-C34-1998;  
*ISBN:* 0968402402  
*Descriptors:* Range management---British Columbia/ Range ecology---British Columbia  
This citation is from AGRICOLA.

**1276. Rangeland health attributes and indicators for qualitative assessment.** Pyke, D. A.; Herrick, J. E.; Shaver, P.; and Pellant, M. *Journal of Range Management* 55 (6): 584-597. (Nov. 2002)  
*NAL Call #:* 60.18-J82;  
*ISSN:* 0022-409X [JRMGAQ]  
*Descriptors:* grasslands/ grassland condition/ range condition/ range management/ assessment/ rapid methods/ hydrological factors/ soil structure/ rill erosion/ overland flow/ ground cover/ gullied land/ wind erosion/ litter plant/ flow resistance/ soil morphology/ soil compaction/ vegetation/ mortality/ biomass production/ introduced species/ perennials/ data collection/ ecological balance/ literature reviews/ United

States/ soil surface/ invasive species  
*Abstract:* Panels of experts from the Society for Range Management and the National Research Council proposed that status of rangeland ecosystems could be ascertained by evaluating an ecological site's potential to conserve soil resources and by a series of indicators for ecosystem processes and site stability. Using these recommendations as a starting point, we developed a rapid, qualitative method for assessing a moment-in-time status of rangelands. Evaluators rate 17 indicators to assess 3 ecosystem attributes (soil and site stability, hydrologic function, and biotic integrity) for a given location. Indicators include rills, water flow patterns, pedestals and terraces, bare ground, gullies, wind scour and depositional areas, litter movement, soil resistance to erosion, soil surface loss or degradation, plant composition relative to infiltration, soil compaction, plant functional/structural groups, plant mortality, litter amount, annual production, invasive plants, and reproductive capability. In this paper, we detail the development and evolution of the technique and introduce a modified ecological reference worksheet that documents the expected presence and amount of each indicator on the ecological site. In addition, we review the intended applications for this technique and clarify the differences between assessment and monitoring that lead us to recommend this technique be used for moment-in-time assessments and not be used for temporal monitoring of rangeland status. Lastly, we propose a mechanism for adapting and modifying this technique to reflect improvements in understanding of ecosystem processes. We support the need for quantitative measures for monitoring rangeland health and propose some measures that we believe may address some of the 17 indicators.  
This citation is from AGRICOLA.

**1277. Rangeland health: New methods to classify, inventory, and monitor rangelands.** National Research Council (U.S.). Committee on Rangeland Classification. Washington, D.C.: National Academy Press; xvi, 180 p.: ill. (1994)  
*Notes:* Includes bibliographical references (p. 158-168) and index.

NAL Call #: SF85.3.R36--1994;  
 ISBN: 0309048796  
<http://books.nap.edu/books/0309048796/html/>  
 Descriptors: Range management--United States/ Rangelands--United States/ Range ecology--United States / Range management/ Rangelands/ Range ecology  
 This citation is from AGRICOLA.

**1278. Rangeland monitoring: Water quality and riparian systems.**

Skinner, Q.  
*Arid Land Research and Management* 17 (4): 407-428. (2003)  
 NAL Call #: S592.17.A73 A74.  
 Notes: 1532-4982  
 Descriptors: Environment/ Ecology/ monitoring/ water quality/ riparian zones/ sediment/ bacteria/ vegetative filter strips/ overland flow/ bacterial populations/ sediment deposition/ simulated rainfall/ stubble height/ grass filters/ management/ areas/ zones  
 Abstract: Ecological concepts serve as a foundation for developing a monitoring program to evaluate water quality and associated riparian systems. Ecological concepts used for developing a monitoring plan must be supported by scientific literature and related to streamflow dynamics and channel interactions. These interactions help determine natural or background habitat quality within and along river longitudinal and environmental gradients from mountains through basins in the western United States. In addition stream size, position in the watershed, and flow are related to sediment sorting, channel bank strength, and channel configuration. These relationships determine channel substrate habitat for aquatic organisms and population diversity. These habitat features may be modified by a channel's ability to store and transport sediment and associated pollutants within a watershed's drainage pattern. Sediment supply, delivery, and timing are altered by differences in snowmelt along elevation gradients, runoff from convective storms, water development history, and stream channel succession. Potential impairment of reference or background aquatic habitat in the western United States is generally sediment related and should be greater in basin river segments and during base flow conditions.

Impairment sources can be shown to originate in the steep and first order tributaries of foothill and basin watersheds, and not from valley slopes where supply must cross established riparian zones. Water column, substrate disturbance, and channel bank disturbances may alter amount of sediment and bacteria pollution measured in basins and during base flow conditions.  
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**1279. Rangeland resource trends in the United States: A technical document supporting the 2000 USDA Forest Service RPA assessment.**

Mitchell, John E. and Rocky Mountain Research Station  
 Fort Collins, CO: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Research Station; 84 p.: ill. (some col.), maps (some col.); Series: General technical report RMRS GTR-68. (2000)  
 Notes: Cover title. "December 2000"--P. 4 of cover. Includes bibliographical references (p. 75-84).  
 NAL Call #: aSD144.A14 G46-no. 68  
<http://www.fs.fed.us/rm/pubs/rmrs%5Fgtr68.html>  
 Descriptors: Range management--United States/ Rangelands--United States  
 This citation is from AGRICOLA.

**1280. Rangeland wildlife.**

Krausman, Paul R.  
 Denver, Colo.: Society of Range Management; xi, 440 p.: ill. (1996)  
 Notes: 1st ed.; Includes bibliographical references.  
 NAL Call #: SK361.R36--1996;  
 ISBN: 1884930050  
 Descriptors: Wildlife management--West--United States/ Rangelands--West--United States  
 This citation is from AGRICOLA.

**1281. Rapid on-farm analysis of manure nutrients using quick tests.**

Van Kessel, J. S.; Thompson, R. B.; and Reeves, J. B.  
*Journal of Production Agriculture* 12 (2): 215-224. (Apr. 1999-June 1999)  
 NAL Call #: S539.5.J68;  
 ISSN: 0890-8524 [JPRAEN]  
 Descriptors: animal manures/ nutrient content/ quantitative analysis/ qualitative analysis/ techniques/ evaluation/ errors/ measurement/ equipment/ ammonium/ nitrogen content/ phosphorus/ dry matter/ specific gravity/ electrical conductivity/

potassium/ ammonium nitrogen / color/ slurries/ costs/ literature reviews/ manure management  
 Abstract: Quick tests enabling rapid, on-farm assessment of manure nutrient content could appreciably enhance manure management. The objectives of this study were to review the literature on the accuracy of quick tests, describe their operation, and to assess their ease of use and their suitability for routine on-farm use. These quick tests are the hydrometer, electrical conductivity (EC), ammonia electrode, reflectometer, Agros N Meter (or Nova meter), and Quantofix-N-Volumeter. The ammonia electrode provided accurate direct measurement of slurry ammonium; however, its fragility and the difficulty of setting it up, suggested limited suitability for on-farm use. The hydrometer indirectly measures total N and total P based on relationships with dry matter (total solids) content and specific gravity. Results have been variable between regions and species. Electrical conductivity is used as an indirect measurement of ammonium and K; the limited results to date have been consistently good for ammonium N, and variable for K. The Agros N Meter and Quantofix-N-Volumeter both directly measure ammonium N and possibly some organic N. For both, agreement with lab analyses of ammonium N has been generally very good. The reflectometer measures the color intensity of test strips; limited results with ammonium N in slurries are promising. Several quick tests have the potential for accurately measuring manure nutrients on the farm. They generally were more effective with slurries than solid manures. For each quick test, single farm or regional calibrations with lab analysis are recommended, and in some cases necessary.  
 This citation is from AGRICOLA.

**1282. Rationale and methods for conserving biodiversity in plantation forests.**

Hartley, M. J.  
*Forest Ecology and Management* 155 (1-3): 81-95. (2002)  
 NAL Call #: SD1.F73;  
 ISSN: 0378-1127.  
 Notes: Publisher: Elsevier Science  
 Descriptors: Plantations/ Reviews/ Conservation/ Biological diversity/ Forest management/ Management  
 Abstract: Industrial forest managers

and conservation biologists agree on at least two things: (1) plantation forests can play a role in conserving biodiversity, and (2) plantations will occupy an increasing proportion of future landscapes. I review literature from around the world on the relationship between biodiversity and plantation management, structure, and yield. The dynamics of plantation ecology and management necessarily differ by landscape, geographic area, ecosystem type, etc. This review provides a broad array of management recommendations, most of which apply to most regions, and many patterns are evident. I suggest a new plantation forest paradigm based on the hypothesis that minor improvements in design and management can better conserve biodiversity, often with little or no reduction in fiber production. There is ample evidence that these methods do benefit biodiversity, and can also entail various economic benefits. Adherence to these recommendations should vary by plantation type, and depending on the proportion of the surrounding landscape or region that is or will be planted. Stand-level variables to consider include socio-economic factors, native community type and structure, crop species composition, and pest dynamics. During establishment, managers should consider innovations in snag and reserve tree management (e.g. leave strips), where mature native trees and/or understory vegetation are left unharvested or allowed to regenerate. Polycultures should be favored over monocultures by planting multiple crop species and/or leaving some native trees unharvested. Native species should generally be favored over exotics. Site-preparation should favor methods that reflect natural disturbances and conserve coarse woody debris. Plantations that have already been established by traditional design can also conserve biodiversity via small modifications to operations. Earlier thinning schedules or longer rotations can strongly affect biodiversity, as can reserve trees left after plantation harvest to remain through a second rotation.

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**1283. RCA III effects of sediment on the aquatic environment: Potential NRCS actions to improve aquatic habitat.**

Castro, Janine.; Reckendorf, Frank.; and United States. Natural Resources Conservation Service.

Washington, D.C.: U.S. Dept. of Agriculture, Natural Resources Conservation Service, 1995. Working paper (United States. Soil Conservation Service) No. 6.

*Notes:* Title from web page. "August 1995." Description based on content viewed May 3, 2002. Includes bibliographical references.

*NAL Call #:* aQH541.5.W3-C37-1995  
<http://www.nrcs.usda.gov/technical/land/pubs/wp06text.html>

*Descriptors:* Aquatic ecology---Environmental aspects---United States/ Aquatic resources conservation---United States/ Soil erosion---United States/ Soil conservation---United States/ Sediment transport---United States/ Aquatic organisms, Effect of contaminated sediments on---United States

This citation is from AGRICOLA.

**1284. RCA III sedimentation in irrigation water bodies, reservoirs, canals, and ditches.**

Reckendorf, Frank. and United States. Natural Resources Conservation Service.

Washington, D.C.: U.S. Dept. of Agriculture, NRCS, 1995. Working paper (United States. Natural Resources Conservation Service) No. 5.

*Notes:* Title from web page. "July 1995." Description based on content viewed May 3, 2002. Includes bibliographical references.

*NAL Call #:* aTC175.2-.R43-1995  
<http://www.nrcs.usda.gov/technical/land/pubs/wp05text.html>

*Descriptors:* Sediment transport---United States/ Irrigation water---United States/ Irrigation water---Pollution---United States/ Irrigation---Environmental aspects---United States

This citation is from AGRICOLA.

**1285. A re-appraisal of Painter's mechanisms of plant resistance to insects, with recent illustrations.**

Manglitz, George R. and Danielson, Stephen D.  
*Agricultural Zoology Reviews* 6: 259-276. (1994);  
*ISSN:* 0269-0543

*Descriptors:* Arthropoda (Arthropoda Unspecified)/ animals/ arthropods/ invertebrates/ Biological Control/ Integrated Pest Management/ Agronomy (Agriculture)/ Economic Entomology/ Physiology  
© Thomson

**1286. Re-engineering irrigation management and system operations.**

Renault, D.

*Agricultural Water Management* 47 (3): 211-226. (Apr. 2001)

*NAL Call #:* S494.5.W3A3;

*ISSN:* 0378-3774 [AWMADF]

*Descriptors:* water management/ irrigation systems/ canals/ literature reviews

This citation is from AGRICOLA.

**1287. Reactions of phosphorus with sediments in fresh and marine waters.**

House, W A; Jickells, T D; Edwards, A C; Praska, K E; and Denison, F H  
*Soil Use and Management* 14 (supplement): 139-146. (1998)

*NAL Call #:* S590.S68;

*ISSN:* 0266-0032

*Descriptors:* phosphorus/ coastal waters/ estuaries/ freshwater/ marine water/ rivers/ salinity/ sediment reactions/ soil erosion/ transport processes

*Abstract:* The interactions of P with soils and sediments are examined in the context of transport processes from land, through rivers to estuaries and coastal waters. In soil erosion, selective size fractionation and preferential sorption to finer solids is crucial in the transport of P to water courses. Problems in quantifying the sorption affinity and equilibrium phosphate concentration (EPC) of mixtures of different soils and sediments are identified. Riverine transport of P by suspended solids is usually very important and examples of the changes in the amount and composition of particulate P (PP) concentration during storm events are discussed. Increased P content of solids during the first autumn storms, probably reflect the resuspension of accumulated stream bed-deposits. The fate of P in estuaries and their importance as possible long-term sinks of P are discussed. The relatively high concentrations of dissolved P associated with riverine inputs are to some extent buffered by the relatively high concentrations of suspended sediments resulting from

tidal flows. Phosphorus may be released during transport to the sea due to decreases in the EPC, increases in salinity and release from bottom sediments as a result of low oxygen conditions.

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**1288. Realizing the potential of integrated irrigation and drainage water management for meeting crop water requirements in semi-arid and arid areas.**

Ayars, J. E.; Hutmacher, R. B.; Schoneman, R. A.; Soppe, R. W. O.; Vail, S. S.; and Dale, F.

*Irrigation and Drainage Systems* 13 (4): 321-347. (1999)

NAL Call #: TC801.166;

ISSN: 0168-6291 [IRDSEG]

**Descriptors:** crops/ gossypium hirsutum/ lycopersicon esculentum/ groundwater/ water uptake/ plant water relations/ saline water/ irrigation/ drainage systems/ salinity/ water quality/ irrigation water/ irrigation scheduling/ evapotranspiration/ leaf water potential/ high water tables/ literature reviews/ subsurface drainage/ arid lands/ semiarid zones/ shallow groundwater

**Abstract:** In situ use of ground water by plants is one option being considered to reduce discharge of subsurface drainage water from irrigated agriculture. Laboratory, lysimeter, and field studies have demonstrated that crops can use significant quantities of water from shallow ground water. However, most studies lack the data needed to include the crop water use into an integrated irrigation and drainage water management system. This paper describes previous studies which demonstrated the potential use of ground water to support plant growth and the associated limitations. Included are results from three field studies which demonstrated some of the management techniques needed to develop an integrated system. The field studies demonstrated that approximately 40 to 45% of the water requirement for cotton can be derived from shallow saline ground water. That regulation of the outflow will result in increasing use. Implementation of integrated management of irrigation and subsurface drainage systems is a viable and sustainable alternative in the management of subsurface drainage water from arid and semi-

arid areas only if soil salinity can be managed and if the system is profitable.

This citation is from AGRICOLA.

**1289. Recent advances in the residue analysis of N-methylcarbamate pesticides.**

Yang, S S; Goldsmith, A I; and Smetena, I

*Journal of Chromatography A* 754 (1-2): 3-16. (1996)

NAL Call #: QD272.C4J68;

ISSN: 0021-9673

**Descriptors:** analytical method/ gas chromatography/ GC/ high performance liquid chromatography/ HPLC/ immunoassay/ methodology/ N methylcarbamate pesticides/ pesticides/ residue analysis/ spectrophotometry/ supercritical fluid chromatography/ thin layer chromatography/ TLC

**Abstract:** This paper highlights recent advances in the determination of methylcarbamate residues in water, soil and plant tissues.

Chromatographic analyses (e.g., HPLC, GC, supercritical fluid chromatography and TLC) with various sample pretreatment procedures and detection methods are reviewed. More generally, some non-chromatographic techniques such as immunoassay, biosensor and spectrophotometry are included.

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**1290. Recent advances in the thin-layer chromatography of pesticides: A review.**

Sherma, J.

*Journal of AOAC International*

86 (3): 602-611. (2003);

ISSN: 1060-3271

This citation is provided courtesy of CAB International/CABI Publishing.

**1291. Recent advances in thin-layer chromatography of pesticides.**

Sherma, J.

*Journal of AOAC International*

84 (4): 993-999. (July-Aug. 2001)

NAL Call #: S583.A7;

ISSN: 1060-3271 [JAINEE]

**Descriptors:** pesticides/ pesticide residues/ thin layer chromatography/ food contamination/ polluted water/ polluted soils/ literature reviews/ high performance thin layer chromatography

**Abstract:** Advances in the applications of thin-layer chromatography (TLC) and high-performance thin-layer

chromatography (HPTLC) for the separation, detection, and qualitative and quantitative determination of pesticides, other agrochemicals, and related compounds are reviewed for the period 1998-2000. Analyses are covered for a variety of samples, such as food, biological, and environmental, and for residues of pesticides of various types, including insecticides, herbicides, and fungicides, belonging to different chemical classes. References on formulation analysis, hydrophobicity studies, and the use of TLC and thin-layer radiochromatography (TLRC) for studies of pesticide metabolism, degradation, uptake, and related studies are also included.

This citation is from AGRICOLA.

**1292. Recent and future developments of liquid chromatography in pesticide trace analysis.**

Hogendoorn, Elbert and Zoonen, Piet van

*Journal of Chromatography A*

892 (1-2): 435-453. (2000)

NAL Call #: QD272.C4J68;

ISSN: 0021-9673

**Descriptors:** pesticides: analysis  
**Abstract:** Until recently, the application of liquid chromatography (LC) in pesticide analysis was usually focused on groups of compounds or single compounds for which no suitable conditions were available for analysis with gas chromatography (GC). However, recent developments in both detection and column material technology show that LC significantly enlarged its scope in this field of analysis. Obviously, the most striking example is the rather abrupt transition of LC coupled to mass spectrometric detection (MS) from an experimental and scientifically fashionable technique to a robust, sensitive and selective detection mode rendering LC-MS being increasingly used in pesticide trace analysis. Other recent major developments originate from the innovation of new LC column packing materials, viz. immuno-affinity sorbents, restricted access medium materials and molecular imprinted polymers improving considerably the screening of polar pesticides by means of reversed-phase LC with UV detection. In this review the merits and perspectives of these important LC developments and their impact to

current and future applications in pesticide trace analysis are presented and discussed.

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**1293. Recent development in poultry waste digestion and feather utilization: A review.**

Shih, J. C. H.

*Poultry Science* 72 (9): 1617-1620. (Sept. 1993)

NAL Call #: 47.8-Am33P;

ISSN: 0032-5791 [POSCAL]

*Descriptors:* feathers/ anaerobic digesters/ poultry manure/ bacillus licheniformis/ proteinases/ feather meal/ digestibility/ feed additives/ literature reviews/ keratinase

*Abstract:* The intensive and large-scale production of food animals and animal products has generated an enormous waste disposal problem for the animal industry. These wastes, which include animal excreta, mortalities, hair, feathers, and processing wastes, are largely organic materials and are convertible to useful resources. Making the conversion processes efficient and economical presents a great challenge to modern biotechnology. An efficient thermophilic anaerobic digester system has been developed that converts animal manure to methane for an energy source, solid residues for feed supplements, and liquid nutrients for aquaculture. This digester system also destroys pathogens and thus protects environmental health. During the development of this system, a feather-degrading bacterium was discovered and identified as a thermophilic *Bacillus licheniformis*, Strain PWD-1. The bacterium can ferment and convert feathers to feather-lysate, a digestible protein source for feed use. An enzyme, keratinase, secreted by this bacterium was purified and characterized. This keratinase is a potent protease that hydrolyzes all proteins tested, including collagen, elastin, and feather keratin. When the enzyme was mixed as an additive in feed, it significantly enhanced the digestibility of feather meal in chickens. In addition to feed technology, the bacterium and the enzyme are believed to have many other industrial and environmental applications.

This citation is from AGRICOLA.

**1294. Recent developments in broadly applicable structure-biodegradability relationships.**

Jaworska, J. S.; Boethling, R. S.; and Howard, P. H.

*Environmental Toxicology and Chemistry* 22 (8): 1710-1723. (2003)

NAL Call #: QH545.A1E58;

ISSN: 0730-7268

This citation is provided courtesy of CAB International/CABI Publishing.

**1295. Recommendations of the Commission on 21st Century Production Agriculture.**

Young E and Effland A

*Agricultural Outlook (AO)* 280: 20-23. (2001)

NAL Call #: aHD1751.A422

This citation is provided courtesy of CAB International/CABI Publishing.

**1296. Recovery in complex ecosystems.**

O'Neill, Robert V

*Journal of Aquatic Ecosystem Stress and Recovery* 6 (3): 181-187. (1998)

NAL Call #: QH541.5.W3 J68;

ISSN: 1386-1980

*Descriptors:* acid particulates/ pollutants/ toxins/ copper/ nickel/ acid damaged lakes/ aquatic ecosystems/ biological communities/ chemical recovery/ ecotoxicology/ emission reductions/ habitat quality/ lake catchments/ lake water quality/ metal damaged lakes/ sediments/ weather related variations

*Abstract:* Current ecosystem theory has a deceptively simple representation of recovery. In actual practice, recovery is affected by the frequency and extent of disturbances and by the spatial heterogeneity of the ecological system. Environmental changes may pass through thresholds causing recovery to a different plant and animal community. The sheer complexity of the system combined with unanticipated synergistic effects can make recovery trajectories difficult or impossible to predict. New theoretical constructs, based on stochastic nonlinear theory, will be needed to guide research and applications.

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**1297. Recycled poultry bedding as cattle feed.**

Rankins, D. L. Jr.; Poore, M. H.;

Capucille, D. J.; and Rogers, G. M.

*Veterinary Clinics of North America, Food Animal Practice* 18 (2): 253-266.

(2002);

ISSN: 0749-0720

This citation is provided courtesy of CAB International/CABI Publishing.

**1298. Reducing erosion and nutrient loss with perennial grasses.**

Hairsine, P. and Prosser, I.

*Australian Journal of Soil and Water Conservation* 10 (1): 8-14. (1997)

NAL Call #: 56.8 Au7;

ISSN: 1032-2426

This citation is provided courtesy of CAB International/CABI Publishing.

**1299. Reducing nitrate in water resources with modern farming systems: MSEA water quality.**

Wiese, Richard A.; Flowerday, A.

Dale; and Power, J. F.

Ames: Iowa State University, University Extension; 18 p.: col. ill., col. map. (2000)

*Notes:* On cover: MSEA water quality, Management Systems Evaluation Areas. "December 1998." Sponsor: USDA Management Systems Evaluation Areas (Project).

NAL Call #: S587.5.N5-W53-2000

*Descriptors:* Nitrogen in agriculture---Middle West/ Water quality management---Middle West/ Water Nitrogen content---Middle West/ Agricultural systems---Middle West  
This citation is from AGRICOLA.

**1300. Reducing nitrogen flow to the Gulf of Mexico: Strategies for agriculture.**

Peters, M.; Ribaud, M.;

Claassen, R.; and Heimlich, R.

*Agricultural Outlook (AO)*

266: 20-24. (Nov. 1999)

NAL Call #: aHD1751.A42;

ISSN: 0099-1066 [AGOU7]

*Descriptors:* pollution control/ United States

This citation is from AGRICOLA.

**1301. Reducing nutrient loads, especially nitrate-nitrogen, to surface water, ground water, and the Gulf of Mexico: Topic 5, Report for the integrated assessment on hypoxia in the Gulf of Mexico.**

Mitsch, W. J.; Day, J. W.; Gilliam, J. W.; Groffman, P. M.; Hey, D. L.; Randall, G. W.; and Wang, N. NOAA Coastal Ocean Program, 1999. *Notes*: 111 p. (application/pdf) [http://www.nos.noaa.gov/products/hypox\\_t5final.pdf](http://www.nos.noaa.gov/products/hypox_t5final.pdf)

*Descriptors*: pollution load/ nitrate nitrogen/ surface water/ groundwater/ Gulf of Mexico/ hypoxia/ nonpoint source pollution/ agricultural runoff/ water pollution/ nitrate fertilizers/ fertilizer application/ precipitation/ riparian buffers/ pollution control

**1302. Reducing phosphorus runoff and improving poultry production with alum.**

Moore, P. A. Jr.; Daniel, T. C.; and Edwards, D. R. *Poultry Science* 78 (5): 692-698. (May 1999)

*NAL Call #*: 47.8-Am33P;  
*ISSN*: 0032-5791 [POSCAL]

*Descriptors*: poultry manure/ phosphorus/ runoff water/ solubility/ ammonia/ aluminum sulfate/ volatile compounds/ cost benefit analysis/ pH/ air quality/ broiler production/ slaughter weight/ production costs/ application to land

*Abstract*: This is a review paper on the effects of aluminum sulfate (alum) on ammonia volatilization and P runoff from poultry litter. Initially, laboratory studies were conducted that showed P solubility could be reduced in poultry litter with Al, Ca, and Fe amendments, indicating that these amendments may reduce P runoff. These results were confirmed in small plot studies in which alum applications to litter were shown to decrease P concentrations in runoff by as much as 87%, while improving tall fescue yields. Leaf tissue analyses indicated that the yield improvements were due to increased N availability, which we hypothesized was due to reduced NH(3) volatilization. This result was confirmed in laboratory studies that showed that alum was one of the most effective (and cost-effective) compounds for reducing NH(3) volatilization. Field trials conducted at commercial broiler farms in conjunction with the Environmental Protection Agency showed that alum additions to poultry litter lowered litter

pH, particularly during the first 3 to 4 wk of each growout, which resulted in less NH(3) volatilization and lower atmospheric NH(3). Ammonia volatilization rates were reduced by 97% for the first 4 wk of the growout. Broilers grown on alum-treated litter were heavier than the controls (1.73 vs 1.66 kg) and had lower mortality (3.9 vs 4.2%) and better feed efficiency (1.98 vs 2.04). Electricity and propane use were lower for alum-treated houses. As a result of these economic benefits to the integrator and grower, the benefit:cost ratio of alum addition was 1.96. Phosphorus concentrations in runoff from small watersheds were 75% lower from alum-treated litter than normal litter over a 3-yr period. Long-term small plot studies on alum use have shown that alum-treated litter results in lower soil test P levels than normal litter and does not increase Al availability in soils or uptake by plants. This citation is from AGRICOLA.

**1303. Reducing rumen methane emissions through elimination of rumen protozoa.**

Hegarty, R S *Australian Journal of Agricultural Research* 50 (8): 1321-1327. (1999)  
*NAL Call #*: 23 Au783;  
*ISSN*: 0004-9409

*Descriptors*: hydrogen / methane: control, emission/ methanogen (Methanogenic Archaeobacteria)/ protozoa (Protozoa)/ ruminant (Artiodactyla): host/ Animals/ Archaeobacteria/ Artiodactyls/ Bacteria/ Chordates/ Invertebrates/ Mammals/ Microorganisms/ Nonhuman Mammals/ Nonhuman Vertebrates/ Protozoans/ Vertebrates/ defaunation/ protozoal elimination/ symbiosis

*Abstract*: Methanogens living on and within rumen ciliate protozoa may be responsible for up to 37% of the rumen methane emissions. In the absence of protozoa, rumen methane emissions are reduced by an average of 13% but this varies with diet. Decreased methane emissions from the protozoa-free rumen may be a consequence of: (1) reduced ruminal dry matter digestion; (2) a decreased methanogen population; (3) an altered pattern of volatile fatty acid production and hydrogen availability; or (4) increased partial pressure of oxygen in the rumen. The decline in methanogenesis associated with removal of protozoa is greatest on

high concentrate diets and this is in keeping with protozoa being relatively more important sources of hydrogen on starch diets, because many starch-fermenting bacteria do not produce H<sub>2</sub>. Because protozoa also decrease the supply of protein available to the host animal, their elimination offers benefits in both decreasing greenhouse gas emissions and potentially increasing livestock production. Strategies for eliminating protozoa are reviewed. None of the available techniques is considered practical for commercial application and this should be addressed.  
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**1304. Reducing tillage intensity: A review of results from a long-term study in Germany.**

Tebruggge, F. and Doring, R. A. *Soil and Tillage Research* 53 (1): 15-28. (1999)

*NAL Call #*: S590.S48;  
*ISSN*: 0167-1987

This citation is provided courtesy of CAB International/CABI Publishing.

**1305. Reference materials for the monitoring of the aquatic environment: A review with special emphasis on organic priority pollutants.**

Bercaru, O.; Gawlik, B. M.; Ulberth, F.; and Vandecasteele, C. *Journal of Environmental Monitoring* 5 (4): 697-705. (2003);  
*ISSN*: 1464-0325

This citation is provided courtesy of CAB International/CABI Publishing.

**1306. Reforestation of bottomland hardwoods and the issue of woody species diversity.**

Allen, J. A. *Restoration Ecology* 5 (2): 125-134. (June 1997)

*NAL Call #*: QH541.15.R45R515;  
*ISSN*: 1061-2971

*Descriptors*: trees/ reforestation/ species diversity/ spatial distribution/ river basins/ Mississippi/ Reclamation/ Temperate forests/ United States  
*Abstract*: Bottomland hardwood forests in the southcentral United States have been cleared extensively for agriculture, and many of the remaining forests are fragmented and degraded. During the last decade, however, approximately 75,000 ha of land - mainly agricultural fields - have been replanted or contracted for replanting, with many more acres likely to be reforested in the near

future. The approach used in most reforestation projects to date has been to plant one to three overstory tree species, usually *Quercus* spp. (oaks), and to rely on natural dispersal for the establishment of other woody species. I critique this practice by two means. First, a brief literature review demonstrates that moderately high woody species diversity occurs in natural bottomland hardwood forests in the region. This review, which relates diversity to site characteristics, serves as a basis for comparison with stands established by means of current reforestation practices. Second, I reevaluate data on the invasion of woody species from an earlier study of 10 reforestation projects in Mississippi, with the goal of assessing the likelihood that stands with high woody species diversity will develop. I show that natural invasion cannot always be counted on to produce a diverse stand, particularly on sites more than about 60 m from an existing forest edge. I then make several recommendations for altering current reforestation practices in order to establish stands with greater woody species diversity, a more natural appearance, and a more positive environmental impact at scales larger than individual sites.  
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**1307. Regional and global hydrology and water resources issues: The role of international and national programs.**

Sorooshian, Soroosh; Whitaker, Martha P L; and Hogue, Terri S *Aquatic Sciences* 64 (4): 317-327. (2002);  
*ISSN*: 1015-1621  
*Descriptors*: Global Energy and Water Cycle Experiment Program [GEWEX Program]/ climate change/ climate variability/ hydrology: global, regional/ international programs/ national programs/ population growth/ precipitation measurements/ riparian areas/ satellite methods/ semiarid regions/ water cycles/ water policy/ water resources issues  
*Abstract*: This paper presents an overview of water resources issues in the context of world population growth, climate change, and variability, and provides examples of how these issues affect local and regional water policy concerns. Also discussed is the associated research of the international scientific

community in regard to physically-based modeling of the hydrological cycle, with special focus on the Global Energy and Water cycle EXperiment (GEWEX) Programme. The critical role of precipitation measurements for climate model accuracy is emphasized, with a review of several satellite methods and strategies for improving precipitation measurements. Finally, the impact of semiarid regions on global hydrologic issues is underscored with a review of research conducted by SAHRA, the National Science Foundation Science and Technology Center dedicated to Sustainability of semi-Arid Hydrology and Riparian Areas.  
© Thomson

**1308. Regional monitoring for disease prediction and optimization of plant protection measures: The IPM wheat model.**

Verreet, J. A.; Klink, H.; and Hoffmann, G. M. *Plant Disease* 84 (8): 816-826. (2000)  
*NAL Call #*: 1.9-P69P;  
*ISSN*: 0191-2917 [PLDIDE]  
*Descriptors*: triticum aestivum/ plant diseases/ monitoring/ prediction/ integrated pest management/ intensive production/ plant pathogens/ epidemiology/ developmental stages/ diagnosis/ plant disease control/ symptoms/ literature reviews/ Germany  
This citation is from AGRICOLA.

**1309. Regional producer workshops: Constraints to the adoption of integrated pest management.**

Sorensen, A. Ann.; United States. Environmental Protection Agency; and National Foundation for Integrated Pest Management Education (U.S.). Austin, Tex.: National Foundation for IPM Management Education; 60 p. (1993)  
*Notes*: "March-April, 1993."  
"Sponsored by the U.S. Environmental Protection Agency"--P. 1. Partially funded by the Office of Pesticide Programs, Office of Prevention, Pesticides and Toxic Substances, U.S. Environmental Protection Agency. CR820822;  
Contents note: "California Fruit and Vegetable IPM Workshops were held at: Monterey, California, March 4, 1993; Fresno, California, March 5, 1993 -- Illinois/Iowa/Indiana Corn and Soybean IPM Workshop:

Bloomington, Illinois, March 16 1993 - - Pennsylvania Apple IPM Workshop: Gettysburg, Pennsylvania, April 1, 1993 -- Texas/Oklahoma Cotton IPM Workshop: Lubbock, Texas, April 7, 1993."  
*NAL Call #*: SB950.A2S67--1993  
*Descriptors*: Pests--Integrated control--Congresses  
This citation is from AGRICOLA.

**1310. Regulation of irrigation canals: Characterisation and classification.**

Malaterre, P. O. *Irrigation and Drainage Systems* 9 (4): 297-327. (Nov. 1995)  
*NAL Call #*: TC801.I66;  
*ISSN*: 0168-6291 [IRDSEG]  
*Descriptors*: irrigation channels/ canals/ water flow/ regulation/ hydrology/ hydraulics/ literature reviews  
This citation is from AGRICOLA.

**1311. Rehabilitation of aging watershed projects.**

Caldwell LW. In: ASAE Annual International Meeting. (Held 12 Jul 1998-16 Jul 1998 at Orlando, Florida.) St. Joseph, Mich.: American Society of Agricultural Engineers; 15 p.; 1998.  
*Notes*: ASAE Paper no. 982017  
*NAL Call #*: S671.3 .A54  
This citation is provided courtesy of CAB International/CABI Publishing.

**1312. Rehabilitation strategies involving woody vegetation for degraded stream corridors: Research opportunities.**

Shields, F. D. and Bernard, J. M. In: ASAE Annual International Meeting. (Held 12 Jul 1998-16 Jul 1998 at Orlando, Florida.) St. Joseph, Mich.: American Society of Agricultural Engineers (ASAE); 14 p.; 1998.  
*Notes*: ASAE Paper no. 982130  
This citation is provided courtesy of CAB International/CABI Publishing.

**1313. A reintroduction to integrated weed management.**

Elmore, C. L. *Weed Science* 44 (2): 409-412. (Apr. 1996-June 1996)  
*NAL Call #*: 79.8-W41;  
*ISSN*: 0043-1745 [WEESA6].  
*Notes*: Special section: Successes of integrated weed management--a symposium. Includes references.  
*Descriptors*: weed control/ integrated pest management/ cropping systems/

crop management/ literature reviews/ integrated control

**Abstract:** Integrated Weed Management (IWM), a long time practice by farmers has become more commonly discussed as a total weed management system. Whether an off shoot of Integrated Pest Management (IPM) or a further recognition of integrating weed control measures within the cropping and farming system, it has become more widespread. IWM is being practiced using many of the same components, from croplands to forests and rangeland. A weed management hierarchy has been developed by degree of diversity of management practices. IWM researchers and educators should invite other pest management specialists to join us in striving for Integrated Crop Management systems. This citation is from AGRICOLA.

**1314. Relating Nitrogen Sources and Aquifer Susceptibility to Nitrate in Shallow Ground Waters of the United States.**

Nolan, B. T.  
*Ground Water* 39 (2): 290-299. (2001)  
 NAL Call #: TD403.G7;  
 ISSN: 0017-467X  
*Descriptors:* USA/ Groundwater Pollution/ Nitrates/ Aquifer Characteristics/ Regression Analysis/ Multivariate Analysis/ Model Studies/ Model Testing/ Prediction/ Land Use/ Pollution Load/ Pollution (Groundwater)/ Nitrate/ Modelling (Multivariate)/ Loading/ Aquifers/ Water analysis/ Contamination/ Nitrogen/ Fertilizers/ Statistical analysis/ Geology/ United States/ Sources and fate of pollution/ Water Quality/ Freshwater pollution/ Characteristics, behavior and fate  
**Abstract:** Characteristics of nitrogen loading and aquifer susceptibility to contamination were evaluated to determine their influence on contamination of shallow ground water by nitrate. A set of 13 explanatory variables was derived from these characteristics, and variables that have a significant influence were identified using logistic regression (LR). Multivariate LR models based on more than 900 sampled wells predicted the probability of exceeding 4 mg/L of nitrate in ground water. The final LR model consists of the following variables: (1) nitrogen fertilizer loading ( $p$ -value = 0.012); (2) percent

cropland-pasture ( $p < 0.001$ ); (3) natural log of population density ( $p < 0.001$ ); (4) percent well-drained soils ( $p = 0.002$ ); (5) depth to the seasonally high water table ( $p = 0.001$ ); and (6) presence or absence of a fracture zone within an aquifer ( $p = 0.002$ ). Variables 1-3 were compiled within circular, 500 m radius areas surrounding sampled wells, and variables 4-6 were compiled within larger areas representing targeted land use and aquifers of interest. Fitting criteria indicate that the full logistic-regression model is highly significant ( $p < 0.001$ ), compared with an intercept-only model that contains none of the explanatory variables. A goodness-of-fit test indicates that the model fits the data well, and observed and predicted probabilities of exceeding 4 mg/L nitrate in ground water are strongly correlated ( $r$  super(2) = 0.971). Based on the multivariate LR model, vulnerability of ground water to contamination by nitrate depends not on any single factor but on the combined, simultaneous influence of factors representing nitrogen loading sources and aquifer susceptibility characteristics.  
 © Cambridge Scientific Abstracts (CSA)

**1315. The relation between particle path length distributions and channel morphology in gravel-bed streams: A synthesis.**

Pyrce, R. S. and Ashmore, P. E.  
*Geomorphology* 56 (1-2): 167-187. (2003);  
 ISSN: 0169-555X  
*Descriptors:* Earth Sciences/ bed load transport/ channel morphology/ path length/ field experiment/ sediment tracers/ sediment transport/ British Columbia/ river/ distance/ clasts/ travel/ movement  
**Abstract:** The path length (downstream displacement over a given time period) of individual bed particles in gravel-bed rivers is central to morphological methods for measuring bed load transport rate and is also fundamental to understanding the bed load transport process and the development of channel morphology. Previous studies of particle movement using tracers report predominantly strongly positively skewed frequency distributions of path length with modes close to the point of entrainment. However, gravel-bed

rivers often have regularly spaced erosion (scour pools) and deposition (channel bars) sites that are several channel widths apart and it is reasonable to expect that particle path length would reflect this morphological scale, at least during flows large enough to create and modify the morphology. Here, we synthesize and re-analyze results from published bed load tracing experiments in gravel-bed rivers to identify the variety of possible path length distributions for differing channel morphology, channel dimensions, bed particle size, and particle mobility (i.e. flow magnitude) and to look for occurrences of path length coinciding with the length scale of the morphology. The results show that path length distributions may be positively skewed, symmetrical, and uni-, bi-, or multi-modal and may include modes that coincide with known or expected pool-bar spacing. Primary path length modes equivalent to possible pool-bar spacing are more probable at higher non-dimensional bed shear stress, from which it is inferred that both particle mobility and channel morphology exert an influence on particle path lengths and that particle movement is unlikely to be stochastic except at relatively low particle mobility. Existing data are inadequate for more than a preliminary analysis of this problem consequently there is a need for new data collected explicitly and systematically to confirm these preliminary results, isolate the effect of the several variables that influence the characteristics of path length frequency distributions and identify the conditions under which path length coincides with the length scale of the dominant morphology. (C) 2003 Elsevier Science B.V. All rights reserved.  
 © Thomson ISI

**1316. The relationship between contracting and livestock waste pollution.**

Vukina, T.; Lichtenberg, E.; and Yoder, J.  
 In: White papers on animal agriculture and the environment/ National Center for Manure & Animal Waste Management; Midwest Plan Service; and U.S. Department of Agriculture; Raleigh, NC: National Center for Manure & Animal Waste Management, 2001.

NAL Call #: TD930.2-W45-2002

*Descriptors:* Agricultural wastes---  
Environmental aspects---United  
States

**1317. The relationship between forest management and amphibian ecology: A review of the North American literature.**

DeMaynadier, P. G. and  
Hunter, M. L. Jr.

*Environmental Review* 3 (3/4):  
230-261. (1995)

NAL Call #: GE140.E59;  
ISSN: 1181-8700

*Descriptors:* amphibia/ species  
diversity/ geographical distribution/  
microhabitats/ forests/ clearcutting/  
age/ natural regeneration/ forest  
plantations/ prescribed burning/  
roads/ riparian forests/ forest  
management/ plant succession/  
nature conservation/ literature  
reviews/ North America/ species  
abundance/ biodiversity/  
logging roads

This citation is from AGRICOLA.

**1318. Relationship of soil organic matter dynamics to physical protection and tillage.**

Balesdent, J.; Chenu, C.; and  
Balabane, M.

*Soil and Tillage Research* 53 (3/4):  
215-230. (2000)

NAL Call #: S590.S48;  
ISSN: 0167-1987

This citation is provided courtesy of  
CAB International/CABI Publishing.

**1319. The Relative Impacts of Nest Predation and Brood Parasitism on Seasonal Fecundity in Songbirds.**

Schmidt, K. A. and Whelan, C. J.  
*Conservation Biology* 13 (1): 46-57.  
(Feb. 1999)

NAL Call #: QH75.A1C5;  
ISSN: 0888-8892

*Descriptors:* Fecundity/ brood  
parasitism/ Habitat fragmentation/  
Nesting behavior/ Passeriformes/  
Perching birds/ Birds

*Abstract:* The impacts of nest  
predation and brood parasitism on the  
seasonal fecundity of birds are  
strongly dependent on the number of  
nesting attempts, and thus seasonal  
fecundity is responsive to behavioral  
traits that increase the number of  
opportunities to nest. We developed  
simple models to investigate the  
relative impacts of nest predation and  
brood parasitism on seasonal  
fecundity in songbirds. In particular,  
we asked to what extent songbirds

can ameliorate the negative effects of  
high nest predation and brood  
parasitism often typical of fragmented,  
urbanized, and agricultural  
landscapes through (1) reneating  
following predation, (2) abandoning  
and reneating following parasitism,  
and (3) double brooding--reneating  
following a successful brood. Our  
model assigned probabilities to all  
possible fates of breeding females  
and calculated seasonal fecundity by  
summing up the individual  
probabilities. We analyzed the model  
through the use of fecundity isopleths,  
which allow one to visually determine  
the impact of predation and parasitism  
simultaneously over the entire range  
of probabilities. Our analysis indicates  
that (1) nest predation has a greater  
impact on seasonal fecundity over a  
larger range of parameter space than  
does parasitism, especially when  
brood loss due to parasitism is low;  
(2) songbird populations experiencing  
nest predation probabilities typical of  
fragmented landscapes (>0.65) are  
unlikely to be self-sustaining; and (3)  
amelioration of nest predation through  
frequent reneating or double brooding  
may be insufficient to establish self-  
sustaining populations. These results  
suggest that predator control should  
be at least as high a priority as  
parasitism control, particularly for  
species that suffer moderate to low  
brood reduction due to parasitism and  
that are single-brooded. Programs  
aimed solely at managing cowbirds  
likely will be of limited success.  
© Cambridge Scientific Abstracts  
(CSA)

**1320. Relative nutrient requirements of plants suitable for riparian vegetated buffer strips.**

Ducnuigeen, Jan.; Williard, Karl.;  
Steiner, Roland C.; Virginia. Dept. of  
Environmental Quality; and Interstate  
Commission on the Potomac  
River Basin.

Rockville, Md. Interstate Commission  
on the Potomac River Basin; Series:  
ICPRB report 97-4; 16 leaves. (1997)  
*Notes:* "September 1997." Includes  
bibliographical references (leaves 10-  
15). For Virginia Department of  
Environmental Quality with funding  
under Section 604(b) of the Clean  
Water Act.

NAL Call #: QK115-.D93-1997

*Descriptors:* Riparian plants---United  
States---Nutrition/ Buffer zones---  
Ecosystem management---United  
States/ Streambank planting---United

States/ Grassed waterways---United  
States/ Nutrient pollution of water---  
United States

This citation is from AGRICOLA.

**1321. Relevance of integrated disease management to resistance durability.**

Mundt, C. C.; Cowger, C.; and  
Garrett, K. A.

*Euphytica* 124 (2): 245-252. (2002)

NAL Call #: 450-Eu6;

ISSN: 0014-2336 [EUPHAA].

*Notes:* Special issue: Durable  
resistance / edited by F. Gover, R.E.  
Niks, and H. van der Beek. Paper  
presented at a symposium held  
November 28-December 1, 2000,  
Wageningen, The Netherlands.  
Includes references.

*Descriptors:* plants/ disease  
resistance/ durability/ genetic  
resistance/ disease control/ integrated  
pest management/ epidemiology/  
evolution/ plant pathogens/  
literature reviews

This citation is from AGRICOLA.

**1322. Relevance of soil testing to agriculture and the environment.**

Kamprath, E. J. Council for  
Agricultural Science and Technology  
(CAST); Issue Paper No. 15, 2000.  
12 p.

[http://www.cast-science.org/cast-  
science.lh/pdf/soiltest\\_ip.pdf](http://www.cast-science.org/cast-science.lh/pdf/soiltest_ip.pdf)

*Descriptors:* soil analysis/ fertilizer  
application/ nutrient management/  
soil nutrients

**1323. Remediating river margin vegetation along fragmented and regulated rivers in the north: What is possible?**

Nilsson, C.

*Regulated Rivers* 12 (4/5): 415-431.  
(1996)

NAL Call #: TC530.R43;  
ISSN: 0886-9375

This citation is provided courtesy of  
CAB International/CABI Publishing.

**1324. Remediation of herbicide-contaminated soil by combinations of landfarming and biostimulation.**

Felsot, A. S.; Mitchell, J. K.; and  
Dzantor, E. K.

*Bioremediation Science and  
Applications* 43: 237-257. (1995)

NAL Call #: S590.S62-no.43

*Descriptors:* polluted soils/  
contamination/ alachlor/ pesticide  
residues/ fuels/ petroleum/ sludges/  
waste disposal/ application to land/  
bioremediation/ nutrients/

supplements/ organic matter/ reviews/  
soil pollution/ pollution control/ land  
spreading

This citation is from AGRICOLA.

**1325. Remediation techniques for manure nutrient loaded soils.**

Zhang, H.; Dao, T. H.; Basta, N. T.;  
Dayton, E. A.; and Daniel, T. C.

In: White papers on animal agriculture  
and the environment/ National Center  
for Manure & Animal Waste  
Management; Midwest Plan Service;  
and U.S. Department of Agriculture;  
Raleigh, NC: National Center for  
Manure & Animal Waste  
Management, 2001.

*NAL Call #:* TD930.2-W45-2002

*Descriptors:* Agricultural wastes---  
Environmental aspects---United  
States

**1326. Remote sensing for crop management.**

Pinter, P. J. Jr.; Hatfield, J. L.;  
Schepers, J. S.; Barnes, E. M.;  
Moran, M. S.; Daughtry, C. S. T.; and  
Upchurch, D. R.

*PE and RS: Photogrammetric  
Engineering and Remote Sensing*  
69 (6): 647-664. (2003)

*NAL Call #:* 325.28 P56;

*ISSN:* 0099-1112

This citation is provided courtesy of  
CAB International/CABI Publishing.

**1327. Remote sensing for nitrogen management.**

Scharf, P. C.; Schmidt, J. P.; Kitchen,  
N. R.; Sudduth, K. A.; Hong, S. Y.;  
Lory, J. A.; and Davis, J. G.

*Journal of Soil and Water  
Conservation* 57 (6): 518-524. (2002)

*NAL Call #:* 56.8-J822;

*ISSN:* 0022-4561 [JSWCA3].

*Notes:* Special section: Nutrient  
management in the United States.  
Paper presented at a joint symposium  
of the Soil and Water Conservation  
Society and the Soil Science Society  
of America held August 4-8, 2001,  
Myrtle Beach, South Carolina and  
Charlotte, North Carolina. Includes  
references.

*Descriptors:* nitrogen/ soil fertility/  
remote sensing/ reflectance/ soil  
organic matter/ soil water/ nitrogen  
fertilizers/ fertilizer requirement  
determination/ site specific crop  
management/ crops/ color/ nitrogen  
content

This citation is from AGRICOLA.

**1328. Remote sensing of soil salinity: Potentials and constraints.**

Metternicht, G. I. and Zinck, J. A.

*Remote Sensing of Environment*  
85 (1): 1-20. (2003)

*NAL Call #:* Q184.R4;

*ISSN:* 0034-4257

This citation is provided courtesy of  
CAB International/CABI Publishing.

**1329. The report of the EPA/State Feedlot Workgroup.**

United States. EPA/State Feedlot  
Workgroup.

Washington, D.C.: U.S.

Environmental Protection Agency,  
Office of Wastewater Enforcement  
and Compliance; vii, v, 156 p.: ill.,  
maps. (1993)

*Notes:* Cover title. "September 1993."  
"PB95-201752." Includes  
bibliographical references.

*NAL Call #:* TD223.U524--1993

*Descriptors:* Water---Pollution---

United States/ Groundwater---

Pollution---United States/ Feedlot

runoff---United States

This citation is from AGRICOLA.

**1330. Report of the Technical Advisory Committee for plant nutrient management.**

California. State Water Resources  
Control Board.

Sacramento, Calif.: State Water  
Resources Control Board; 19, 16 p.  
(1994)

*Notes:* Cover title. "November 1994."  
Includes bibliographical references.

*NAL Call #:* TD428.A37R46--1994

*Descriptors:* Plant nutrients---

Environmental aspects---California/

Crops and water---Environmental

aspects---California/ Agricultural

pollution California/ Nonpoint source

pollution California/ Water quality

management California

This citation is from AGRICOLA.

**1331. Research advance in forest restoration on the burned blanks.**

Kong FanHua; Li XiuZhen; Zhao  
ShanLun; and Yin HaiWei

*Journal of Forestry Research* 14 (2):  
180-184. (2003);

*ISSN:* 1007-662X

This citation is provided courtesy of  
CAB International/CABI Publishing.

**1332. Research needs for conserving California's rare plants.**

Skinner, M. W.; Tibor, D. P.; Bittman,  
R. L.; Ertter, B.; Ross, T. S.; Boyd, S.;  
Sanders, A. C.; Shevock, J. R.; and  
Taylor, D. W.

*Madrono* 42 (2): 211-241.

(Apr. 1995-June 1995)

*NAL Call #:* 450-M26;

*ISSN:* 0024-9637 [MADRAU].

*Notes:* In the Special Issue: The  
Future of California floristics and  
systematics: research, education,  
conservation. Proceedings of a  
symposium held June 3-5, 1994,  
Berkeley, California. Includes  
references.

*Descriptors:* wild plants/ species/  
endangered species/ nature  
conservation/ research/ information  
needs/ California/ rare species/  
endemic species

This citation is from AGRICOLA.

**1333. Research needs for forest and rangeland management in Arizona and New Mexico.**

Evans, Keith E. and Rocky Mountain  
Forest and Range Experiment Station

Fort Collins, Colo.: U.S. Dept. of  
Agriculture, Forest Service, Rocky

Mountain Forest and Range

Experiment Station; iii, 27 p.: ill.;

Series: General technical report RM  
291. (1997)

*Notes:* Cover title. Author statement  
from p. [i]. Shipping list no.: 97-0831-  
M. "March 1997"--P. [2] of cover.

Includes bibliographical references  
(p. 19). SUDOCs: A 13.88:RM-  
GTR-291.

*NAL Call #:* Fiche-S-133-A-

13.88:RM-GTR-291-

*Descriptors:* Forest management---

Research---Arizona/ Forest

management---Research---New

Mexico/ Range management---

Research---Arizona/ Range

management---Research---New

Mexico

This citation is from AGRICOLA.

**1334. Research Needs for Water Quality Management in the 21st Century: A Spatial Decision Support System.**

Lovejoy, S. B.; Lee, J. G.;  
Randhir, T. O.; and Engel, B. A.

*Journal of Soil and Water  
Conservation* 52 (1): 18-22.

(Feb. 1997)

*NAL Call #:* 56.8 J822;

*ISSN:* 0022-4561

*Descriptors:* watershed management/  
water quality management/ decision

making/ computers/ information systems/ research priorities/ future planning/ water management/ computer applications/ decision support systems/ water use/ resource management/ Internet/ Techniques of planning/ Freshwater pollution

**Abstract:** How can we better manage watersheds so that they can produce the products and services we desire? Most individuals want a product /service mix that includes production of food and fiber, housing, urban services, industrial sites, wildlife habitat, water quality, etc. Many individuals, communities and states are struggling with how to manage the resources within the watershed to achieve an acceptable mix of products and services (e.g. making the right trade-offs). Making these decisions requires greater thought about what types of data and information are needed in making informed choices. In addition, the data, information and knowledge needs to be easily accessible and usable by the decision makers and not constrained to one type of operating system or particular brand of hardware or software. One viable option is to make this data, information and decision aids accessible via the Internet where the data and decision aids reside on a central server and users can interact with them for analysis. This paper details our ideas concerning the research needs (information and knowledge) as well as the decision making supports necessary for individuals and communities to make better choices regarding the trade-offs among potential goods, services and levels of environmental amenities.

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**1335. Research on Society & Natural Resources: A content analysis of the first decade.**  
Culhane, P. J.  
*Society and Natural Resources* 14 (5): 365-384. (May 2001-June 2001)  
NAL Call #: HC10.S63;  
ISSN: 0894-1920 [SNREEI]  
**Descriptors:** natural resources/ journals/ literature reviews  
This citation is from AGRICOLA.

**1336. Research opportunities to improve nutrient-use efficiency in rice cropping systems.**  
Lafitte, H. R.  
*Field Crops Research* 56 (1/2): 223-236. (1998)  
NAL Call #: SB183.F5;  
ISSN: 0378-4290 [FCREDZ].  
**Notes:** In the special issue: Nutrient use efficiency in rice cropping systems / edited by K.G. Cassman and H.R. Lafitte. Includes references.  
**Descriptors:** oryza sativa/ cropping systems/ nutrients/ use efficiency/ agricultural research/ nutrient availability/ irrigation/ soil fertility / crop yield/ crop management/ water/ cultivars/ intensive cropping/ genetic improvement/ simulation models/ plant breeding/ literature reviews  
This citation is from AGRICOLA.

**1337. Reservoir System Management and Environmental Flows.**  
McMahon, T. A. and Finlayson, B. L.  
*Lakes and Reservoirs: Research and Management* 1 (1): 65-76. (1995);  
ISSN: 1320-5331  
**Descriptors:** reservoir operation/ ecological effects/ alteration of flow/ water management/ river regulations/ dams/ beneficial use/ reservoirs/ reviews/ management/ Australia/ reservoirs (water)/ environmental impact/ environmental protection/ ecosystem management/ Control of water on the surface/ Management/ Environmental action/ Mechanical and natural changes  
**Abstract:** Considerable attention has been paid to the downstream effects of reservoirs on the ecology of rivers, streams and wetlands. However, most reservoirs were constructed well before ecological concerns became prominent. Little attention has been given to the question of what extent existing structures and management systems can accommodate changes. The paper discusses this matter and a range of associated issues. It is concluded that many problems can be rectified by structural means but that such rectification will be very expensive. While based primarily on Australian systems, the conclusions and examination are considered to be globally applicable.  
© Cambridge Scientific Abstracts (CSA)

**1338. Residue management, conservation tillage and soil restoration for mitigating greenhouse effect by CO<sub>2</sub>-enrichment.**  
Lal, R.  
*Soil and Tillage Research* 43 (1/2): 81-107. (1997)  
NAL Call #: S590.S48;  
ISSN: 0167-1987  
This citation is provided courtesy of CAB International/CABI Publishing.

**1339. Residue management impact on the environment.**  
Sims, G. K.; Buhler, D. D.; and Turco, R. F.  
In: *Managing agricultural residues*/ Unger, P. W.  
Boca Raton, Fla.: Lewis Publishers, 1994; pp. 77-98.  
ISBN: 0-87371-730-9  
This citation is provided courtesy of CAB International/CABI Publishing.

**1340. Resilience and restoration of lakes.**  
Carpenter, Stephen R and Cottingham, Kathryn L  
*Conservation Ecology* 1 (1)(1997)  
NAL Call #: QH75.A1C67.  
**Notes:** No page numbers; Online version cited: April 25, 2004; Table of contents available:  
<http://www.ecologyandsociety.org/vol1/iss1/index.html>  
**Descriptors:** phosphorus/ agricultural runoff/ conservation/ ecological economics/ eutrophication/ food web structures/ humic production/ lake restoration/ nutrient retention/ phosphorus/ riparian forests/ urban runoff/ water quality/ watershed resilience/ wetlands  
**Abstract:** Lake water quality and ecosystem services are normally maintained by several feedbacks. Among these are nutrient retention and humic production by wetlands, nutrient retention and woody habitat production by riparian forests, food web structures that channel phosphorus to consumers rather than phytoplankton, and biogeochemical mechanisms that inhibit phosphorus recycling from sediments. In degraded lakes, these resilience mechanisms are replaced by new ones that connect lakes to larger, regional economic and social systems. New controls that maintain degraded lakes include runoff from agricultural and urban areas, absence of wetlands and riparian forests, and changes in lake food webs and biogeochemistry

that channel phosphorus to blooms of nuisance algae. Economic analyses show that degraded lakes are significantly less valuable than normal lakes. Because of this difference in value, the economic benefits of restoring lakes could be used to create incentives for lake restoration. © Thomson

**1341. Resistance: A threat to the insecticidal crystal proteins of *Bacillus thuringiensis*.**

Bauer, L. S.

*Florida Entomologist* 78 (3): 414-443. (Sept. 1995)

NAL Call #: 420-F662;

ISSN: 0015-4040 [FETMAC].

Notes: Paper presented at the symposium "The Myths of Managing Resistance," 1994 Annual meeting of the Florida Entomological Society, August 8-11, 1994, Stuart, Florida. Includes references.

Descriptors: bacillus thuringiensis/ biological control agents/ endotoxins/ genetic resistance/ insecticide resistance/ transgenic plants/ cross resistance/ mode of action/ resistance mechanisms/ integrated pest management/ literature reviews/ resistance management

This citation is from AGRICOLA.

**1342. Resistance as a concomitant of modern crop protection.**

Urech, P. A.; Staub, T.; and Voss, G. *Pesticide Science* 51 (3): 227-234. (1997)

NAL Call #: SB951.P47;

ISSN: 0031-613X

Descriptors: pesticide resistance/ agricultural practices/ chemical control/ Insecta/ Fungi/ Acari/ Agricultural & general applied entomology

Abstract: This paper reviews the impact of resistance to fungicides and insecticides/acaricides on the way crop protection is practised. It is now clear that resistance can develop to virtually any crop-protection product, in any pest, fungal pathogen or even weed. As a limiting factor in crop protection, it is a fact of life. A positive side-effect is the precision with which products are used today, with increasing implementation of Integrated Pest Management (IPM) programmes. This is a vital step towards sustainability. This paper describes: past experiences; current status of resistance; how resistance management influences current crop protection practices; regulatory

aspects; and the outlook for the future. It concludes that EU regulations on resistance management must be simple and workable. Chemicals will continue to have a central role in optimising yields from the world's crops, as new tools, including biotechnology, become available for crop protection and resistance management. The crop-protection industry's innovations and product stewardship programmes will contribute to sustainable agriculture. This will provide continued benefits to users, the environment and society. © Cambridge Scientific Abstracts (CSA)

**1343. Response of a Zooplankton Community to Insecticide Application in Experimental Ponds: A Review and the Implications of the Effects of Chemicals on the Structure and Functioning of Freshwater Communities.**

Hanazato, T.

*Environmental Pollution* 101 (2):

361-373. (1998)

NAL Call #: QH545.A1E52;

ISSN: 0269-7491

Descriptors: Reviews/ Zooplankton/ Food chains/ Insecticides/ Ponds/ Freshwater pollution/ Chemical pollutants/ Pollution effects/ Toxicity tolerance/ Freshwater crustaceans/ Population dynamics/ Body size/ Chemical pollution/ Community structure/ Daphnia/ Water Pollution/ Pesticides/ Pesticide applications/ Daphnia/ Japan/ Experimental research/ Environmental impact/ Effects on organisms/ Freshwater pollution/ Effects of pollution/ Pollution effects

Abstract: A review is presented of experimental studies in outdoor experimental ponds to investigate the effects of various insecticide exposures on natural zooplankton communities. Large zooplankton species, which generally are superior to small zooplankton species in competition, are also more sensitive to insecticides. Relatively low insecticide concentrations, which damage only large taxa (*Daphnia*), may affect the population dynamics of other zooplankton indirectly through altered competitive relationships. The effects of insecticide on the zooplankton community are also influenced by factors such as temperature, chemical properties (e.g. degradation rate), population trends among the organisms, community

structure (presence or absence of predators), and timing of the chemical application. These factors modify interrelationships between organisms and, therefore, control the recovery process of the zooplankton community following insecticide impacts. Results to date suggest that insecticide stress decreases the average size of the organisms, reduces energy transfer efficiency, elongates the food chain and sometimes increases species richness.

© Cambridge Scientific Abstracts (CSA)

**1344. Response of potato (*Solanum tuberosum* L.) to nitrogen and farmyard manure: A review.**

Ramanjit Kaur; Nathu Singh; Kler DS; Kaur R; and Singh N

*Environment and Ecology* 19 (1): 87-105; 104 ref. (2001)

This citation is provided courtesy of CAB International/CABI Publishing.

**1345. Response of soil and irrigated fruit trees to fertigation or broadcast application of nitrogen, phosphorus, and potassium.**

Neilsen, G. H.; Neilsen, D.; and Peryea, F.

*HortTechnology* 9 (3): 393-401.

(July 1999-Sept. 1999)

NAL Call #: SB317.5.H68;

ISSN: 1063-0198.

Notes: Paper presented at the American Society for Horticultural Science. Workshop on Conservation tillage for vegetables held July 11-16, 1998, Charlotte, North Carolina. Includes references.

Descriptors: fruit trees/ irrigation/ fertigation/ broadcasting/ nitrogen fertilizers/ phosphorus fertilizers/ potassium fertilizers/ roots/ spatial distribution/ acidification/ soil solution/ monitoring/ foliar application/ microirrigation/ malus pumila/ crop yield/ leaves/ nutrient content/ fruits/ literature reviews/ high density planting

Abstract: Traditionally, broadcast or foliar fertilizer applications have been used to improve or sustain the nutrition of many irrigated, deciduous fruit tree orchards in western North America. Recent developments, including adoption of low-pressure microirrigation systems and planting at higher densities [especially for apple (*Malus domestica* Borkh.)], have increased interest in controlled application of fertilizers directly with

irrigation (fertigation). Recent fertigation research in western North America is reviewed, emphasizing results from high-density apple orchards. Fertigation and traditional broadcast application methods are examined with respect to mobility of N, P, and K in the soil and response of fruit trees to application of these nutrients. This citation is from AGRICOLA.

**1346. Restoration Experiments in Middle European Wet Terrestrial Ecosystems: An Overview.**

Pfadenhauer, J. and Kloetzli, F. *Vegetatio* 126 (1-4): 101-115. (Sept. 1996); ISSN: 0042-3106.

*Notes:* Conference: 6. International Congress of Ecology, Manchester (UK), Aug 1994

*Descriptors:* peat/ wetlands/ agriculture/ man induced effects/ ecosystem management/ nature conservation/ restoration/ environmental/ Europe/ environmental effects/ drainage/ flooding/ Europe/ fens/ water retention/ Habitat community studies/ Protective measures and control/ Reclamation/ Effects on water of human nonwater activities

*Abstract:* Most wetlands in the central European lowlands have been severely altered by cultivation. As a consequence they no longer fulfil their function as habitats for specialised species and communities, nor as retention areas for water and solid materials. Therefore, a number of renaturation experiments are in progress, which intend to develop and test strategies and measures to improve this defect in landscape diversity. For this purpose experiments on re-wetting, nutrient depletion of eutrophicated areas and re-establishment of typical wetland plant species and phytocoenoses have been performed. An ecological development concept defining the aims and describing their feasibility precedes such experiments. Preliminary results indicate that the reconstruction of the former state (regeneration) is impossible within reasonable time spans. In drained raised bogs overgrown with heather, as well as in those which have been industrially exploited, the primary aim must always be to restore efficient peat formation as far as possible; as a rule one succeeds only with well-growing and nutrient-demanding fen

and transitional bog species. In cultivated fens the aim is to reduce peat loss. As a first step this is accomplished by converting arable fields and sown meadows into permanent grassland, if possible with reduced fertilization and low mowing or grazing frequencies, and accompanied by rewetting during winter. Many experiments have sought to impoverish eutrophicated fen soils and introduce typical fen species by sowing or planting, so well tested techniques are available. However, the total prevention of peat loss is only possible by permanent rewetting throughout the year, so that peat accumulation can start again. Only in this way could fens regain their former function as sinks in landscape processes. © Cambridge Scientific Abstracts (CSA)

**1347. Restoration of aquatic macrophyte vegetation in acidified and eutrophicated shallow soft water wetlands in the Netherlands.**

Roelofs, J G M; Brouwer, E; and Bobbink, R *Hydrobiologia* 478: 171-180 (2002) NAL Call #: 410 H992; ISSN: 0018-8158

*Descriptors:* carbon/ carbon dioxide/ aquatic macrophyte (Plantae)/ Plants/ alkalization/ anthropogenic processes/ atmospheric deposition/ catchment acidification/ colonization rates/ conservation strategies/ drainage/ environmental degradation/ eutrophication/ geographic distribution/ hydrology/ lake types/ nutrient inputs/ soft water wetlands/ vegetation restoration

*Abstract:* Soft water lakes possess a highly characteristic vegetation adapted to limitation of carbon. Based upon hydrology, vegetation and geographic distribution, boreal and Atlantic lake types can be distinguished. Reducing the input of nutrients or liming, or both, the stream or its catchment is generally sufficient to restore typical soft water vegetation of boreal soft water lakes. The vegetation of Atlantic soft water lakes is subject to many anthropogenic degradation processes. Therefore, spontaneous recovery in the near future is not expected and restoration is urgently required. Removal of nutrient-rich, anoxic, organic sediments is a prerequisite for restoration of these lakes. In acidified or acid-sensitive lakes, additional

measures against acidification are required. Controlled supply of calcareous, nutrient-poor water is much better than direct liming. The effects of these restoration measures strongly depend on the detrimental effects of processes such as atmospheric deposition, drainage, catchment acidification, eutrophication and reduced colonisation rates. © Thomson

**1348. Restoration of brook valley meadows in the Netherlands.**

Grootjans, A P; Bakker, J P; Jansen, A J M; and Kemmers, R H *Hydrobiologia* 478: 149-170 (2002) NAL Call #: 410 H992; ISSN: 0018-8158

*Descriptors:* organism (Organisms): Red List species, protected species/ agricultural fields/ atmospheric deposition/ brook valley meadows/ drainage/ groundwater discharge/ hydrological systems/ restoration management/ seed banks/ seed dispersal mechanisms/ soil properties: chemical, physical/ topsoil removal/ wetlands conservation

*Abstract:* Until recently, restoration measures in Dutch brook valley meadows consisted of re-introducing traditional management techniques, such as mowing without fertilisation and low-intensity grazing. In the Netherlands, additional measures, such as rewetting and sod cutting, are now carried out on a large scale to combat negative influences of drainage and acidifying influences by atmospheric deposition. An analysis of successful and unsuccessful projects shows that restoration of brook valley meadows is most successful if traditional management techniques are applied in recently abandoned fields that had not been drained or fertilised. Large-scale topsoil removal in former agricultural fields that had been used intensively for several decades is often unsuccessful since seed banks are depleted, while hydrological conditions and seed dispersal mechanisms are sub-optimal. In areas with an organic topsoil, long-term drainage had often led to irreversible changes in chemical and physical properties of the soil. Successful sites were all characterised by a regular discharge of calcareous groundwater provided by local or regional hydrological systems, and, where not very long ago, populations of target species existed. On mineral soils, in

particular, sod removal in established nature reserves was a successful measure to increase the number of endangered fen meadow species. It is argued that attempts to restore species-rich meadows should be avoided on former agricultural fields, where pedological processes have led to almost irreversible changes in the soil profile and where soil seed banks have been completely depleted. From a soil conservation point of view, such areas should be exploited as eutrophic wetlands that are regularly flooded.

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**1349. Restoration of degraded lands in the interior Columbia River basin: Passive vs. active approaches.**

Mclver, J. and Starr, L.  
*Forest Ecology and Management* 153 (1/3): 15-28. (Nov. 2001)  
NAL Call #: SD1.F73;  
ISSN: 0378-1127 [FECMDW].  
Notes: Special issue: The science basis for ecosystem management in the interior Columbia River basin / edited by R. Haynes, T. Quigley, T. Spies, and J. Clifford. Includes references.

*Descriptors:* degraded forests/ afforestation/ reclamation/ riparian vegetation/ steppes/ altitude/ plant communities/ weeding/ prescribed burning/ thinning/ fuel appraisals/ stand structure/ botanical composition/ literature reviews/ Washington/ Oregon/ idaho/ Nevada/ Wyoming/ Montana/ Utah  
This citation is from AGRICOLA.

**1350. Restoration of floodplain forests in Britain.**

Peterken, G. F. and Hughes, F. M. R.  
*Forestry* 68 (3): 187-202. (1995)  
NAL Call #: 99.8-F767;  
ISSN: 0015-752X [FRSTAH]

*Descriptors:* floodplains/ bottomland forests/ riparian forests/ forestry development/ forest management/ river regulation/ land use planning/ forest policy/ forest influences/ forest resources/ literature reviews/ UK  
*Abstract:* Floodplain forests have almost completely disappeared from Britain. Throughout the temperate regions of Europe and North America they have been greatly reduced and many of the remainder are threatened. River control has altered the natural flooding and disturbance regime. However, changes in agricultural requirements and

attitudes to river management and the need to water quality have created an opportunity for restoring some more natural river dynamics habitats. This paper presents a case for including managed and natural floodplain forests in river and floodplain restoration projects. Benefits would accrue for timber production, reduction of agricultural surpluses, nature conservation, fishing, water quality, river control and landscape quality. Limited practical experience of floodplain forest restoration in North America and continental Europe suggests that practical problems can be overcome.

This citation is from AGRICOLA.

**1351. Restoration of riparian vegetation in the south-western United States: Importance of flow regimes and fluvial dynamism.**

Stromberg, J. C.  
*Journal of Arid Environments* 49 (1): 17-34. (2001)  
NAL Call #: QH541.5.D4J6;  
ISSN: 0140-1963

This citation is provided courtesy of CAB International/CABI Publishing.

**1352. Restoration of sustainability of physically degraded fish habitats: The Model of Intermediate Restoration.**

Zalewski, Maciej and Welcomme, Robin  
*Ecohydrology and Hydrobiology* 1 (3): 279-282. (2001);  
ISSN: 1642-3593

*Descriptors:* fish (Pisces)/ Animals/ Chordates/ Fish/ Nonhuman Vertebrates/ Vertebrates/ abiotic factors/ biodiversity/ biogeochemical cycles/ ecohydrology/ ecological restoration: intermediate/ ecosystem productivity/ eutrophication/ forestation/ freshwater ecosystems/ habitat degradation/ habitat quality/ human impact/ impoverishment/ nutrient cycling/ nutrient pools: control, regulation/ physical modification/ phytotechnologies/ plant cover/ riparian ecotones/ river basins/ stock rehabilitation/ wilderness  
*Abstract:* Freshwater ecosystems are situated in depressions in the landscape. As a result they accumulate the impacts of human activities. The quality of fish habitat depends to a great extent on the density of the human population and its activities within the basin. Anthropogenic impacts on fish habitats can be defined both

technologically and ecologically. Emission of pollutants can be controlled by technology. Modification of hydrological and biogeochemical cycles, that have negative consequences for the biota, can only be reduced by an integrated approach. The Restoration Ecohydrology Concept serves as an integrating mechanism for the restoration of physically modified freshwater habitats. There are two main approaches to restoration and mitigation: Firstly actions at the catchment level connected with integrated management of abiotic factors including, landscape planning, catchment management, forestation, phytotechnologies and hydrology by impoundment. Secondly actions at the level of the aquatic ecosystem itself, particularly those linked to fisheries management, including restoration of the diversity and connectivity of habitats by rehabilitation of the river channel and floodplains, and rehabilitation of the fish stock itself by stocking and introductions. These measures have to be oriented toward the control and regulation of the dynamic pool of nutrients, maintaining a fine line between eutrophication and impoverishment, to manipulate the productivity and diversity of the biota, especially the fish assemblages, for the goals of society. The definition of societal goals is fundamental in determining policies for the restoration of physically modified fish habitat in the broad sense of modification of biogeochemical cycles. The papers presented at the EIFAC Workshop "Ecohydrology as a tool for restoration of physically degraded habitats" conclude that the highest biodiversity and productivity of fish assemblages appears at an intermediate level of human disturbances, which, in the case of the biogeochemical cycle, has usually been connected with limited degradation of catchment cover. The increase of fish biomass and diversity under these conditions apparently results firstly from nutrient enrichment and improved energy influxes to the stream arising from the more rapid cycling of nutrients of terrestrial origin cycling, and secondly from the intermediate complexity of the riparian ecotones. The maximum of biomass might appear under different conditions than those that favour maximum biodiversity due to this ecosystem enrichment and amplified access to energy. The data presented at the symposium lead to three

conclusions: 1. Restoration of river systems to pristine conditions is not realistic but is also not necessary. (In Europe the separation in time between present conditions and the wilderness state is much greater than in other areas of the world such as the USA or Australia) 2. The target of restoration of physically degraded habitats should lie somewhere in the range between maximum biodiversity and maximum productivity of fish communities. 3. If the connectivity of the river system is maintained, the "patchy" restoration of physically degraded fish habitats at the river basin scale might be sufficient (See Cowx, Welcomme 1998 for a definition of the bead concept as applied to floodplain restoration). Further investigations are needed to develop standards for fish habitat restorations in different the geographic regions as determined by the geology, hydrology and degree of human modification of the plant cover. Research is also needed to define the societal goals that will determine the type of restoration undertaken.  
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**1353. Restoration of temperate wetlands.**

Wheeler, Bryan D.  
Chichester; New York: Wiley; xiv, 562 p.: ill. (1995)  
*Notes:* Papers from a symposium held at the University of Sheffield, England in Sept. 1993. Includes bibliographical references and index.  
*NAL Call #:* QH541.5.M3R47--1995;  
*ISBN:* 0471951056  
*Descriptors:* Wetland ecology--- Congresses/ Restoration ecology--- Congresses/ Wetland conservation--- Congresses  
This citation is from AGRICOLA.

**1354. Restoring prairie wetlands: An ecological approach.**

Galatowitsch, Susan M.; Valk, Arnoud van der; and Institute for Wetland and Waterfowl Research.  
Ames: Iowa State University Press; x, 246 p.: ill. (1994)  
*Notes:* 1st ed.; "A special publication of Ducks Unlimited's Institute for Wetland and Waterfowl Research." Includes bibliographical references and index.  
*NAL Call #:* QH75.G35--1994;  
*ISBN:* 0813824990 (alk. paper)  
*Descriptors:* Wetland conservation/ Wetland conservation---Prairie Pothole Region/ Restoration ecology/

Restoration ecology---Prairie Pothole Region/ Wetland ecology/ Wetland ecology---Prairie Pothole Region  
This citation is from AGRICOLA.

**1355. Results of long-term trials with fertilizers.**

Boinchan B and Lykov A  
*Mezhdunarodnyi Sel'skokhozyaistvennyi Zhurnal* 6: 42-45. (1999)  
This citation is provided courtesy of CAB International/CABI Publishing.

**1356. Resuspension in lakes and its ecological impact: A review.**

Weyhenmeyer, Gesa A  
*Ergebnisse der Limnologie* (51): 185-200. (1998);  
*ISSN:* 0071-1128  
*Descriptors:* ecological impact/ eutrophication/ lake ecosystem/ sediment resuspension/ total organic settling material/ water pollution  
*Abstract:* To determine geochemical, toxicological and biological impacts of sediment resuspension on lake ecosystems, this review tackles the questions where, why, when, how much, how often and what kind of sediment is resuspended and how resuspended material is distributed in the water column. Due to internal seiche activities sediment resuspension may occur in very deep areas. In the moderately deep Lake Erken in south-eastern Sweden (mean depth: 9 m, maximum depth: 21 m) internal seiche activities are, for example, one of the explanations why, as an annual average, 85% of the total settling material in the water column was determined to be resuspended sediment. The annual averages of resuspended sediment in 16 other shallow and deep lakes spread throughout the world were 15-92%. Also large amounts of organic sediment are resuspended (annual averages: 25-84% of total organic settling material was resuspended organic sediment in 9 lakes). These large amounts of resuspended sediment, especially of organic resuspended sediment, have such an important influence on lake ecosystems that the flux of newly produced planktonic particulate matter was observed to be significantly related to the flux of resuspended sediment. It is suggested that the flux of resuspended sediment is not only related to planktonic production and

thereby eutrophication but also to the degree of water pollution by contaminants.  
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**1357. A review and synthesis of habitat use by breeding birds in agricultural landscapes of Iowa.**

Best, L. B.; Freemark, K. E.; Dinsmore, J. J.; and Camp, M.  
*American Midland Naturalist* 134 (1): 1-29. (July 1995)  
*NAL Call #:* 410-M58;  
*ISSN:* 0003-0031 [AMNAAF]  
*Descriptors:* wild birds/ species diversity/ breeding places/ habitat selection/ vegetation types/ agricultural land/ checklists/ conservation/ Iowa/ species abundance  
This citation is from AGRICOLA.

**1358. Review: Denitrification in temperate climate riparian zones.**

Martin, T. L.; Kaushik, N. K.; Trevors, J. T.; and Whiteley, H. R.  
*Water, Air and Soil Pollution* 111 (1-4): 171-186. (1999)  
*NAL Call #:* TD172.W36;  
*ISSN:* 0049-6979  
*Descriptors:* Denitrification/ Riparian environments/ Agricultural runoff/ Water pollution control/ Nitrates/ Reviews/ Watersheds/ Biofiltration/ Pollution control/ Flood plains/ Water pollution/ Temperate Zone/ Riparian Land/ Research Priorities/ Assay/ Freshwater pollution/ Behavior and fate characteristics/ Water quality control  
*Abstract:* Excess nitrate (NO<sub>3</sub><sup>-</sup>) in lakes and streams has deleterious effects for environmental and human health. Nitrate concentrations have become problematic in agricultural watersheds due to increased use of fertilizers and improper management of livestock wastes. Research has indicated that the planting and/or preservation of riparian buffer zones can be an effective means of reducing pollution from agricultural fields. Biological denitrification is the most desirable means of nitrate attenuation as the microbial conversion of NO<sub>3</sub><sup>-</sup> removes nitrate from the watershed in the form of N gases. Despite the inherent value of biological denitrification, a comprehensive review discussing the role of this process in removing nitrate from riparian zones is lacking. In this paper we examine the results and conclusions of past research on the

topic of denitrification in riparian zones and make recommendations for future research in this area. The need for subsurface denitrification assays in riparian zones is emphasized.

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**1359. A review of ammonia emissions from confined swine feeding operations.**

Arogo, J.; Westerman, P. W.; and Heber, A. J.

*Transactions of the ASAE* 46 (3): 805-817. (2003)

NAL Call #: 290.9 Am32T;

ISSN: 0001-2351.

Notes: Number of References: 92

**Descriptors:** Agriculture/ Agronomy/ ammonia emission/ confined animal feeding operations/ emission factors/ swine feeding operations/ growing finishing pigs/ wind tunnel technique/ livestock buildings/ hydrogen sulfide/ nitrous oxide/ sprinkler irrigation/ excretory behavior/ odorous compounds/ treatment lagoons/ UK  
**Abstract:** Ammonia emissions from swine feeding operations depend on the housing type; animal size, age, and type; manure management, storage, and treatment; climatic variables; and manure utilization or land application techniques.

Techniques or methods for estimating or quantifying NH<sub>3</sub> flux from a source to the atmosphere include nitrogen mass balance, micrometeorology, flux chambers, models, and emission factors. Of these techniques, emission factors, once established, provide the most convenience in estimating emissions. However, it is important to understand how a particular emission factor is determined and whether it accurately reflects a composite or average emission for all the variable conditions. Using an average ammonia emission factor multiplied by pig inventory to determine a regional or national ammonia emission inventory may be misleading, especially in the U.S. where existing emission factors were developed using data from swine facilities in Western Europe. Housing, manure management practices, and climate vary among different regions of the U.S. and can be very different from those in Western Europe. In addition, ammonia concentrations and emission estimations have been determined with a variety of methods, making it difficult to compare results.

To determine representative ammonia emissions from confined swine feeding operations, it is important that emission factors be specific enough to account for animal type and size, housing system, manure storage and treatment, land application, and climatic effects. This article describes the strengths and limitations of emission factors as currently used and provides recommendations for determining realistic ammonia emission factors for swine feeding operations. Because of the limited nature of the data published in the literature, emission factors for different animal management systems could not be presented. Regulators, consultants, cooperative extension personnel, and other leaders in the agricultural community with interest in ammonia emissions should be aware of the lack of reliable U.S. data available for calculating accurate emission factors. The scientific research community should standardize methods for measurement, calculation, and reporting of ammonia emissions.

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**1360. A review of aquatic impact associated with turbidity.**

Edwards, C. J.

In: Technical workshop on sediments: Proceedings. (Held 3 Feb 1992-7 Feb 1992 at Corvallis, Oregon.)

Washington, D.C.: Terrene Institute; pp. 109-112; 1993.

NAL Call #: QE571.T42-1992

**Descriptors:** erosion/ sediment/ turbidity/ logging/ logging effects/ aquatic organisms

This citation is from AGRICOLA.

**1361. A review of aquatic weed biology and management research conducted by the United States Department of Agriculture-Agricultural Research Service.**

Anderson, Lars W J

*Pest Management Science* 59 (6-7): 801-813. (2003)

NAL Call #: SB951-.P47;

ISSN: 1526-498X

**Descriptors:** aquatic herbicides: environmental effects, fate, modes of action/ aquatic weed (Plantae): biology, ecology, invasive, management research, physiology/ Plants/ collaborations/ field level studies/ host specificity / natural aquatic habitat protection/ plant competition/ riparian habitats protection/ specific biochemical work/

specific molecular work/ water demand/ weed management strategies

**Abstract:** Ever-increasing demand for water to irrigate crops, support aquaculture, provide domestic water needs and to protect natural aquatic and riparian habitats has necessitated research to reduce impacts from a parallel increase in invasive aquatic weeds. This paper reviews the past 4-5 years of research by USDA-ARS covering such areas as weed biology, ecology, physiology and management strategies, including herbicides, biological control and potential for use of natural products. Research approaches range from field-level studies to highly specific molecular and biochemical work, spanning several disciplines and encompassing the most problematic weeds in these systems. This research has led to new insights into plant competition, host-specificity, and the fate of aquatic herbicides, their modes of action and effects on the environment. Another hallmark of USDA-ARS research has been its many collaborations with other federal, state action and regulatory agencies and private industry to develop new solutions to aquatic weed problems that affect our public natural resources and commercial enterprises.

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**1362. A Review of Bioremediation of Contaminated Soils and Groundwater.**

Ritter, W. F. and Scarborough, R. W. *Journal of Environmental Science and Health, Part A: Environmental Science and Engineering and Toxic and Hazardous Substance Control* A30 (2): 333-357. (1995); ISSN: 1077-1204

**Descriptors:** soil remediation/ groundwater/ bioremediation/ polycyclic aromatic hydrocarbons/ fungi/ Phanerochaete chrysosporium/ explosives/ reviews / soil pollution/ ground water/ water pollution/ sediment pollution/ groundwater pollution/ pollution control/ water pollution treatment/ aromatic hydrocarbons/ Soil Contamination/ Hydrocarbons/ Phanerochaete chrysosporium/ Land pollution/ Freshwater pollution/ Utilization/ Methods and instruments/ Water quality control

**Abstract:** The paper discusses bioremediation of contaminated

groundwater and soils. Research needs for bioremediation are also discussed. Forms of bioremediation practiced today are the microbiological approach, which involves augmentation of the contaminated site with one or more species of contaminant-specific degrading organisms, and the microbial ecology approach, which involves adjusting certain physical and chemical factors at a site to enhance degradation. The microbial approach can be used at most sites. Contaminated soils may be bioremediated by in-situ techniques, landfarming, composting or in slurry bioreactors. Anaerobic biodegradation may offer an effective alternative to aerobic in-situ bioremediation for some compounds. Chlorinated aliphatic and heterocyclics have been degraded anaerobically. Petroleum hydrocarbons are the most easily bioremediated compounds. White rot fungus *Phanerochaete chrysosporium* will degrade many PAH compounds found in creosote. Bioremediation is also being used to remediate soils contaminated with explosives.  
© Cambridge Scientific Abstracts (CSA)

**1363. A Review of Canadian Remote Sensing Applications in Hydrology, 1995-1999.**

Pietroniro, A. and Leconte, R. *Hydrological Processes* 14 (9): 1641-1666. (2000)  
NAL Call #: GB651.H93;  
ISSN: 0885-6087.  
Notes: DOI: 10.1002/1099-1085(20000630)14:9<1641::AID-HYP75>3.3.CO;2-9  
Descriptors: Canada/ Remote Sensing/ Water Resources Management/ Satellite Technology/ Hydrology/ Watersheds/ Hydrologic Data/ Hydrologic Aspects/ Water resources/ Water management/ Data collections/ Satellite imagery/ Catchment areas/ Canada/ Data acquisition/ Monitoring and Analysis of Water and Wastes  
Abstract: The potential of remote sensing for providing information to hydrologists and water resources practitioners has been recognized since the 1970s. The variety of satellite and airborne platforms and the greater ease of access to imagery now make it possible to evaluate and quantify an increasingly large number of watershed physical characteristics and state variables. Canadian

scientists have been very active over the last 5 years creating algorithms to extract hydrological information from remotely sensed data and to develop new, or adapt existing, hydrological methods capable of making efficient use of this new information. Over the years, research and applications of remote sensing in Canadian hydrology have embraced a variety of topics and recent research has placed significant emphasis on radar remote sensing as the Canadian RADARSAT satellite was launched successfully on 4 November 1995. This paper reviews recent (1995-99) remote sensing contributions in hydrology by Canadians, specifically focusing on the usefulness and applicability of current remote sensing technology for water management purposes. A very brief description of the theory underlying each application as well as relevant sensors is presented.  
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**1364. Review of compost process-control for product function.**

Szmidt, R. A.  
In: Microbiology of composting/ Insam, H.; Riddech, N.; and Klammer, S.  
New York: Springer-Verlag, 2002; pp. 217-230.  
ISBN: 354067568X; Conference: International Conference on Microbiology of Composting, Innsbruck, Austria, October 18-20, 2000  
Descriptors: compost/ contamination/ safety/ control parameters/ engineering/ feedstock/ microbial dynamics/ pollution/ product function/ product use/ Agriculture / Bioprocess Engineering/ Pollution Assessment Control and Management/ Soil Science / Waste Management (Sanitation)/ composting/ waste processing method/ environmental management/ organic waste recycling/ waste management method/ waste management industry  
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**1365. A review of concepts and criteria for assessing agroecosystem health including a preliminary case study of southern Ontario.**

Xu, W. and Mage, J. A.  
*Agriculture, Ecosystems and Environment* 83 (3): 215-233. (2001)  
NAL Call #: S601.A34;  
ISSN: 0167-8809 [AEENDO]

Descriptors: agriculture/ ecosystems/ agricultural research/ ecological balance/ indicators/ species diversity/ nutrient availability/ water availability/ interactions/ land use/ literature reviews/ Ontario  
This citation is from AGRICOLA.

**1366. A review of conservation tillage strategies for humid temperate regions.**

Carter, M. R.  
*Soil and Tillage Research* 31 (4): 289-301. (1994)  
NAL Call #: S590.S48;  
ISSN: 0167-1987  
This citation is provided courtesy of CAB International/CABI Publishing.

**1367. A review of decision support systems for fertiliser application and manure management.**

Falloon, P. D.; Smith, J. U.; and Smith, P.  
*Acta Agronomica Hungarica* 47 (2): 227-236. (1999);  
ISSN: 0238-0161  
This citation is provided courtesy of CAB International/CABI Publishing.

**1368. Review of design and performance of the Pelenna wetland systems.**

Nuttall, C. A. and Connelly, R.  
*Land Contamination and Reclamation* 11 (2): 293-300. (2003);  
ISSN: 0967-0513  
This citation is provided courtesy of CAB International/CABI Publishing.

**1369. A review of dissolved oxygen modelling techniques for lowland rivers.**

Cox, B. A.  
*Science of the Total Environment* 314-316: 303-334. (2003)  
NAL Call #: RA565.S365;  
ISSN: 0048-9697.  
Notes: Special issue: Land Ocean Interaction: processes, functioning and environmental management: A UK perspective  
Descriptors: Environment/ Ecology/ dissolved oxygen/ biochemical oxygen demand/ photosynthesis/ respiration/ mass balance model/ rate parameter/ atmospheric reaeration/ water quality/ streams/ prediction/ coefficient/ rates/ respiration/ equations/ sediment/ systems  
Abstract: This review introduces the methods used to simulate the processes affecting dissolved oxygen (DO) in lowland rivers. The important processes are described and this

provides a modelling framework to describe those processes in the context of a mass-balance model. The process equations that are introduced all require (reaction) rate parameters and a variety of common procedures for identifying those parameters are reviewed. This is important because there is a wide range of estimation techniques for many of the parameters. These different techniques elicit different estimates of the parameter value and so there is the potential for a significant uncertainty in the model's inputs and therefore in the output too. Finally, the data requirements for modelling DO in lowland rivers are summarised on the basis of modelling the processes described in this review using a mass-balance model. This is reviewed with regard to what data are available and from where they might be obtained. (C) 2003 Elsevier Science B.V. All rights reserved.

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**1370. Review of emission factors and methodologies to estimate ammonia emissions from animal waste handling: Research and development.**

Doorn, Michiel R. J.; Natschke, David F.; Meeuwissen, Pieter C.; North Carolina. Dept. of Environment and Natural Resources; United States. Environmental Protection Agency. Office of Air and Radiation; United States. Environmental Protection Agency. Office of Research and Development; and National Risk Management Research Laboratory (U.S.).

Washington, D.C.: Environmental Protection Agency. (2002)

Notes: Title from web page. "April 2002." "EPA/600/R-02/017." Prepare by National Risk Management Research Laboratory, for Office of Air and Radiation, U.S. Environmental Protection Agency, Office of Research and Development and State of North Carolina, Division of Air Quality, Department of Environment and Natural Resources. Description based on content viewed May 21, 2003. Includes bibliographical references. No. 68-C-99-201.

NAL Call #: TD930.2-D66-2002  
<http://www.epa.gov/ORD/NRMRL/Pubs/600R02017/600R02017.pdf>

Descriptors: Animal waste---United States---Management---Methodology/

Animal waste Netherlands---Management---Methodology/  
 Ammonia---Environmental aspects  
 This citation is from AGRICOLA.

**1371. A review of environmental applications of bioluminescence measurements.**

Steinberg, S. M.; Poziomek, E. J.; Engelmann, W. H.; and Rogers, K. R. *Chemosphere* 30 (11): 2155-2197. (1995)

NAL Call #: TD172.C54;  
 ISSN: 0045-6535

This citation is provided courtesy of CAB International/CABI Publishing.

**1372. Review of environmental monitoring methods: Survey designs.**

McDonald, T. L.

*Environmental Monitoring and Assessment* 85 (3): 277-292. (2003)

NAL Call #: TD194.E5;  
 ISSN: 0167-6369

This citation is provided courtesy of CAB International/CABI Publishing.

**1373. A Review of Factors Affecting Productivity of Bald Eagles in the Great Lakes Region: Implications for Recovery.**

Bowerman, W. W.; Giesy, J. P.; Best, D. A.; and Kramer, V. J.

*Environmental Health Perspectives* 103 (4 Supp.): 51-59. (1995)

NAL Call #: RA565.A1E54;  
 ISSN: 0091-6765.

Notes: Conference: Work Session on Environmentally Induced Alterations in Development: A Focus on Wildlife, Racine, WI (USA), 10-12 Dec 1993  
 Source: Wildlife Development., 1995;  
 Editors: Rolland, R. //Gilbertson, M. //Colborn, T.; Document number: NIH 95-218

Descriptors: DDT/ reproduction/ Haliaeetus leucocephalus/ United States, Great Lakes/ pesticides (organochlorine)/ PCB/ TCDD/ PCB compounds/ birds/ mortality/ water pollution/ eggs/ environmental quality/ polychlorinated biphenyls/ aquatic birds/ pollution effects/ Freshwater pollution/ North America, Great Lakes/ pesticides/ Environmental impact/ Toxicology and health/ Effects of pollution/ Effects on organisms

Abstract: The bald eagle (*Haliaeetus leucocephalus*) population in North America declined greatly after World War II due primarily to the eggshell thinning effects of p,p'-DDE, a biodegradation product of DDT. After the banning of DDT in the United

States and Canada during the early 1970s, the bald eagle population started to increase. However, this population recovery has not been uniform. Eagles nesting along the shorelines of the North American Great Lakes and rivers open to spawning runs of anadromous fishes from the Great Lakes still exhibit impaired reproduction. We have explored both ecological and toxicological factors that would limit reproduction of bald eagles in the Great Lakes region. Based on our studies, the most critical factors influencing eagle populations are concentrations of environmental toxicants. While there might be some continuing effects of DDE, total PCBs and most importantly 2,3,7,8-tetrachlordibenzo-p-dioxin equivalents (TCDD-EQ) in fishes from the Great Lakes and rivers open to spawning runs of anadromous fishes from the Great Lakes currently represent a significant hazard to bald eagles living along these shorelines or near these rivers and are most likely related to the impaired reproduction in bald eagles living there.

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**1374. A review of farm-scale nutrient budgets for organic farms as a tool for management of soil fertility.**

Watson, C A; Bengtsson, H; Ebbesvik, M; Loes, A K; Myrbeck, A; Salomon, E; Schroder, J; and Stockdale, E A

*Soil Use and Management* 18 ([supplement]): 264-273. (2002)  
 NAL Call #: S590.S68;

ISSN: 0266-0032

Descriptors: nitrogen: budgets, fixation, nutrient, use efficiency/ nutrients: input output balance/ phosphorus: budgets, nutrient/ potassium: budgets, nutrient/ arable systems/ beef systems/ estimate bias sources/ farm scale nutrient budgets: soil fertility management tool/ horticultural systems/ long term sustainability/ management system diversity/ measurement bias sources/ organic farms/ purchased manure/ short term productivity

Abstract: On organic farms, where the importation of materials to build/maintain soil fertility is restricted, it is important that a balance between inputs and outputs of nutrients is achieved to ensure both short-term productivity and long-term

sustainability. This paper considers different approaches to nutrient budgeting on organic farms and evaluates the sources of bias in the measurements and/or estimates of the nutrient inputs and outputs. The paper collates 88 nutrient budgets compiled at the farm scale in nine temperate countries. All the nitrogen (N) budgets showed an N surplus (average 83.2 kg N ha<sup>-1</sup> yr<sup>-1</sup>). The efficiency of N use, defined as outputs/inputs, was highest (0.9) and lowest (0.2) in arable and beef systems respectively. The phosphorus (P) and potassium (K) budgets showed both surpluses and deficits (average 3.6 kg P ha<sup>-1</sup> yr<sup>-1</sup>, 14.2 kg K ha<sup>-1</sup> yr<sup>-1</sup>) with horticultural systems showing large surpluses resulting from purchased manure. The estimation of N fixation and quantities of nutrients in purchased manures may introduce significant errors in nutrient budgets. Overall, the data illustrate the diversity of management systems in place on organic farms, and suggest that used together with soil analysis, nutrient budgets are a useful tool for improving the long-term sustainability of organic systems.  
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**1375. A Review of Field Lysimeter Studies to Describe the Environmental Fate of Pesticides.**

Winton, K. and Weber, J. B.  
*Weed Technology* 10 (1): 202-209. (1996)  
NAL Call #: SB610.W39;  
ISSN: 0890-037X  
*Descriptors:* lysimeters/ fate of pollutants/ pesticides/ transpiration/ leaching/ Sources and fate of pollution  
*Abstract:* A brief review is presented for the use of soil lysimeters in studying transpiration, evapotranspiration, moisture, and nutrient movement in earlier times and pesticide dissipation and movement, and mass-balance of pesticide dissipation in more recent times. The important factors needed to understand research findings and to model pesticide dissipation such as key soil and site characteristics, climatic conditions, and the methods involved are discussed. Several case studies carried out by Ciba and North Carolina State University are

discussed and current developments in soil column field lysimeters are presented.  
© Cambridge Scientific Abstracts (CSA)

**1376. A review of field scale phosphorus dynamics models.**

Lewis, D. R. and McGechan, M. B.  
*Biosystems Engineering* 82 (4): 359-380. (Aug. 2002)  
NAL Call #: S671-.B567;  
ISSN: 1537-5110  
*Descriptors:* phosphorus/ cycling/ simulation models/ transport processes/ phosphorus fertilizers/ manures/ slurries/ immobilization/ mineralization/ soil flora/ absorption/ desorption/ leaching/ runoff/ nutrient uptake/ crops/ losses from soil/ water erosion/ overland flow/ literature reviews  
*Abstract:* In order to ascertain the limitations of current soil phosphorus models, three dynamic models are reviewed and compared, along with a more general contaminant transport model which has been applied to phosphorus dynamics. These models are ANIMO from the Netherlands, GLEAMS and DAYCENT from the USA, and MACRO from Sweden. The model concepts and constituent processes are analysed with particular reference to the equations used. Processes considered are the transport of soluble and particulate phosphorus, surface application (as fertilizer, manure or slurry, atmospheric deposition, and deposition or incorporation of dead plant material), mineralization/immobilization (between organic and inorganic forms), absorption/desorption, leaching, runoff and uptake by plants. All the models considered have a partial representation of these processes. In order to improve our understanding and simulation of phosphorus in soils, further P modelling work is required, which should be focussed on constructing a new hybrid version of the four models described here. Such a model is likely to include a description of both soluble and particulate P flow through micropores and macropores as in the MACRO model framework, combined with a full representation of the C/N/P cycle as described by GLEAMS, with manure and slurry components as described by ANIMO, and plant residue decay equations taken from the DAYCENT model. Finally, the

overland flow and erosion losses should be represented by components from the GLEAMS model.  
This citation is from AGRICOLA.

**1377. Review of GIS Applications in Hydrologic Modeling.**

Devantier, B. A. and Feldman, A. D.  
*Journal of Water Resources Planning and Management* 119 (2): 246-261. (1993)  
NAL Call #: TC401.A45  
*Descriptors:* Flood forecasting/ Geographic information systems/ Information systems/ Model studies/ Streamflow forecasting/ Computer models/ Computer programs/ Costs/ Databases/ Digital map data/ Erosion control/ Hydrologic models/ Numerical analysis/ Reviews/ Terrain analysis/ Topographic mapping/ Water management/ Water quality/ Watershed management / Streamflow and runoff/ Watershed protection/ Evaluation, processing and publication  
*Abstract:* Geographic information systems (GIS) provide a digital representation of watershed characteristics used in hydrologic modeling. Past efforts and current trends in using digital terrain models and GIS to perform hydrologic analyses were summarized. GIS data types may be topographic or topologic. Three methods of geographic information storage are: raster or grid, triangulated irregular network, and contour-based line networks. Remotely-sensed data are used in GIS and hydrologic modeling. Lumped parameter, physics-based, and hybrid approaches to hydrologic rainfall-runoff modeling all use geographic data inputs. General indices of the tendency to produce runoff include imperviousness, natural land cover, and watershed delineation and stream networks. Some end uses of GIS hydrologic prediction are floodplain management and flood forecasting, erosion prediction/control, water quality prediction/control, and drainage utility implementations. Since the cost of implementing a GIS can be significant, especially when the cost of data collection and manipulation is considered, it is best when the database can be shared for several related purposes. With less limitation from computing power, the focus of future advancements may be

improved data collection, expanded databases, and advances in numerical modeling approaches. (Fish-PTT)  
© Cambridge Scientific Abstracts (CSA)

**1378. A review of information on interactions between vegetation and groundwater.**

Maitre, D. C. le; Scott, D. F.; and Colvin, C.  
*Water SA (Pretoria)* 25 (2): 137-152. (1999);  
ISSN: 0378-4738  
This citation is provided courtesy of CAB International/CABI Publishing.

**1379. Review of Information on Pesticide Residues in the Canadian Environment.**

Sangodoyin, A. Y. and Smith, D. W.  
*Environmentalist* 16 (3): 187-196. (1996);  
ISSN: 0251-1088  
*Descriptors:* Canada/ Reviews/ Pesticides/ Monitoring/ Developing Countries/ Compliance/ Safety/ Assessments/ Spatial Distribution/ Temporal Distribution/ Pesticide residues/ Wildlife/ Pollution monitoring/ Food contamination/ Water pollution/ Air pollution/ Government regulations/ Sediment pollution/ Pollution control/ Pollution dispersion/ Identification of pollutants/ Environmental action/ Behavior and fate characteristics

*Abstract:* Pesticide residues in soil, water, food, wildlife and other media have been analysed in several monitoring studies. The purpose was to establish the distribution of these residues across a defined area, ascertain their trend over a specific period and use the results to assess environmental compliance and safety. In the present review the availability of information on pesticide residues in various Canadian environmental components was sought. With the possible exception of localized pesticide contamination of some private water supply wells, ground and surface water, most analyses revealed concentrations below guideline limits. Only a few cases were reported of mishandling, misuse and poisoning from pesticides. Continuing surveillance programmes and in-depth and well-organized monitoring studies, with special focus on areas that are vulnerable to contamination, by both provincial and federal governments, are largely

responsible for the encouraging results. This experience in the control of pesticide use and monitoring of residues in the environment should be of particular interest in developing countries.  
© Cambridge Scientific Abstracts (CSA)

**1380. A review of irrigation performance assessment in California.**

Purkey, D. R. and Wallender, W. W.  
*Irrigation and Drainage Systems* 8 (4): 233-249. (1994)  
NAL Call #: TC801.I66;  
ISSN: 0168-6291 [IRDSEG]  
*Descriptors:* irrigation/ irrigated farming/ irrigation systems/ irrigation requirements/ hydraulic structures/ performance/ irrigability surveys/ California  
This citation is from AGRICOLA.

**1381. A review of methods for measuring emission rates of ammonia from livestock buildings and slurry or manure stores, part 1: Assessment of basic approaches.**

Phillips VR; Scholtens R; Lee DS; Garland JA; and Sneath RW  
*Journal of Agricultural Engineering Research* 77 (4): 355-364; 39 ref. (2000)  
NAL Call #: 58.8-J82  
This citation is provided courtesy of CAB International/CABI Publishing.

**1382. A review of methods for measuring emission rates of ammonia from livestock buildings and slurry or manure stores, part 2: Monitoring flux rates, concentrations and airflow rates.**

Phillips VR; Lee DS; Scholtens R; Garland JA; and Sneath RW  
*Journal of Agricultural Engineering Research* 78 (1): 1-14; Many ref. (2001)  
NAL Call #: 58.8-J82  
This citation is provided courtesy of CAB International/CABI Publishing.

**1383. A Review of Methods Used to Measure Sediment Resuspension.**

Bloesch, J.  
*Hydrobiologia* 284 (1): 13-18. (1994)  
NAL Call #: 410 H992;  
ISSN: 0018-8158.  
*Notes:* Conference: Special Session at the 25. Cong. of the Int. Association of Limnology, Barcelona (Spain), 21-27 Aug 1992; Source: Sediment Resuspension., 1994; Editor: Bloesch, J.

*Descriptors:* sediments/ suspended sediments/ bottom sediments/ lakes/ lake sediments/ measuring instruments/ wind/ cores/ turbidity/ measurement/ resuspension/ resuspended sediments/ sedimentation/ lacustrine sedimentation/ Erosion and sedimentation/ Lakes/ Methods and instruments

*Abstract:* Resuspension of bottom sediments is an important lake-internal process with regard to particle cycling and sedimentation. Current methods to measure sediment resuspension are reviewed, such as optical and acoustical instruments, instantaneous multiple point water samplers, sediment traps, sediment cores and grabs, radiotracers such as Pb super(210), Cs super(137) and Be super(7), mass balance calculations, various modelling approaches, statistical methods (correlation analysis), and laboratory experiments. For the quantification of resuspension, the combined use of sediment traps, sediment cores, near bottom current meters, and turbidity meters to measure suspended and settling particulate matter in the hypolimnion of lakes is recommended; in addition, wind stress, seiches, slumping and sliding, and riverine input may be monitored to elucidate the mechanisms behind the process.  
© Cambridge Scientific Abstracts (CSA)

**1384. A review of microbiology in swine manure odor control.**

Zhu, Jun  
*Agriculture, Ecosystems and Environment* 78 (2): 93-106. (2000)  
NAL Call #: S601 .A34;  
ISSN: 0167-8809  
*Descriptors:* volatile organic compounds/ Clostridium (Endospore forming Gram Positives)/ Eubacterium (Irregular Nonsporing Gram Positive Rods)/ Bacteria/ Eubacteria/ Microorganisms/ low temperature/ swine manure: odor control  
*Abstract:* Generation of odors is a complex process that involves many bacterial species, producing an extensive array of volatile organic compounds under different manure storage systems currently used. A lack of understanding of the basic microbiology in manure leads to a poor odor prevention and control from animal wastes. This review covers

pertinent available information about the indigenous bacterial genera in swine manure and their potentials of producing odorous volatile compounds. It addresses not only the odorous compounds in swine manure but also the inherent relations between the bacterial species and the related compounds. It also discusses several odor control techniques that have been developed based on microbial activities and the limitations with these techniques. Two bacterial genera, *Eubacterium* and *Clostridium*, are most likely the major contributors to odorous volatile fatty acids. It appears that anaerobic lagoons may not be an appropriate choice for treating swine manure for odor control due to the reduced methanogenic activities resulted from the low temperatures in lagoon liquid. Also, it seems questionable that the microbial-based manure additives will work, without aeration, in a real storage system for the purpose of odor control.  
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**1385. Review of modelling crop growth, movement of water and chemicals in relation to topsoil and subsoil compaction.**

Lipiec, J.; Arvidsson, J.; and Murer, E. *Soil and Tillage Research* 73 (1/2): 15-29. (2003)  
NAL Call #: S590.S48;  
ISSN: 0167-1987  
This citation is provided courtesy of CAB International/CABI Publishing.

**1386. A review of New Zealand research measuring phosphorus in runoff from pasture.**

Gillingham, A. G. and Thorrold, B. S. *Journal of Environmental Quality* 29 (1): 88-96. (2000)  
NAL Call #: QH540.J6;  
ISSN: 0047-2425  
This citation is provided courtesy of CAB International/CABI Publishing.

**1387. A review of pesticide effects upon immature aphid parasitoids within mummified hosts.**

Longley, M. *International Journal of Pest Management* 45 (2): 139-145. (Apr. 1999-June 1999)  
NAL Call #: SB950.A1P3;  
ISSN: 0967-0874  
*Descriptors:* aphidoidea/ parasitoids/

parasites of insect pests/ pesticides/ nontarget organisms/ nontarget effects/ toxicity/ mortality/ longevity/ fecundity/ sublethal effects/ insect control/ integrated pest management/ literature reviews/ aphid mummies  
This citation is from AGRICOLA.

**1388. Review of Phosphorus Control Measures in the United States and Their Effects on Water Quality.**

Litke, D. W. U. S. Department of the Interior, U. S. Geological Survey [Also available as: USGS Water-Resources Investigations Report 99-4007], 1999 (application/pdf)  
<http://water.usgs.gov/nawqa/nutrients/pubs/wri99-4007/wri99-4007.pdf>  
*Descriptors:* phosphorus/ environmental management/ water quality analysis/ wastewater treatment/ pollution load/ nonpoint source pollution/ agricultural runoff/ eutrophication/ detergents/ National Water Quality Assessment Program / United States/ phosphorus detergents/ NWQAP  
*Abstract:* Historical information on phosphorus loadings to the environment and the effect on water quality are summarized in this report, which was produced as part of the U.S. Geological Survey's National Water-Quality Assessment (NAWQA) Program. Phosphorus is a water-quality constituent of concern because it is often the limiting nutrient responsible for accelerated eutrophication in water bodies.

**1389. A review of plant disease, pathogen interactions and microbial antagonism under conservation tillage in temperate humid agriculture.**

Sturz, A. V.; Carter, M. R.; and Johnston, H. W. *Soil and Tillage Research* 41 (3/4): 169-189. (1997)  
NAL Call #: S590.S48;  
ISSN: 0167-1987  
This citation is provided courtesy of CAB International/CABI Publishing.

**1390. A review of prescribed burning effectiveness in fire hazard reduction.**

Fernandes, P. M. and Botelho, H. S. *International Journal of Wildland Fire* 12 (2): 117-128. (2003);  
ISSN: 1049-8001  
This citation is provided courtesy of CAB International/CABI Publishing.

**1391. A review of processes responsible for metal removal in wetlands treating contaminated mine drainage.**

Sobolewski, A. *International Journal of Phytoremediation* 1 (1): 19-51. (1999)  
NAL Call #: TD192.75-.I58;  
ISSN: 1522-6514  
*Descriptors:* mine spoil/ contaminants/ waste water treatment/ biogeochemistry/ wetlands/ bioremediation/ pollution control/ literature reviews/ constructed wetlands  
This citation is from AGRICOLA.

**1392. A review of rainfall simulators for soil erosion studies.**

Shrivastava, P. K. and Ghanshyam Das *Indian Journal of Soil Conservation* 26 (2): 76-80. (1998)  
NAL Call #: S625.I47S6  
This citation is provided courtesy of CAB International/CABI Publishing.

**1393. Review of selected literature on indicators of irrigation performance.**

Rao, P. S. and International Irrigation Management Institute. Colombo, Sri Lanka: International Irrigation Management Institute; xiii, 75 p.: ill. (1993)  
*Notes:* "Research paper." Includes bibliographical references (p. 65-67).  
NAL Call #: S619.E34R36--1993;  
ISBN: 9290901985  
*Descriptors:* Irrigation efficiency/ Irrigation--Bibliography  
This citation is from AGRICOLA.

**1394. A review of soil erosion potential associated with biomass crops.**

Kort, J.; Collins, M.; and Ditsch, D. *Biomass and Bioenergy* 14 (4): 351-359. (1998);  
ISSN: 0961-9534  
This citation is provided courtesy of CAB International/CABI Publishing.

**1395. Review of Strategies for Modelling the Environmental Fate of Pesticides Discharged Into Riverine Systems.**

Petit, V.; Cabridenc, R.; Swannell, R. P. J.; and Sokhi, R. S. *Environment International* 21 (2): 167-176. (1995)  
NAL Call #: TD169.E54;  
ISSN: 0160-4120.  
*Notes:* Conference: Inland and Coastal Water Quality '93 --

Measurement and Modelling, Stevenage (UK), 29 Sep 1993; Source: Proceedings of the Inland and Coastal Water Quality '93 -- Measurement and Modelling; Editors: Sokhi, R. S. //Ellis, J. B. //Burton, J. D. //Leeks, G. J. L.

*Descriptors:* fate of pollutants/ pesticides/ rivers/ model studies/ agricultural chemicals/ water pollution sources/ herbicides/ aquatic environment/ agrochemicals/ aquatic environment/ biodegradation/ sorption/ aquatic microorganisms/ pollutant persistence/ pollution dispersion/ models/ fate/ degradation/ Sources and fate of pollution/ Freshwater pollution/ Microbial degradation/ Characteristics, behavior and fate

*Abstract:* Pesticides are often produced and stored in large quantities near rivers posing a potential hazard for the aquatic environment. Accidental incidents such as storage facility fires are of major concern as significant amounts of pesticide chemicals can enter the nearby riverine system, possibly causing considerable environmental damage. This paper discusses and reviews the major physical, chemical, and microbiological fate processes of selected herbicides in riverine systems. Glyphosate, paraquat, and diquat herbicides have been selected for discussion as they are widely used and because they degrade in freshwater mainly by well-defined fate processes. The paper concentrates on biodegradation, sorption, and photolysis, the primary fate processes by which these herbicides degrade. Strategies for mathematically modelling the environmental fate of pesticides in rivers are reviewed and areas of future work identified.

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**1396. A review of stream restoration techniques and a hierarchical strategy for prioritizing restoration in Pacific Northwest watersheds.**

Roni, P.; Beechie, T. J.; Bilby, R. E.; Leonetti, F. E.; Pollock, M. M.; and Pess, G. R.

*North American Journal of Fisheries Management* 22 (1): 1-20. (2002)  
NAL Call #: SH219.N66;  
ISSN: 0275-5947

This citation is provided courtesy of CAB International/CABI Publishing.

**1397. A review of the aquatic environmental fate of triclopyr and its major metabolites.**

Petty, D. G.; Getsinger, K. D.; and Woodburn, K. B.  
*Journal of Aquatic Plant Management* 41: 69-75. (2003)  
NAL Call #: SB614.H9;  
ISSN: 0146-6623.

*Notes:* Number of References: 37  
*Descriptors:* Aquatic Sciences/ Garlon 3A/ Renovate 3/ metabolite/ toxicology/ aquatic plant control/ herbicide dissipation/ Rhodamine WT dye/ triethylamine salt/ lake minnetonka/ dissipation/ toxicity/ 3,5,6 trichloro 2 pyridinol

*Abstract:* The triethylamine salt formulation of triclopyr was recently registered for use in aquatic sites by the U.S. Environmental Protection Agency for selective control of invasive aquatic and wetland weed species. Research shows that this herbicide and its metabolites have an environmentally compatible degradation scenario, an excellent toxicological profile, and the ability to selectively control a variety of exotic weed species, making it a valuable tool for restoring and managing aquatic ecosystems. Laboratory studies show that photolytic processes rapidly degrade triclopyr, indicating a major role in dissipation from aquatic sites. However, subsequent field studies indicate that photolysis has a more limited role in the aquatic degradation, likely due to sunlight attenuation in natural waters, and show that metabolic degradation processes assume a more important role. Laboratory investigations show aerobic and anaerobic degradation in hydrosoils is a slower process, and hydrolysis plays a minor role in triclopyr degradation. Field studies conducted in California, Georgia, Minnesota, Missouri, Texas and Washington have shown triclopyr and its TCP and TMP metabolites dissipated from water with half-lives ranging from 0.5 to 7.5, 4.2 to 10.0, and 4.0 to 8.8 days, respectively. Sediment dissipation half-lives ranged from 2.7 to 13.3 days for the same compounds. Half-lives for fish and shell fish ranged from 1.6 to 15.1 days. Results from laboratory and field studies indicate dissipation rates of the parent triclopyr and its metabolites are similar and relatively rapid.

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**1398. A Review of the Design and Performance of Vertical-Flow and Hybrid Reed Bed Treatment Systems.**

Cooper, P.  
*Water Science and Technology* 40 (3): 1-9. (1999)  
NAL Call #: TD420.A1P7;  
ISSN: 0273-1223.

*Notes:* Conference: 6. International Conference on Wetland Systems for Water Pollution Control, Aguas de Sao Pedro, SP (Brazil), 27 Sep-2 Oct 1998

Source: Wetland Systems for Water Pollution Control; Editor: Cooper, P.; ISBN: 008043424X

*Descriptors:* Vertical Flow/ Reviews/ Wetlands/ Oxygen Transfer/ Denitrification/ Water Treatment/ reed beds/ Wastewater treatment processes

*Abstract:* The paper reviews the different options for the combination of vertical- and horizontal-flow beds used in hybrid reed bed/wetland systems. The design and performance of these systems are briefly described. The importance of the oxygen transfer capacity of the different arrangements to their performance and their size is discussed. Alternative methods for denitrification are briefly described. © Cambridge Scientific Abstracts (CSA)

**1399. Review of the effect of ammonia and dust concentrations on broiler performance.**

Al-Homidan, A.; Robertson, J. F.; and Petchey, A. M.

*World's Poultry Science Journal* 59 (3): 340-349. (2003)  
NAL Call #: 47.8-W89;  
ISSN: 0043-9339

This citation is provided courtesy of CAB International/CABI Publishing.

**1400. A review of the effect of N fertilizer type on gaseous emissions.**

Harrison, R. and Webb, J.  
*Advances in Agronomy* 73: 65-108. (2001)

NAL Call #: 30-Ad9;  
ISSN: 0065-2113 [ADAGA7]

*Descriptors:* nitrogen fertilizers/ nutrient sources/ nitrogen/ air pollutants/ air pollution/ ammonia/ volatilization/ nitrous oxide/ nitric oxide/ urease inhibitors/ measurement/ nitrification/ literature reviews

This citation is from AGRICOLA.

**1401. Review of the effects of non-point nutrient loading on coastal ecosystems.**

Gabric, A. J. and Bell, P. R. F. *Australian Journal of Marine and Freshwater Research* 44 (2): 261-283. (1993);

ISSN: 0067-1940

*Descriptors:* pollution effects/ nutrients (mineral)/ literature reviews/ coastal waters/ eutrophication/ ecosystem management/ runoff/ erosion/ land use/ coastal zone management/ man induced effects/ human factors/ coastal water/ nutrients/ nonpoint pollution/ non point pollution/ Ecosystems and energetics/ Effects on organisms/ Pollution Environment/ Coastal zone management/ Pollution effects/ Marine Pollution

*Abstract:* In many coastal regions (e.g. parts of the North Sea, northern Adriatic Sea, Baltic Sea, Great Barrier Reef lagoon, wider Caribbean, coastal areas of the USA) there is large-scale, and in some cases chronic, eutrophication. In some regions, the link between eutrophication and the destruction of an ecosystem is obvious, with excessive algal growth and water-column anoxia. In other cases, particularly in more fragile ecosystems such as coral-reef and seagrass areas, the links are not so obvious, yet the impacts of eutrophication in such regions can be devastating. Eutrophication can have more insidious effects such as contributing directly to the mortality of fish, marine mammals and sea birds and indirectly to disease or death in humans owing to the accumulation of biotoxins in seafoods. Increased development and changes in land-use patterns in the coastal zone have increased the loading of diffuse or non-point nutrients. In areas subject to runoff and soil erosion, most of the nutrient load is transported in particulate form. In such cases, the loads of nutrients discharged from cropping lands are typically an order of magnitude greater than those discharged from pristine forested areas. Nutrient export from pasture lands, whether these are fertilized or not, is also significantly greater than that from pristine areas, and in many cases the total loads from such areas are far higher than those from intensively farmed areas. A reduction in nutrient discharges to coastal waters will require careful land-use planning. The importance of the particulate fraction in the nutrient load

necessitates effective control of soil erosion. The hydrological and nutrient linkage between terrestrial and marine ecosystems must be emphasized. Collective management of hinterland and coastal-zone resources could initiate remediation of a serious and growing problem.

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**1402. A review of the environmental effects of different livestock manure storage systems, and a suggested procedure for assigning environmental ratings.**

Nicholson, R. J.; Webb, J.; and Moore, A.

*Biosystems Engineering* 81 (4): 363-377. (Apr. 2002)

NAL Call #: S671-.B567;

ISSN: 1537-5110

*Descriptors:* animal manures/ storage/ structures/ odor emission/ water pollution/ groundwater pollution/ ammonia/ methane/ nitrous oxide/ nitric oxide/ pathogens/ emission/ risk assessment/ literature reviews/ manure storage structures

*Abstract:* There are concerns over a range of adverse environmental effects resulting from the storage of livestock manures on farms. The objectives of this study were to examine all the likely environmental effects of different storage methods, and to recommend which were the most desirable options. Literature reviews were undertaken to identify the likely environmental consequences of each commonly used storage method, in terms of water pollution risks, odor and ammonia emissions, greenhouse gas emissions and survival of microorganisms during storage. Planning and landscape aspects were considered and the most feasible options for abatement of ammonia emissions were identified. An 'environmental rating' for different storage systems was then devised, with the aim of obtaining a balance between water pollution, aerial emissions and other concerns. The environmental rating exercise favored the more sophisticated and hence most expensive storage methods. No large differences emerged between ratings for slurry systems and solid systems when ease of adding ammonia control measures was excluded. For pigs, slurry systems appear to have a slight advantage, because of the greater ammonia

emissions from the solid pig manure. The use of such a rating system could be developed further as more data become available. Whilst the method indicates the relative desirability of systems at a national scale it could be adapted to take account of local considerations or those of individual farm sites.

This citation is from AGRICOLA.

**1403. A Review of the Evidence for Endocrine Disruption in Canadian Aquatic Ecosystems.**

McMaster, M. E.

*Water Quality Research Journal of Canada* 36 (3): 215-231. (2001);

ISSN: 1201-3080.

*Notes:* Theme Issue: Endocrine Disrupting Substances in the Canadian Environment

*Descriptors:* Endocrine system/ Reviews/ Aquatic environment/ Pesticides/ Heavy metals/ Industrial pollution/ Canada/ Water pollution/ Chemical pollution/ Research programs/ Contaminants/ endocrine disruptors/ Pollution effects/ Wildlife/ Toxicity/ Trout (Freshwater)/ Effluent/ Pulp/ Endocrine glands/ Chemicals/ Pulp and paper industry waste waters (Sulphate)/ Salmon/ Tin (Organic compounds)/ Trout/ Salmon/ Water Pollution Effects/ Effluents/ Pulp Wastes/ Kraft Mills/ Fish Populations/ Pisces/ Canada/ endocrine disruptors/ Freshwater pollution/ Effects of Pollution/ Effects of pollution

*Abstract:* Endocrine disrupting substances in the environment and the potential affects they have on wildlife species has recently received increased public attention. This paper provides background information on research that has addressed the endocrine disruption issue in the Canadian aquatic environment as well as information on studies that are presently being conducted within the country to address this issue. Two of the three studies from across the world often cited as presenting sufficient evidence for connecting contaminants and endocrine disruption in fish populations are Canadian -- Lake Ontario lake trout and TCDD and related compounds, and white sucker exposed to bleached kraft pulp mill effluent. Several other Canadian examples exist, including altered stress responses in yellow perch exposed to heavy metals, altered smoltification in Atlantic salmon exposed to 4-

nonylphenol and imposex in dogwelks exposed to tributyltin. While other Canadian studies suggest alterations in reproductive function in fish, direct links to contaminants have not been made. Other studies have identified endocrine active compounds in the receiving environments but have yet to link these to alterations in endocrine function in resident fish populations. The strength of Canada's research programs lies in the breadth and depth of their field related research. It is this world-recognized expertise and strength that Canada can contribute to the international effort to address the endocrine disruptor issue.

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**1404. A review of the export of carbon in river water: Fluxes and processes.**

Hope, D.; Billett, M. F.; and Cresser, M. S.  
*Environmental Pollution* 84 (3): 301-324. (1994)  
 NAL Call #: QH545.A1E52;  
 ISSN: 0269-7491 [ENPOEK]  
 Descriptors: carbon/ organic compounds/ transport processes/ river water/ watersheds/ upland areas/ flow/ land use/ acidification/ global warming/ carbon cycle  
 This citation is from AGRICOLA.

**1405. A review of the Federal Clean Water Act and the Maryland Water Quality Improvement Act: The rationale for developing a water and nutrient management planning process for container nursery and greenhouse operations.**

Lea Cox, J. D. and Ross, D. S.  
*Journal of Environmental Horticulture* 19 (4): 226-229. (Dec. 2001)  
 NAL Call #: SB1.J66;  
 ISSN: 0738-2898 [JEHOD5]  
 Descriptors: nurseries/ greenhouse crops/ water quality/ pollution/ water conservation/ economic analysis/ leaching/ environmental protection/ nitrogen/ phosphorus/ eutrophication/ United States/ Maryland  
 This citation is from AGRICOLA.

**1406. Review of the methods to determine the hazard and toxicity of pesticides to bumblebees.**

Steen, Jozef J. M. van der  
*Apidologie* 32 (5): 399-406. (2001);  
 ISSN: 0044-8435  
 Descriptors: pesticides: toxin/ bumblebees (Hymenoptera): adult,

nontarget organism/ Animals/ Arthropods/ Insects/ Invertebrates/ acute toxicity/ apiculture/ field hazards/ sublethal effects  
 Abstract: Methods to determine the impact of pesticides on bumblebees are described. They are classified into laboratory tests to determine the acute toxicity and the hazard to bumblebees, (semi) field tests, and brood tests. The reproducibility and the significance of the data for practical purpose are discussed. Standardized laboratory toxicity tests supply reproducible data. In hazard tests, both in the laboratory and semi field tests, the exposure is not proportionate to the number of adult insects and the brood. Field tests provide realistic data on the hazard of a pesticide to bumblebee colonies but when the results are interpreted it must be taken in account that the test plot is only a portion of the total foraging area of a bumblebee colony. In a brood nest, due to the disorderly structure, only major effects can be recognized. Laboratory rearing of bumblebee brood should be developed to produce a standardized brood test that supplies reproducible data.

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**1407. A review of the scientific literature on riparian buffer width, extent and vegetation.**

Wenger, Seth. and University of Georgia. Institute of Ecology. Office of Public Service & Outreach.  
 Athens, Ga.: University of Georgia Institute of Ecology (Rev. version (Mar. 5, 1999)). (1999)  
 Notes: Caption title.  
 NAL Call #: QH541.15.B84-W45-1999  
[http://outreach.ecology.uga.edu/tools/buffers/lit\\_review.pdf](http://outreach.ecology.uga.edu/tools/buffers/lit_review.pdf)  
 Descriptors: Buffer zones---Ecosystem management---Georgia  
 This citation is from AGRICOLA.

**1408. Review of the small watershed program: Hearing before the Subcommittee on Environment, Credit, and Rural Development of the Committee on Agriculture, House of Representatives, One Hundred Third Congress, second session on H.R. 1634, H.R. 2460, H.R. 4213, H.R. 4289, September 27, 1994.**

United States. Congress. House. Committee on Agriculture.

Subcommittee on Environment, Credit and Rural Development.  
 Washington: U.S. G.P.O.; iv, 208 p.: ill. (1995)

Notes: Distributed to some depository libraries in microfiche. Shipping list no.: 95-0090-P. "Serial no. 103-94." Includes bibliographical references. SUDOCs: Y 4.AG 8/1:103-94.  
 NAL Call #: KF27-.A3338-1994b;  
 ISBN: 0160468337  
 Descriptors: Watersheds---United States/ Watershed management---United States/ Water resources development---United States  
 This citation is from AGRICOLA.

**1409. Review of the Use of Swine Manure in Crop Production: Effects on Yield and Composition and on Soil and Water Quality.**

Choudhary, M.; Bailey, L. D.; and Grant, C. A.  
*Waste Management and Research* 14 (6): 581-595. (Dec. 1996)  
 NAL Call #: TD896.W37;  
 ISSN: 0734-242X  
 Descriptors: manure/ animal wastes/ land application/ crops/ agriculture/ nutrients/ water quality/ soil/ fertilizers/ Canada/ waste disposal/ livestock/ waste management/ Waste management/ Ultimate disposal of wastes  
 Abstract: The world swine population produces about 1.7 billion tonnes of liquid manure annually. At an application rate of 20 tonnes per hectare, this could fertilize about 85 million hectares of land annually. Storage and disposal of this material presents a challenge to producers because of the potential for environmental pollution. However, because swine manure contains essential plant nutrients, use of swine manure as a soil amendment for crop production is a practical method to solve the disposal problem. The composition and effectiveness of swine manure as a source of plant nutrients depends on several factors including type of ration fed, housing system, method of manure collection, storage and handling. Research has shown that manure application increased soil N, P, K, Ca, Mg and Na. However, heavy or excessive application of manure increased leaching of NO sub(3)-N, P and Mg. Swine manure is reported to be effective in increasing the yields of cereals, legumes, oilseeds, vegetables and pastures, and in increasing plant nutrient

concentration, especially N, P and K. The efficient use of swine manure can be an agronomically and economically viable management practice for sustainable crop production in temperate regions such as the Canadian prairies where the swine industry is expanding rapidly.  
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**1410. A review of tillage effects on crop residue management, seedbed conditions and seedling establishment.**

Guérif, J.; Richard, G.; Dürr, C.; Machet, J. M.; Recous, S.; and Roger-Estrade, J.  
*Soil and Tillage Research* 61 (1/2): 13-32. (2001)  
NAL Call #: S590.S48;  
ISSN: 0167-1987

This citation is provided courtesy of CAB International/CABI Publishing.

**1411. A review of trout management in southeast Minnesota streams.**

Thorn, W. C.; Anderson, C. S.; Lorenzen, W. E.; Hendrickson, D. L.; and Wagner, J. W.  
*North American Journal of Fisheries Management* 17 (4): 860-872. (1997)  
NAL Call #: SH219.N66;  
ISSN: 0275-5947

*Descriptors:* Fishery management/ Sport fishing/ Man induced effects/ habitat/ Minnesota/ Habitats/ Trout/ Fish Management/ Fishing/ Stream Biota/ Watershed Management/ *Salvelinus fontinalis*/ *Salmo trutta*/ Minnesota/ historical account/ Habitat/ Sport fishing/ Management/ Watershed protection/ United States  
*Abstract:* Agricultural development after 1850 in southeast Minnesota degraded instream habitat, and by 1900, the native brook trout *Salvelinus fontinalis* was extirpated from most streams. By the 1940s, after 60-70 years of stocking, the exotic brown trout *Salmo trutta* was the most common trout, but abundance was low and limited by lack of reproductive habitat. Soil conservation practices of the 1930s and 1940s and watershed management under Public Law (PL) 566 in the 1950s and 1960s reduced flooding, erosion, and sedimentation and increased infiltration and base flow. By the 1970s, brown trout reproduction was common, but abundance was still low. Fisheries managers of the Minnesota

Department of Natural Resources assumed that adult habitat limited abundance, so they improved instream habitat in streams with public access, which increased brown trout abundance in some streams. Experimental management since 1975 has shown that the lack of adult habitat did limit trout abundance. This management regime has also enabled the quantification of habitat quality and has developed a decision key for brown trout management. When land management has degraded stream habitat, land treatments, acquisition of riparian corridors, and instream management are necessary to rehabilitate habitat and provide recreational fisheries.  
© Cambridge Scientific Abstracts (CSA)

**1412. A Review of Water Quality Concerns in Livestock Farming Areas.**

Hooda, P. S.; Edwards, A. C.; Anderson, H. A.; and Miller, A.  
*Science of the Total Environment* 250 (1-3): 143-167. (2000)  
NAL Call #: RA565.S365;  
ISSN: 0048-9697.  
*Notes:* DOI: 10.1016/S0048-9697(00)00373-9  
*Descriptors:* Water quality/ Livestock/ Fertilizers/ Agrochemicals/ Animal wastes/ Pesticides/ Nutrient loss/ Manure/ Pathogens/ Water Pollution Sources/ Farming/ Agricultural Chemicals/ Water quality (Natural waters)/ Pollution (Water)/ Livestock/ Farms and farming/ Animal manures/ Pathogenic organism/ Pesticides/ Freshwater pollution/ Sources and fate of pollution/ Water Quality  
*Abstract:* Post-war changes in farming systems and especially the move from mixed arable-livestock farming towards greater specialisation, together with the general intensification of food production have had adverse affects on the environment. Livestock systems have largely become separated into pasture-based (cattle and sheep) and indoor systems (pigs and poultry). This paper reviews water quality issues in livestock farming areas of the UK. The increased losses of nutrients, farm effluents (particularly livestock wastes), pesticides such as sheep-dipping chemicals, bacterial and protozoan contamination of soil and water are some of the main concerns regarding water quality degradation. There has

been a general uncoupling of nutrient cycles, and problems relating to nutrient loss are either short-term direct losses or long-term, related to accumulated nutrient surpluses. Results from several field studies indicate that a rational use of manure and mineral fertilisers can help reduce the pollution problems arising from livestock farming practices. Several best management practices are suggested for the control of nutrient loss and minimising release of pathogen and sheep-dip chemicals into agricultural runoff.  
© Cambridge Scientific Abstracts (CSA)

**1413. A Review of Wetlands Remote Sensing and Defining New Considerations.**

Rundquist, D. C.; Narumalani, S.; and Narayanan, R.  
*Remote Sensing Reviews* 20 (3): 207-226. (2001);  
ISSN: 0275-7257

*Descriptors:* Wetlands research/ Spectral reflectance measurements/ Wetlands climate relationships/ Remote sensing of water resources/ Remote sensing/ Wetlands/ Data handling/ Spectral analysis/ Soil/ water systems/ Soil Water/ Data Collections/ Spectral Analysis/ Aquatic plants/ Water resources/ Environmental monitoring/ Classification systems/ Identification/ Reflectance/ Spectral composition / Plantae/ spectral signatures/ Observation methods/ Monitoring and Analysis of Water and Wastes/ Data acquisition/ Remote geosensing/ Ecological techniques and apparatus/ Swamps and Marshes

*Abstract:* Significant progress has been made in using remote sensing as a means of acquiring information about wetlands. This research provides a brief review of selected previous works, which address the issues of wetland identification, classification, biomass measurement, and change detection. Suggested new research emphases include compiling basic spectral-reflectance characteristics for individual wetland species by means of close-range instrumentation, analyzing canopies architectures to facilitate species identification, and assessing the impact on composite spectral signatures of wet soils and variable depths of standing water beneath emergent canopies. These research foci are justifiable when considered in

the context of environmental change / variability and the production of trace gases.

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**1414. A Review of Whole-Plant Water Use Studies in Trees.**

Wullschlegel, S. D.; Meinzer, F. C.; and Vertessy, R. A.

*Tree Physiology* 18 (8-9): 499-512. (1998)

NAL Call #: QK475.T74;

ISSN: 0829-318X.

Notes: Conference: International Symposium on Forests at the Limit: Environmental Constraints of Forest Function, Kruger National Park (South Africa), 11-17 May 1997

Descriptors: Plants/ Water Use/ Trees/ Surveys/ Lysimeters/ Measuring Instruments/ Water and plants

Abstract: Weighing lysimeters, large-tree potometers, ventilated chambers, radioisotopes, stable isotopes and an array of heat balance/heat dissipation methods have been used to provide quantitative estimates of whole-tree water use. A survey of 52 studies conducted since 1970 indicated that rates of water use ranged from 10 kg day super(-1) for trees in a 32-year-old plantation of *Quercus petraea* L. ex Liebl. in eastern France to 1,180 kg day super(-1) for an overstory *Euphorbia purpurea* Bth. tree growing in the Amazonian rainforest. The studies included in this survey reported whole-tree estimates of water use for 67 species in over 35 genera. Almost 90% of the observations indicated maximum rates of daily water use between 10 and 200 kg day super(-1) for trees that averaged 21 m in height. The thermal techniques that made many of these estimates possible have gained widespread acceptance, and energy-balance, heat dissipation and heat-pulse systems are now routinely used with leaf-level measurements to investigate the relative importance of stomatal and boundary layer conductances in controlling canopy transpiration, whole-tree hydraulic conductance, coordinated control of whole-plant water transport, movement of water to and from sapwood storage, and whole-plant vulnerability of water transport to xylem cavitation. Techniques for estimating whole-tree water use complement existing approaches to calculating catchment water balance and provide the forest

hydrologist with another tool for managing water resources. Energy-balance, heat dissipation and heat-pulse methods can be used to compare transpiration in different parts of a watershed or between adjacent trees, or to assess the contribution of transpiration from overstory and understory trees. Such studies often require that rates of water use be extrapolated from individual trees to that of stands and plantations. The ultimate success of this extrapolation depends in part on whether data covering short time sequences can be applied to longer periods of time. We conclude that techniques for estimating whole-tree water use have provided valuable tools for conducting basic and applied research. Future studies that emphasize the use of these techniques by both tree physiologists and forest hydrologists should be encouraged.

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**1415. Review on emissions of ammonia from housing systems for laying hens in relation to sources, processes, building design and manure handling.**

Koerkamp PWGG and Groot Koerkamp PWG

*Journal of Agricultural Engineering Research* 59 (2): 73-87; 81 ref. (1994)

NAL Call #: 58.8-J82

This citation is provided courtesy of CAB International/CABI Publishing.

**1416. A review on environmental impacts of nutritional strategies in ruminants.**

Tamminga, S.

*Journal of Animal Science* 74 (12): 3112-3124. (Dec. 1996)

NAL Call #: 49-J82;

ISSN: 0021-8812 [JANSAG].

Notes: Paper presented at the symposium "Ruminant Nutrition from an Environmental Perspective" at the ASAS 87th Annual Meeting, July 1995, Orlando, Florida. Includes references.

Descriptors: ruminant feeding/ nutrient balance/ energy sources/ net energy/ energy content/ feeds/ carbon/ nitrogen/ phosphorus/ potassium/ ratios/ excretion/ losses/ nitrogen fertilizers/ dairy cows/ milk yield/ cattle manure/ urine/ literature reviews/ Netherlands

Abstract: Primary (plant), secondary (animal), and tertiary (human)

biological systems are driven by energy, either fossil or renewable energy in biomass. Their ratio shifts from about 10:90 in primary, via 25:75 in secondary, to 90:10 in tertiary systems. Energy input in ruminant production is mainly as plants and plant parts from primary production, and the amount needed per unit product (milk, meat) primarily depends on its digestibility. This is high in young, leafy, whole plants, in roots and tubers, and in reproductive organs (whole seeds) or organ parts (by-products) of mature plants. Use of fossil energy per kilogram of DM for primary production ranges from 1 to 3 MJ in forage to over 8 MJ in concentrate feeds, whereas input per kilogram of milk is 1 to 10 MJ. Biomass energy used in ruminant production contains nitrogen (N), phosphorus (P), and potassium (K), but in a ratio rarely balanced to the animals requirements. In secondary systems, energy is partitioned between foods of animal origin and waste. The latter contains OM, N, P, K, and gases (CO<sub>2</sub>, CH<sub>4</sub>), which may cause environmental problems. Losses per kilograms of milk vary and are 10 to 45 g for N, 0 to 3 g for P, and 2 to 20 g for K. Environmental impacts of animal production can be reduced by varying the use of inorganic fertilizer and changing the forage to concentrate ratio. Digestibilities can be improved by proper harvest management. Level and ratio of dietary N, P, and K can be adjusted to requirements by selecting proper ingredients, reducing their loss in waste. Limited scope exists to reduce losses in respiration and fermentation gases. This citation is from AGRICOLA.

**1417. A review on sustainable nitrogen management in intensive vegetable production systems.**

Neeteson, J. J.; Booij, R.; and Whitmore, A. P.

*Acta Horticulturae* (506): 17-26. (Dec. 1999)

NAL Call #: 80 Ac82;

ISSN: 0567-7572 [AHORA2]

Descriptors: vegetables/ intensive cropping/ nitrogen

This citation is from AGRICOLA.

**1418. Review: Plant Life in Extremely Acidic Waters.**

Nixdorf, B.; Fyson, A.; and Krumbek, H.

*Environmental and Experimental Botany* 46 (3): 203-211. (2001); ISSN: 0098-8472.

*Notes:* Special Issue: Plants and Organisms in Wetland Environments  
*Descriptors:* Reviews/ Acidity/ pH effects/ Algae/ Phytoplankton/ Primary production/ Autotrophy/ Phototrophy/ Nutrients/ Water column/ Sediments/ Water Pollution Effects/ Acidic Water/ Ecological Effects/ Aquatic Plants/ Ecosystems/ Ecological Distribution/ Interfaces/ Primary Productivity/ Adaptation/ Adaptations/ Wetlands/ Plant metabolism/ Photosynthesis/ Limiting factors/ Bacteria/ Algae/ Plantae/ Bacteria/ Algae/ Effects of pollution/ Physiology, biochemistry, biophysics/ Mechanical and natural changes

*Abstract:* In acidic waters, a variety of autotrophic organisms are found including phototrophic bacteria, phytoplankton, filamentous- and micro-benthic algae and macrophytes. To explain the occurrence and distribution of primary producers we must answer the following question. What is acidity and where and how does it influence autotrophic metabolism in aquatic ecosystems? The very low pH per se will have profound effects on the survival and growth of organisms and therefore influence biodiversity. On the other hand, we observed a spatial structuring of phototrophic colonization according to the supply of nutrients at interfaces or specific layers. These are interfaces between sediment and water and the chemocline of meromictic lakes or in the case of planktonic development, chlorophyll maxima in the hypolimnion. Therefore, we attempt to analyze the growth conditions for different types of autotrophic organism in relation to resource demands and the distribution of limiting nutrients in sediments and the water column. Adaptations may be morphological (e.g. size, shape, surface area), physiological (e.g. heterotrophic or mixotrophic metabolism, CO<sub>2</sub> concentrating mechanisms, low intrinsic growth rates), behavioral (e.g. diurnal migration) or ecological (low grazing pressure, low losses through sedimentation).

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**1419. A Review: Pyrite Oxidation Mechanisms and Acid Mine Drainage Prevention.**

Evangelou, V. P. B. and Zhang, Y. L. *Critical Reviews in Environmental Science and Technology* 25 (2): 141-199. (1995)

NAL Call #: QH545.A1C7; ISSN: 1064-3389

*Descriptors:* review/ oxidation/ acid mine drainage/ sulfur/ heavy metals/ pyrite/ ores/ mineral industry/ mine drainage/ mine tailings/ drainage water/ acidification/ environmental impact/ water pollution/ pollution control/ Water quality control/ Freshwater pollution/ Prevention and control

*Abstract:* Sulfide oxidation, part of sulfur's biotic/abiotic cycle, is an important natural phenomenon. However, because of the sulfide's association with metallic ores and fossil fuels in the form of pyrite (FeS sub(2)) and the world's increasing demand for metals and fossil fuels, sulfide oxidation in nature is in some state of perturbation. This perturbation, which results from land disturbances (e.g., mining, and/or ore processing), produces acid drainage often enriched with heavy metals. This acid drainage, commonly referred to as acid mine drainage (AMD), has become an economic and environmental burden. This review deals with abiotic/biotic modes of pyrite oxidation and the mechanistic involvement of OH super(-), O sub(2), and Fe super(3+) in the pyrite oxidation process in low/high pH environments. Also included is recent evidence on the potential involvement of CO sub(2) in catalyzing pyrite oxidation in near-neutral and alkaline environments. Finally, the review deals with various pyrite-oxidation control approaches, the merits of these approaches, and some new and promising pyrite microencapsulation techniques currently under development in our laboratory.

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**1420. Review the impact of wetlands and nonpoint source pollution regulations on agricultural land: Hearing before the Subcommittee on Environment, Credit, and Rural Development of the Committee on Agriculture, House of Representatives, One Hundred Third Congress, second session, March 23, 1994.**

United States. Congress. House. Committee on Agriculture. Subcommittee on Environment, Credit and Rural Development. Washington: U.S. G.P.O.; iv, 234 p.: ill. (1994)

*Notes:* Distributed to some depository libraries in microfiche. Shipping list no.: 94-0333-P. "Serial no. 103-61." Includes bibliographical references (p. 146-148). SUDOCs: Y 4.AG 8/1:103-61.

NAL Call #: KF27.A3338--1994; ISBN: 016045929X

*Descriptors:* Agricultural laws and legislation---United States/ Nonpoint source pollution---United States/ Wetlands---United States/ Agricultural resources---United States---Management

This citation is from AGRICOLA.

**1421. Rice fields as temporary wetlands: A review.**

Lawler, S. P.

*Israel Journal of Zoology* 47 (4): 513-528. (2001); ISSN: 0021-2210

*Descriptors:* Wetlands / Agricultural land/ *Oryza sativa*/ Rice/ Wetlands/ Aquatic entomology

*Abstract:* Rice fields are temporary wetlands that harbor many of the same species that breed in natural temporary ponds. Therefore the rice agroecosystem has the potential to help sustain the regional biodiversity of many invertebrates and vertebrates. Like natural areas of wetlands, rice cultivation provides a habitat mosaic of temporary and more permanent waters. Because of their low floral diversity and because their species composition will rarely overlap completely with that of natural ponds, rice fields are not substitutes for natural temporary ponds.

However, they are important in sustaining populations of several species, including wading birds and frogs. Farming methods vary widely, and different practices can alter the suitability of rice fields as habitats. Farmers use water management, pesticides, and sometimes fish to

control crop pests and mosquitoes, and other taxa may be affected as well. Farmers may irrigate rice intermittently to control pests, and intermittent habitat holds fewer species than areas that are flooded for longer periods. Broad-spectrum pesticides may harm invertebrates and other wildlife, and may even cause pest resurgences if they have greater effects on predator populations than on the pests. Fish often decrease the abundance of invertebrate predators, but fish farming in rice fields often discourages the use of harmful pesticides. Because farming practices can affect the conservation value of rice fields, ecologists are encouraged to work with farmers and study the role of rice fields in the population dynamics of temporary pond species, and how changing farming methods alter this role.  
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**1422. Riparian area responses to changes in management.**  
Borman, M. M.; Massingill, C. R.; and Elmore, E. W.  
*Rangelands* 21 (3): 3-7. (1999)  
NAL Call #: SF85.A1R32;  
ISSN: 0190-0528  
This citation is provided courtesy of CAB International/CABI Publishing.

**1423. Riparian areas: Functions and strategies for management.**  
Committee on Riparian Zone Functioning and Strategies for Management; Water Science and Technology Board; Board on Environmental Studies and Toxicology; Division on Earth and Life Studies; and National Research Council.  
National Academy Press, 2002.  
ISBN: 0309082951  
<http://www.nap.edu/books/0309082951/html/>  
*Descriptors:* riparian areas/ environmental management/ laws and regulations/ land use

**1424. Riparian buffer systems in crop and rangelands.**  
Schultz, R. C.; Isenhardt, T. M.; and Colletti, J. P.  
In: Agroforestry and sustainable systems symposium proceedings. (Held 7 Aug 1994-10 Aug 1994 at Fort Collins, Colorado.)  
Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky

Mountain Forest and Range Experiment Station; pp. 13-27; 1995.  
NAL Call #: aSD11.A42-no.261  
*Descriptors:* riparian forests/ riparian vegetation/ ecosystems/ ecotones/ ecology/ biodiversity/ rangelands / agricultural land/ grazing/ water quality/ environmental management/ grazing systems/ environmental protection/ stream flow/ groundwater/ models/ pollution/ literature reviews  
This citation is from AGRICOLA.

**1425. Riparian ecosystem management model: Simulator for ecological processes in riparian zones.**  
Altier, Lee S. and United States. Agricultural Research Service. Washington, D.C.: U.S. Dept. of Agriculture, Agricultural Research Service; v. 216 p.: ill.; Series: Conservation research report no. 46. (2002)  
*Notes:* "February 2002"--Cover. Includes bibliographical references.  
NAL Call #: A279.9-Ag8-no.-46  
*Descriptors:* Riparian areas--- Management/ Riparian ecology--- Mathematical models  
This citation is from AGRICOLA.

**1426. Riparian ecosystem recovery in arid lands: Strategies and references.**  
Briggs, Mark K.  
Tucson: University of Arizona Press; xiv, 159 p.: ill. (1996)  
NAL Call #: QH104.5.S6B77--1996;  
ISBN: 0816516421 (cloth); 0816516448 (paper)  
*Descriptors:* Riparian ecology--- Southwest, New/ Riparian ecology--- Mexico/ Restoration ecology--- Southwest, New/ Restoration ecology--- Mexico/ Riparian ecology--- Southwest, New---Case studies/ Riparian ecology---Mexico---Case studies/ Restoration ecology--- Southwest, New---Case studies/ Restoration ecology---Mexico---Case studies  
This citation is from AGRICOLA.

**1427. Riparian ecosystems of semi-arid North America: Diversity and human impacts.**  
Patten, D. T.  
*Wetlands* 18 (4): 498-512. (1998)  
NAL Call #: QH75.A1W47;  
ISSN: 0277-5212  
This citation is provided courtesy of CAB International/CABI Publishing.

**1428. Riparian Forest Buffer Panel report.**  
Chesapeake Bay Program (U.S.); Chesapeake Executive Council; Riparian Forest Buffer Panel; and U.S. Environmental Protection Agency, Region III Philadelphia, Penn.: U.S. Environmental Protection Agency, Region III; Series: Technical report series 97/167; ii, 362 p.: ill., maps. (1997)  
*Notes:* "March 1997"--Cover. "Printed by the U.S. Environmental Protection Agency for the Chesapeake Bay Program." "EPA 903-R-97-007"--Cover. Includes bibliographical references.  
NAL Call #: QH76.5.M3-R56-1997  
*Descriptors:* Riparian forests--- Chesapeake Bay---Md and Va/ Water quality management---Chesapeake Bay Watershed---Md and Va/ Natural resources---Chesapeake Bay Watershed---Md and Va/ Chesapeake Bay Watershed---Md and Va  
This citation is from AGRICOLA.

**1429. Riparian grazing management that worked: Introduction and winter grazing.**  
Masters, L.; Swanson, S.; and Burkhardt, W.  
*Rangelands* 18 (5): 192-195. (1996)  
NAL Call #: SF85.A1R32;  
ISSN: 0190-0528.  
*Notes:* Subtitle: [Part] I.  
This citation is provided courtesy of CAB International/CABI Publishing.

**1430. Riparian landscapes.**  
Malanson, G. P.  
Cambridge; New York: Cambridge University Press; Series: Cambridge Studies in Ecology; 296 p. (1993)  
NAL Call #: QH541.15.L35M35--1993; ISBN: 0-521-38431-1  
This citation is provided courtesy of CAB International/CABI Publishing.

**1431. Riparian livestock enclosure research in the western United States: A critique and some recommendations.**  
Sarr, Daniel A  
*Environmental Management* 30 (4): 516-526. (2002)  
NAL Call #: HC79.E5E5;  
ISSN: 0364-152X  
*Descriptors:* animal (Animalia): aquatic, terrestrial/ Animals/ Humpty Dumpty model/ agenda laden literature reviews/ broken leg model/ critical reviews / ecosystem recovery: mechanisms, scales/ geomorphology/

improved enclosure placement/design/ long term research programs: development/ meta analyses/ post exclusion dynamics/ pre treatment data: collection/ restoration ecology/ riparian ecosystem ecology: livestock impact susceptibility/ riparian livestock enclosure research: critique, recommendations/ rubber band model/ study popularization/ unifying conceptual framework / vegetation/ weak study designs  
**Abstract:** Over the last three decades, livestock enclosure research has emerged as a preferred method to evaluate the ecology of riparian ecosystems and their susceptibility to livestock impacts. This research has addressed the effects of livestock exclusion on many characteristics of riparian ecosystems, including vegetation, aquatic and terrestrial animals, and geomorphology. This paper reviews, critiques, and provides recommendations for the improvement of riparian livestock enclosure research. Enclosure-based research has left considerable scientific uncertainty due to popularization of relatively few studies, weak study designs, a poor understanding of the scales and mechanisms of ecosystem recovery, and selective, agenda-laden literature reviews advocating for or against public lands livestock grazing. Enclosures are often too small (<50 ha) and improperly placed to accurately measure the responses of aquatic organisms or geomorphic processes to livestock removal. Depending upon the site conditions when and where livestock enclosures are established, postexclusion dynamics may vary considerably. Systems can recover quickly and predictably with livestock removal (the "rubber band" model), fail to recover due to changes in system structure or function (the "Humpty Dumpty" model), or recover slowly and remain more sensitive to livestock impacts than they were before grazing was initiated (the "broken leg" model). Several initial ideas for strengthening the scientific basis for livestock enclosure research are presented: (1) incorporation of meta-analyses and critical reviews; (2) use of restoration ecology as a unifying conceptual framework; (3) development of long-term research programs; (4) improved enclosure placement/design; and (5) a stronger commitment to collection of pre-treatment data.

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**1432. Riparian management in forests of the continental Eastern United States.**

Verry, Elon S.; Hornbeck, James W.; and Dolloff, Charles Andrew  
 Boca Raton, Fla.: Lewis Publishers; xx, 402 p.: ill., maps. (2000)  
*Notes:* Includes bibliographical references (p. 341-391) and index.  
*NAL Call #:* SD144.A112-R56-2000;  
*ISBN:* 1566705010 (alk. paper)  
*Descriptors:* Riparian forests---East---United States---Management/ Riparian areas---East---United States---Management/ Forested wetlands---East---United States---Management  
 This citation is from AGRICOLA.

**1433. Riparian mesquite forests: A review of their ecology, threats, and recovery potential.**

Stromberg, J. C.  
*Journal of the Arizona-Nevada Academy of Science* 27 (1): 111-124. (1993)  
*NAL Call #:* 500-Ar44;  
*ISSN:* 0193-8509 [JAASDM]  
*Descriptors:* prosopis/ forest ecology/ riparian forests/ endangered species/ forest resources/ literature reviews/ nature conservation/ Arizona  
 This citation is from AGRICOLA.

**1434. Riparian restoration and streamside erosion control handbook.**

Thompson, Jennifer N.; Green, Don L.; Johnson, LeAnne.; and Tennessee. Dept. of Environment and Conservation.  
 Nashville, TN: Tennessee Dept. of Environment and Conservation; 74, 32 p.: ill. (1994)  
*Notes:* "November, 1994."  
 Bibliography: p. [7-9] (2nd group).  
*NAL Call #:* QH541.5.R52T46--1994  
*Descriptors:* Riparian ecology---Handbooks, manuals, etc/ Stream conservation---Handbooks, manuals, etc  
 This citation is from AGRICOLA.

**1435. Riparian Restoration: Current Status and the Reach to the Future.**

Landers, D. H.  
*Restoration Ecology* 5 (4 [supplement]): 113-121. (1997)  
*NAL Call #:* QH541.15.R45R515;  
*ISSN:* 1061-2971.  
*Notes:* Special issue: Riparian Restoration  
*Descriptors:* Site Selection/ Reviews/ Rehabilitation/ Riparian Vegetation/ Interdisciplinary Studies/ Geographical Information Systems/

Baseline Studies/ Environmental restoration/ Riparian environments/ Vegetation patterns/ Rivers/ Habitat improvement/ Environmental protection/ Pollution control/ Planning/ Evaluation process/ Reclamation/ Protective measures and control/ Streamflow and runoff  
**Abstract:** Nine articles in the special issue of Restoration Ecology addressing the subject of site selection for riparian restoration activities were critically examined for this review. The approaches described make significant and original contributions to the field of riparian restoration. All are interdisciplinary to some extent, often combining the fields of hydrology, geomorphology, and biology in the design of restorations. A common component among the articles is that they take a broad view, if not a watershed view, of restoration site selection. The approaches can be generally described as top-down strategic approaches to siting restorations, as opposed to the more methods- and site-driven bottom-up, or tactical, approach. All the articles recognize the importance of developing endpoints related to the ecological function of riparian ecosystems. They succeed in their quest for these indicators of ecological function to varying degrees. The most common indicator used in these papers is riparian vegetation. Several additional elements of scientific investigation, if successfully pursued, could provide vital information and advance our understanding of riparian restoration: developing interdisciplinary approaches more fully; defining endpoints and reference conditions; implementing multiple scale approaches; viewing restorations as experimental ecosystem manipulations; developing a philosophy regarding exotic species; incorporating geographic information systems more often; and integrating science, society, and politics. The foundation provided by the contributions in this issue should provide a strong basis for the rapid advancement of future research in the area of riparian restoration.  
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**1436. Riparian restoration in the western United States: Overview and perspective.**

Goodwin, C. N.; Hawkins, C. P.; and Kershner, J. L.

*Restoration Ecology* 5 (4S): 4-14. (1997)

NAL Call #: QH541.15.R45R515; ISSN: 1061-2971

This citation is provided courtesy of CAB International/CABI Publishing.

**1437. Riparian vegetation diversity along regulated rivers: Contribution of novel and relict habitats.**

Johnson, W Carter

*Freshwater Biology* 47 (4): 749-759. (2002)

NAL Call #: QH96.F6; ISSN: 0046-5070

*Descriptors:* plant (Plantae)/ Plants/ dams/ deltas/ floodplains/ novel ecosystems/ regulated rivers/ relict habitats/ reservoir shorelines/ riparian vegetation/ sedimentation/ spatial heterogeneity/ species diversity/ temporal heterogeneity/ water diversions/ water levels

*Abstract:* 1. The creation and maintenance of spatial and temporal heterogeneity by rivers flowing through floodplain landscapes has been disrupted worldwide by dams and water diversions. Large reservoirs (novel ecosystems) now separate and isolate remnant floodplains (relict ecosystems). From above, these appear as a string of beads, with beads of different sizes and string connections of varying lengths. 2. Numerous studies have documented or forecast sharp declines in riparian biodiversity in relict ecosystems downstream from dams. Concurrently, novel ecosystems containing species and communities of the former predam ecosystems have arisen along all regulated rivers. These result from the creation of new environments caused by upper reservoir sedimentation, tributary sedimentation and the formation of reservoir shorelines. 3. The contribution of novel habitats to the overall biodiversity of regulated rivers has been poorly studied. Novel ecosystems may become relatively more important in supporting riverine biodiversity if relict ecosystems are not restored to predam levels. The Missouri River of the north-central

U.S.A. is used to illustrate existing conditions on a large, regulated river system with a mixture of relict and novel ecosystems.

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**1438. Riparian vegetation effectiveness.**

Castelle, Andrew J.; Johnson, A. W.; and National Council for Air and Stream Improvement.

Research Triangle Park, NC: National Council for Air and Stream Improvement, Inc.; 26 p.: ill.; Series: Technical bulletin (National Council for Air and Stream Improvement) no. 799. (2000)

*Notes:* "February 2000." Includes bibliographical references (p. 20-26).

NAL Call #: TD899.P3-N34-no.-799

*Descriptors:* Buffer zones---Ecosystem management/ Streambank planting/ Riparian plants/ Grassed waterways/ Best management practices---Pollution prevention  
This citation is from AGRICOLA.

**1439. Riparian wetlands and water quality.**

Gilliam, J W

*Journal of Environmental Quality* 23 (5): 896-900. (1994)

NAL Call #: QH540.J6;

ISSN: 0047-2425

*Descriptors:* nitrate/ phosphorus/ plant (Plantae Unspecified)/ Plantae (Plantae Unspecified)/ plants/ drainage/ farming/ nitrate/ nonpoint source pollution/ phosphorus/ urban activity/ wet soils

*Abstract:* Because of wet soils adjacent to the streams, riparian buffers are frequently present between farming and urban activities on the uplands and small streams. These riparian areas have been shown to be very valuable for the removal of nonpoint-source pollution from drainage water. Several researchers have measured gt 90% reductions in sediment and nitrate concentrations in water flowing through the riparian areas. The riparian buffers are less effective for P removal but may retain 50% of the surface-water P entering them. I consider riparian buffers to be the most important factor influencing nonpoint-source pollutants entering surface water in many areas of the USA and the most important wetlands for surface water quality protection.  
© Thomson

**1440. Riparian wildlife habitat literature review.**

McComb, William. and Hagar, Joan. Oregon: Oregon State University, Dept. of Forest Science; 63 p.: maps. (1994)

*Notes:* Cover title. Includes bibliographical references (p. 25-35).

NAL Call #: QH541.5.R52-M36-1994

*Descriptors:* Riparian areas---United States/ Riparian animals---United States

This citation is from AGRICOLA.

**1441. Riparian zone, stream, and floodplain issues: A review.**

Bren, L. J.

*Journal of Hydrology* 150 (2/4): 277-299. (Oct. 1993)

NAL Call #: 292.8-J82;

ISSN: 0022-1694 [JHYDA7].

*Notes:* Special issue: Water Issues in Forests Today / edited by E.M. O'Loughlin and F.X. Dunin. Papers presented at the International Symposium on Forest Hydrology, November 22-26, 1992, Canberra, Australia. Includes references.

*Descriptors:* riparian forests/ floodplains/ streams/ forest management/ water management/ literature reviews

*Abstract:* In the last two decades, the effects of forest management on streams, riparian zones, and floodplains have become of much interests. In general, there is agreement that such areas should be maintained in a state approximating naturalness, although it is recognised that definition of this state is usually difficult or impossible. A diversity of management effects has been recognised and, in some cases quantified. For upland catchments, issues particularly relate to direct disturbance of the zone, changes in the flow of woody debris into the stream, or disturbance to the environment by effects generated upstream or downstream. For many areas, a particularly important commercial aspect is the definition of a 'stream', as this can impose many expensive and severe restrictions on management of the land. For large rivers, a common issue is the effect of river management on flooding forests. In each case, the issues are complex, information is difficult to collect, and there are fundamental difficulties in going from anecdotal observation to data. Currently, most information appears to be at a relatively local level, and there is a very inadequate

knowledge base to give a more holistic overview, although the concept of 'cumulative effects', with the effects accumulated over both space and time, has much potential value. There are many opportunities for work in this field.

This citation is from AGRICOLA.

**1442. A Risk Assessment of Emerging Pathogens of Concern in the Land Application of Biosolids.**

Gerba, C. P.; Pepper, I. L.; and Whitehead, L. F.

*Water Science and Technology* 46 (10): 225-230. (2002)

NAL Call #: TD420.A1P7;

ISSN: 0273-1223.

Notes: Conference: IWA Specialised Conference, Acapulco [Mexico], 25-27 Oct 2001; Source: Sludge

Management: Regulation, Treatment, Utilisation and Disposal; Editors:

Jimenez, B. //Spinosa, L. //Odegaard, H. //Lee, D. J.; ISBN: 184339426X

Descriptors: Sludge Disposal/ Land Disposal/ Regulations/ Pathogens/ Disinfection/ Resistance/ Literature Review/ Fate of Pollutants/ Public Health/ Microbiological Studies/ Law/ Risk analysis/ Pathogenic organism/ Reviews/ Public health/ Risk assessment/ risk assessment/ Ultimate disposal of wastes/ Sewage/ Non patents / Soil Pollution: Monitoring, Control & Remediation/ Sources and fate of pollution

**Abstract:** Since the development of the United States Environmental Protection Agency's 503 biosolids Rule, which includes treatment requirements to reduce the threat of pathogen transmission, many new pathogens have been recognized which could be transmitted by biosolids. A risk analysis was performed to assess which emerging pathogens would be most likely to survive treatments required for Class B biosolids before land application. The literature was reviewed on the resistance of emerging pathogens to temperature and other environmental factors to assess their probability of surviving various biosolids treatment processes. In addition existing information on occurrence in biosolids and dose response models for each pathogen was reviewed. It was concluded that adenoviruses and hepatitis A virus are the most thermally resistant viruses and can survive for prolonged periods in the environment. The protozoan parasites microsporidia and Cyclospora were

unlikely to survive the temperatures achieved in anaerobic digestion and do not survive well under low moisture conditions. A risk model was used to assess the risk of infection and illness from enteric viruses after application of class B biosolids.

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**1443. Risk-Based Multiattribute Decision-Making in Property and Watershed Management.**

Prato, T.

*Natural Resource Modeling* 12 (3): 307-334. (1999);

ISSN: 0890-8575.

Notes: Publisher: The Rocky Mountain Mathematics Consortium

Descriptors: decision making/ Watersheds/ Government policies/ Sustainable development/ Resource management/ United States, Missouri/ Risk/ Watershed Management/ Best Management Practices / Reviews/ Farming/ Agricultural Watersheds/ Resources Management/ River basin management/ Regional planning/ Environmental protection/ Resource conservation/ Management/ Models/ MADM/ best management practices/ sustainable use/ Environmental action/ Watershed protection/ Conservation, wildlife management and recreation/ Modeling, mathematics, computer applications/ Policy and planning/ Techniques of planning

**Abstract:** Determining best management systems for properties and evaluating their sustainability at the watershed scale are useful and important aspects of integrated watershed management. Multiattribute decision-making (MADM) is very useful for modeling the selection of best management systems for properties in a watershed. This paper reviews four MADM approaches including utility theory, surrogate worth tradeoff, free iterative search and stochastic dominance with respect to a function (SDWF). Emphasis is on determining how the first three methods could be used to determine the best (most preferred) combinations of attributes and associated management systems for a property. An application of the expected utility method with risk neutral preferences is presented in which farmer's preferences for five attributes are used to rank five farming systems for an agricultural watershed in Missouri. A framework is

presented for assessing the sustainability of the best management systems for all properties in a watershed and the cost-effectiveness of policies for enhancing sustainable resource management at the watershed scale.

© Cambridge Scientific Abstracts (CSA)

**1444. A risk management perspective on integrated weed management.**

Gunsolus, J. L. and Buhler, D. D.

*Journal of Crop Production* 2 (1):

167-187. (1999)

NAL Call #: SB1.J683;

ISSN: 1092-678X [JCPRF8].

Notes: Special issue: Expanding the context of weed management / edited by Douglas D. Buhler. Includes references.

Descriptors: weed control/ integrated pest management/ risk assessment/ risk reduction/ decision making/ crop yield/ yield losses/ economic analysis/ labor/ management/ time management/ growth rate/ crop growth stage/ plant development/ seedling emergence/ literature reviews

This citation is from AGRICOLA.

**1445. Risk of Nitrate in Groundwater of the United States: A National Perspective.**

Nolan, B. T.; Ruddy, B. C.; Hitt, K. J.; and Helsel, D. R.

*Environmental Science and Technology* 31 (8): 2229-2236. (1997)

NAL Call #: TD420.A1E5;

ISSN: 0013-936X.

Notes: DOI: 10.1021/es960818d

Descriptors: USA/ Nitrates/ Groundwater Pollution/ Risk/ Data Interpretation/ Mapping/ Regional Analysis/ hazard assessment/ agricultural pollution/ eutrophication/ pollutant persistence/ water supply/ risk assessment/ hazards/ United States/ NAWQA/ USGS/ Sources and fate of pollution/ Behavior and fate characteristics/ Freshwater pollution/ Environment

**Abstract:** Nitrate contamination of groundwater occurs in predictable patterns, based on findings of the U.S. Geological Survey's (USGS) National Water Quality Assessment (NAWQA) Program. The NAWQA Program was begun in 1991 to describe the quality of the Nation's water resources, using nationally consistent methods. Variables affecting nitrate concentration in

groundwater were grouped as "input" factors (population density and the amount of nitrogen contributed by fertilizer, manure, and atmospheric sources) and "aquifer vulnerability" factors (soil drainage characteristic and the ratio of woodland acres to cropland acres in agricultural areas) and compiled in a national map that shows patterns of risk for nitrate contamination of groundwater. Areas with high nitrogen input, well-drained soils, and low woodland to cropland ratio have the highest potential for contamination of shallow groundwater by nitrate. Groundwater nitrate data collected through 1992 from wells less than 100 ft deep generally verified the risk patterns shown on the national map. Median nitrate concentration was 0.2 mg/L in wells representing the low-risk group, and the maximum contaminant level (MCL) was exceeded in 3% of the wells. In contrast, median nitrate concentration was 4.8 mg/L in wells representing the high-risk group, and the MCL was exceeded in 25% of the wells.  
© Cambridge Scientific Abstracts (CSA)

**1446. Risk, reliability, uncertainty and robustness of water resource systems.**

Bogardi, J. J. and Kundzewicz, Z. W. New York: Cambridge University Press; xv, 220 p. (2002); ISBN: 0-521-80036-6  
This citation is provided courtesy of CAB International/CABI Publishing.

**1447. The risks and benefits of genetically modified crops: A multidisciplinary perspective.**

Peterson, G.; Cunningham, S.; Deutsch, L.; Erickson, J.; Quinlan, A.; Raez-Luna, E.; Tinch, R.; Troell, M.; Woodbury, P.; and Zens, S. *Conservation Ecology* 4 (1): U38-U49. (2000)  
NAL Call #: QH75.A1C67;  
ISSN: 1195-5449  
This citation is provided courtesy of CAB International/CABI Publishing.

**1448. Risks associated with the use of chemicals in pond aquaculture.**

Boyd, C. E. and Massaut, L. *Aquacultural Engineering* 20 (2): 113-132. (June 1999)  
NAL Call #: SH1.A66;  
ISSN: 0144-8609 [AQEND6]  
*Descriptors:* aquaculture/ ponds/ risk assessment/ lime/ fertilizers/ eutrophication/ nutrient availability/

solubility/ food safety/ herbicides/ algicides/ probiotics/ disinfectants/ oxidants/ coagulants/ osmoregulation/ chemicals/ degradation/ chemical precipitation/ water pollution/ environmental impact/ literature reviews  
This citation is from AGRICOLA.

**1449. Riverbank filtration: Understanding contaminant biogeochemistry and pathogen removal.**

Ray, Chittaranjan. In: Proceedings of the NATO Advanced Research Workshop on Riverbank Filtration: Understanding Contaminant Biogeochemistry and Pathogen Removal. (Held 5 Sep 2001-8 Sep 2001 at Tihany, Hungary.) Dordrecht: Kluwer Academic Publishers; xviii, 253 p.: ill., maps; 2002.  
*Notes:* Published in Earth and environmental sciences, v. 14  
NAL Call #: TD443-.R58-2002;  
ISBN: 1402009542  
*Descriptors:* Water---Purification---Riverbank filtration---Congresses/ Biochemistry---Congresses/ Water---Purification---Microbial removal---Congresses/ Drinking water---Purification---Congresses  
This citation is from AGRICOLA.

**1450. Riverine landscape diversity.**

Ward, J. V.; Tockner, K.; Arscott, D. B.; and Claret, C. *Freshwater Biology* 47 (4): 517-539. (2002)  
NAL Call #: QH96.F6;  
ISSN: 0046-5070  
This citation is provided courtesy of CAB International/CABI Publishing.

**1451. Riverine landscapes: Biodiversity patterns, disturbance regimes, and aquatic conservation.**

Ward, J V *Biological Conservation* 83 (3): 269-278. (1998)  
NAL Call #: S900.B5;  
ISSN: 0006-3207  
*Descriptors:* aquatic conservation/ bank stabilization/ biodiversity patterns/ channelization/ disturbance regimes/ environmental gradient/ environmental heterogeneity/ flow regulation/ groundwater aquifers/ multiple interactive pathways/ riparian/ floodplain systems/ riverine landscapes/ upstream-downstream linkage  
*Abstract:* The term riverine landscape

implies a holistic geomorphic perspective of the extensive interconnected series of biotopes and environmental gradients that, with their biotic communities, constitute fluvial systems. Natural disturbance regimes maintain multiple interactive pathways (connectivity) across the riverine landscape. Disturbance and environmental gradients, acting in concert, result in a positive feedback between connectivity and spatio-temporal heterogeneity that leads to the broadscale patterns and processes responsible for high levels of biodiversity. Anthropogenic impacts such as flow regulation, channelization, and bank stabilization, by (1) disrupting natural disturbance regimes, (2) truncating environmental gradients, and (3) severing interactive pathways, eliminate upstream-downstream linkages and isolate river channels from riparian/floodplain systems and contiguous groundwater aquifers. These alterations interfere with successional trajectories, habitat diversification, migratory pathways and other processes, thereby reducing biodiversity. Ecosystem management is necessary to maintain or restore biodiversity at a landscape scale. To be effective, conservation efforts should be based on a solid conceptual foundation and a holistic understanding of natural river ecosystems. Such background knowledge is necessary to re-establish environmental gradients, to reconnect interactive pathways, and to reconstitute some semblance of the natural dynamics responsible for high levels of biodiversity. The challenge for the future lies in protecting the ecological integrity and biodiversity of aquatic systems in the face of increasing pressures on our freshwater resources. This will require integrating sound scientific principles with management perspectives that recognize floodplains and groundwaters as integral components of rivers and that are based on sustaining, rather than suppressing, environmental heterogeneity.  
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**1452. Role of agroforestry in sustainable land-use systems.**

Brooks, K. N.; Gregersen, H. M.; and Ffolliott, P. F.

In: Agroforestry and sustainable systems symposium proceedings. Fort Collins, Colo.: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 199-205; 1995.

Notes: Meeting held August 7-10, 1994, Fort Collins, Colorado.

Includes references.

NAL Call #: aSD11.A42-no.261

Descriptors: agroforestry/ sustainability/ land use/ nature conservation/ land management/ watersheds/ erosion/ streams/ literature reviews

This citation is from AGRICOLA.

**1453. The role of biological indicators in a state water quality management process.**

Yoder, Chris O and Rankin, Edward T  
*Environmental Monitoring and Assessment* 51 (1-2): 61-88. (1998)

NAL Call #: TD194.E5;

ISSN: 0167-6369

Descriptors: biological indicators/ environmental impact/ habitat degradation/ nonpoint source assessment/ pollution control/ sediment contamination/ sewer overflow/ water quality management/ Clean Water Act

**Abstract:** State water quality agencies are custodians of water quality management programs under the Clean Water Act of which the protection and restoration of biological integrity in surface waters is an integral goal. However, an inappropriate reliance on chemical/physical stressor and exposure data or administrative indicators in place of the direct measurement of ecological response has led to an incomplete foundation for water resource management. As point sources have declined in significance, the consequences of this flawed foundation for dealing with the major limitations to biological integrity (nonpoint sources, habitat degradation) have become more apparent. The use of biocriteria in Ohio, for example, resulted in the identification of 50% more impairment than a water chemistry approach alone and other inconsistencies of a flawed monitoring foundation are illustrated in the national 305(b) report statistics on waters monitored, aquatic

life use attainment, and habitat degradation. Biological criteria (biocriteria) incorporates the broader concept of water resource integrity to supplement the roles of chemical and toxicological approaches and reduces the likelihood of making overly optimistic estimates of aquatic life condition. A carefully conceived ambient monitoring approach comprised of biological, chemical, and physical measures ensures all relevant stressors to water resource integrity are identified and that the efficacy of administrative actions can be directly measured with environmental results. New multimetric indices, such as the IBI, ICI, and BIBI represent a significant advancement in aquatic resource characterization that have allowed the inclusion of biological information into many States water quality management programs. Ohio adopted numerical biocriteria in the Ohio water quality standards regulations in May 1990 and, through multiple aquatic life uses that reflect a continuum of biological condition, represents a tiered approach to water resource management. Biocriteria provide the impetus and opportunity to recognize and account for natural, ecological variability in the environment, something which previously was been lacking in state water quality management programs. The upper Great Miami River in Ohio illustrates a case study where bioassessment data documented the efficacy of efforts to permit, fund, and construct municipal treatment systems in restoring aquatic life. In contrast, in the Mahoning River similar administrative actions were inadequate to restore aquatic life in an environment with severe sediment contamination and impacts from combined sewer overflows. A biocriteria-based goal of restoring 75% of aquatic life uses by the year 2000 in Ohio has led to the use of biological data to identify trends and forecast the status and the causes and sources of impairment to Ohio streams, an effort that should affect the strategic focus of our water resource management efforts. A biocriteria-based approach has profoundly influenced strategic planning and priority setting, water quality based permitting, water quality standards, basic monitoring and reporting, nonpoint source assessment, and problem discovery within Ohio EPA.

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**1454. Role of buffer strips in management of waterway pollution: A review.**

Barling, R. D. and Moore, I. D.  
*Environmental Management* 18 (4): 543-558. (1994)

NAL Call #: HC79.E5E5;

ISSN: 0364-152X

This citation is provided courtesy of CAB International/CABI Publishing.

**1455. The role of column liquid chromatography-mass spectrometry in environmental trace-level analysis: Determination and identification of pesticides in water.**

Hogenboom, Ariadne C; Niessen, Wilfried M A; and Brinkman, Udo A Th  
*Journal of Separation Science* 24 (5): 331-354. (2001);

ISSN: 1615-9306

Descriptors: pesticides: agrichemical, environmental pollutant, extraction, pesticide, quantitative analysis, river water level, separation, toxin  
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**1456. The role of corridors in biodiversity conservation in production forest landscapes: A literature review.**

MacDonald, M. A.  
*Tasforests* 14: 41-52. (2003);

ISSN: 1033-8306

This citation is provided courtesy of CAB International/CABI Publishing.

**1457. The role of earthworms for assessment of sustainability and as bioindicators.**

Paoletti, M. G.  
*Agriculture, Ecosystems and Environment* 74 (1/3): 137-155. (June 1999)

NAL Call #: S601.A34;

ISSN: 0167-8809 [AEENDO].

Notes: Special issue: Invertebrate biodiversity as bioindicators of sustainable landscapes / edited by M.G. Paoletti. Includes references.  
Descriptors: earthworms/ indicator species/ sustainability/ evaluation/ monitoring/ environmental management/ environmental impact/ habitats/ agricultural land/ urban areas/ industrial sites/ species diversity/ biomass/ taxonomy/ identification/ soil pollution/ pesticides/ heavy metals/ genetic engineering/ crops/ stress/ orchards/ literature reviews/ polluted soils  
**Abstract:** Earthworms, which inhabit soils and litter layers in most landscapes, can offer an important

tool to evaluate different environmental transformations and impacts. Agricultural landscapes, urban and industrialized habitats have some earthworms that represent interesting indicators to monitor different contaminations, to assess different farming practices and different landscape structures and transformations. Species number, abundance and biomass can give easily measurable elements. Ecological guilds can help in comparing different environments. Taxonomy is relatively well known, at least in temperate areas, where species identification is in general easily solved. CD-ROM based programs facilitate rapid identification of collected specimens. The substantial amount of research carried out on these invertebrates has made these soil organisms more promising for further improved and accurate work in assessing sustainability of different environments. In most cases earthworm biomass or abundance can offer a valuable tool to assess different environmental impacts such as tillage operations, soil pollution, different agricultural input, trampling, industrial plant pollution, etc. In rural environments different farming systems can be assessed using earthworm biomass and numbers. This citation is from AGRICOLA.

**1458. The role of ecology in the development of weed management systems: An outlook.**

Mortensen, D. A.; Bastiaans, L.; and Sattin, M.  
*Weed Research* 40 (1): 49-62. (Feb. 2000)  
 NAL Call #: 79.8-W412;  
 ISSN: 0043-1737 [WEREAT]  
*Descriptors:* weeds/ weed biology/ plant ecology/ weed control/ integrated pest management/ species differences/ life cycle/ habit/ population dynamics/ mortality/ developmental stages/ application rates/ herbicides/ crop weed competition/ phenotypes/ simulation models/ herbicide resistant weeds/ literature reviews/ integrated weed management  
 This citation is from AGRICOLA.

**1459. The role of fire and soil heating on water repellency in wildland environments: A review.**

DeBano, L. F.  
*Journal of Hydrology* 231/232: 195-206. (2000)  
 NAL Call #: 292.8-J82;  
 ISSN: 0022-1694 [JHYDA7].  
*Notes:* Special issue: Water repellency is soils / edited by C.J. Ritsema and L.W. Dekker. Proceedings of a workshop held September 2-4, 1998, Wageningen, Netherlands. Includes references.  
*Descriptors:* water repellent soils/ prescribed burning  
*Abstract:* This paper describes the heat transfer mechanisms operating as heat moves downward in the soil along steep temperature gradients during both wildfires and prescribed fires. The transfer of heat downward in the upper part of the soil is enhanced by the vaporization and movement of water and organic compounds. Available information on the changes in the chemistry of vaporized organic compounds is summarized and discussed. An operational theory describing the formation of a highly water repellent soil condition during fire is presented. The relationship between the formation of this fire-related watershed condition and subsequent surface runoff and erosion from wildland ecosystems is explored. Worldwide literature describing fire-induced water repellency is reviewed and summarized.  
 This citation is from AGRICOLA.

**1460. The role of grazing sheep in sustainable agriculture.**

Ely, D. G.  
*Sheep Research Journal:* 37-51. (1994)  
 NAL Call #: SF371.R47;  
 ISSN: 1057-1809.  
*Notes:* Special issue: Role of sheep grazing in natural resource management. Includes references.  
*Descriptors:* sheep/ grazing/ sustainability/ forage/ digestibility/ agricultural production/ maturity stage/ feed conversion/ solar energy/ nitrogen fertilizers/ triticum aestivum/ grazing systems/ profitability/ soil conservation/ literature reviews  
 This citation is from AGRICOLA.

**1461. The Role of Invertebrates on Leaf Litter Decomposition in Streams: A Review.**

Graca, M. A. S.  
*International Review of Hydrobiology* 86 (4-5): 383-393. (2001);  
 ISSN: 1434-2944  
*Descriptors:* Streams/ Leaf litter/ Decomposition/ Macrofauna/ Zoobenthos/ Invertebrates/ Riparian Vegetation/ Organic Matter/ Bacteria/ Abrasion/ Leaf Litter/ Aquatic entomology/ Freshwater/ Water and plants  
*Abstract:* Leaves entering low order streams are subject to physical abrasion, microbial degradation and invertebrate fragmentation. Aquatic invertebrates feeding on leaves are known as shredders and their densities tend to be correlated with the spatial and temporal accumulation of organic matter in streams. Shredders discriminate among the variety of leaves normally found in the stream; this discrimination may be related to differences in leaf toughness, plant nutrient content of leaves and the presence of secondary compounds. Shredders also consume leaves preferentially after the establishment of a well-developed microbial community. This preference may be the result of changes in leaf matrix carried out by the microbial community or the presence of fungal hyphae with a higher nutrition value than the leaves themselves. The immediate consequence of invertebrate feeding on leaves is the incorporation of plant material into secondary production and the fragmentation of leaves. The relative importance of fungi and invertebrates in the decomposition process depends upon the density of shredders, which, in turn, may depend on litter accumulation in streams. Therefore, the type of riparian vegetation has the potential to control the diversity and abundance of shredders and changes in riparian vegetation have the potential to affect the assemblages of aquatic invertebrates.  
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**1462. The role of land/inland water ecotones in fish ecology on the basis of Russian research: A review.**

Dgebuadze, Y. Y.

*International journal of ecohydrology and hydrobiology* 1 (1-2): 229-237. (2001)

NAL Call #: QH541.15.E19 I58;

ISSN: 1642-3593.

Notes: Special Issue: Catchment Processes Land/Water Ecotones and Fish Communities

Descriptors: Riparian environments/ Fishery management/ Freshwater fish/ Environment management/ Rivers/ Population number/ Agricultural runoff/ Eutrophication/ Pollution effects/ Russia/ Stock assessment and management/ Effects on organisms

Abstract: This review summarises some results of investigation carried out by Russian scientists, concerning the influence of land/inland water ecotones on fish. The main objectives and hypotheses developing in the framework UNESCO MAB working group "Fish and land/inland ecotones" in Russia are: comparison of fish population in salmonid rivers affected or non-affected by lake-rivers ecotones; small scale ecotone studies of model and restored microhabitat of salmonid rivers; comparison of the ecotone patterns and fish abundance in two rivers differing by historical origin of their ichthyofauna; the analysis of the effect of cattle ranching on fish assemblages distribution, dynamics and productivity along a river course in the steppe zone; and the influence of periodically drying up lakes and ecotones on the dynamics of fish populations in the connected river system.

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**1463. The role of parasitoid and predator production in technology transfer of field crop biological control.**

Leppla, N C and King, E C

*Entomophaga* 41 (3-4): 343-360. (1996)

NAL Call #: 421 EN835M;

ISSN: 0013-8959

Descriptors: insect (Insecta Unspecified)/ Insecta (Insecta Unspecified)/ animals/ arthropods/ insects/ invertebrates/ biobusiness/ biological control/ integrated pest management/ parasitoid production/ pest control method/ pest

management/ predator production/ technology transfer

Abstract: The immediate goals for improving natural enemy production are to reduce costs, increase efficacy and provide additional species for pest management. This paper describes expanding markets for natural enemies that are or could be produced commercially, gives operational and experimental examples of parasitoid and predator production for use in field crop biological control, defines some of the obstacles and makes recommendations for producing and using natural enemies. Additionally, it provides recent published guidance for implementing biological control in integrated pest management.

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**1464. The Role of Phosphorus in the Eutrophication of Receiving Waters: A Review.**

Correll, D. L.

*Journal of Environmental Quality* 27 (2): 261-266. (1998)

NAL Call #: QH540.J6;

ISSN: 0047-2425

Descriptors: Phosphorus/ Bottom Sediments/ Eutrophication/ Receiving Waters/ Primary Productivity/ Dissolved Oxygen/ Nutrients/ Surface Water/ Water Quality/ Water Pollution/ Nutrient concentrations/ Phosphates/ Aquatic environment/ Algal blooms/ Primary production/ Water quality control/ Sources and fate of pollution/ Freshwater pollution/ Characteristics, behavior and fate

Abstract: Phosphorus (P) is an essential element for all life forms. It is a mineral nutrient. Orthophosphate is the only form of P that autotrophs can assimilate. Extracellular enzymes hydrolyze organic forms of P to phosphate. Eutrophication is the overenrichment of receiving waters with mineral nutrients. The results are excessive production of autotrophs, especially algae and cyanobacteria. This high productivity leads to high bacterial populations and high respiration rates, leading to hypoxia or anoxia in poorly mixed bottom waters and at night in surface waters during calm, warm conditions. Low dissolved oxygen causes the loss of aquatic animals and release of many materials normally bound to bottom sediments including various forms of P. This release of P reinforces the eutrophication. Excessive concentrations of P is the most

common cause of eutrophication in freshwater lakes, reservoirs, streams, and headwaters of estuarine systems. In the ocean, N becomes the key mineral nutrient controlling primary production. Estuaries and continental shelf waters are a transition zone, where excessive P and N create problems. It is best to measure and regulate total P inputs to whole aquatic ecosystems, but for an easy assay it is best to measure total P concentrations, including particulate P, in surface waters or N/P atomic ratios in phytoplankton.

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**1465. Role of plant pathology in integrated pest management.**

Jacobsen, B. J.

*Annual Review of Phytopathology* 35: 373-391. (1997)

NAL Call #: 464.8-An72;

ISSN: 0066-4286 [APPYAG]

Descriptors: plant pathology/ integrated pest management/ plant diseases/ models/ yield losses/ interdisciplinary research/ extension education/ literature reviews/ ecologically based pest management/ biointensive pest management  
This citation is from AGRICOLA.

**1466. Role of reference materials in analysis of environmental pollutants.**

Namiesnik, J and Zygmunt, B

*Science of the Total Environment* 228 (2-3): 243-257. (1999)

NAL Call #: RA565.S365;

ISSN: 0048-9697

Descriptors: air pollution/ environmental pollution analysis: quality assurance, quality controls, reference materials/ sediment pollution/ sludge pollution/ soil pollution/ waste water pollution/ water pollution

Abstract: This paper discusses the importance and use of reference materials for quality assurance and quality control in environmental analysis. The general classification of reference materials and categorisation of those for chemical composition are presented. The most common reference materials for pollutants in air, water, waste water, soil, sediments, sludge and some biological materials and their producers are tabulated. Definitions,

practical recommendations on selection and handling, and application areas of reference materials are also presented.  
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**1467. The role of science in the preservation of forest biodiversity.**

Simberloff, D.  
*Forest Ecology and Management* 115 (2/3): 101-111. (1999)  
NAL Call #: SD1.F73;  
ISSN: 0378-1127

This citation is provided courtesy of CAB International/CABI Publishing.

**1468. Role of sediment and internal loading of phosphorus in shallow lakes.**

Sondergaard, M.; Jensen, J. P.; and Jeppesen, E.  
*Hydrobiologia* 506 (1-3): 135-145. (2003)  
NAL Call #: 410 H992;  
ISSN: 0018-8158.

Notes: Number of References: 108;  
Dordrecht: Kluwer Academic Publ  
*Descriptors:* Aquatic Sciences/ biomanipulation/ iron/ recovery/ redox/ release mechanisms/ retention/ phosphate release/ hypereutrophic lake/ eutrophic lake/ phytoplankton biomass/ resuspended sediment/ aquatic macrophytes/ inorganic phosphate/ planktivorous fish/ aerobic sediments/ temperate lakes  
*Abstract:* The sediment plays an important role in the overall nutrient dynamics of shallow lakes. In lakes where the external loading has been reduced, internal phosphorus loading may prevent improvements in lake water quality. At high internal loading, particularly summer concentrations rise, and phosphorus retention can be negative during most of the summer. Internal P loading originates from a pool accumulated in the sediment at high external loading, and significant amounts of phosphorus in lake sediments may be bound to redox-sensitive iron compounds or fixed in more or less labile organic forms. These forms are potentially mobile and may eventually be released to the lake water. Many factors are involved in the release of phosphorus. Particularly the redox sensitive mobilization from the anoxic zone a few millimetres or centimetres below the sediment surface and microbial processes are considered important, but the phosphorus release mechanisms are to a certain extent lake specific. The importance of

internal phosphorus loading is highly influenced by the biological structure in the pelagic, and lakes shifting from a turbid to a clearwater state as a result of, for example, biomanipulation may have improved retention considerably. However, internal loading may increase again if the turbid state returns. The recovery period following a phosphorus loading reduction depends on the loading history and the accumulation of phosphorus in the sediment, but in some lakes a negative phosphorus retention continues for decades. Phosphorus can be released from sediment depths as low as 20 cm. The internal loading can be reduced significantly by various restoration methods, such as removal of phosphorus-rich surface layers or by the addition of iron or alum to increase the sediment's sorption capacity.  
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**1469. Role of Selenium Toxicity and Oxidative Stress in Aquatic Birds.**

Hoffman, D. J.  
*Aquatic Toxicology* 57 (1-2): 11-26. (2002);  
ISSN: 0166-445X.  
Notes: Publisher: Elsevier Science  
*Descriptors:* Reviews/ Water pollution/ Aquatic animals/ Selenium/ Oxidative stress/ Glutathione/ Mortality/ Teratogenesis/ Aquatic birds/ Stress/ Toxicity/ Wildlife/ Pollution effects/ Histopathology/ Bioindicators/ Symptoms/ Liver/ Sexual reproduction/ Agricultural pollution/ Agricultural runoff/ Irrigation water/ Drainage water/ Teratogens/ Toxicity tests/ Water Pollution Effects/ Ecological Effects/ Water birds/ Sublethal Effects/ Metabolism/ Blood/ Pollution (Water)/ Ecology/ Toxicity/ Lethal limits/ Blood/ Pollution indicators/ *Anas platyrhynchos*/ *Recurvirostra americana*/ *Catoptrophorus semipalmatus*/ *Chen canagica*/ *Himantopus mexicanus*/ *Fulica americana*/ Mallard/ American avocet/ Willet/ Emperor goose/ *Anser canagicus*/ Black necked stilt/ American coot/ glutathione/ Biochemistry/ Toxicology and health/ Effects on organisms/ Pollution Organisms/ Ecology/ Toxicology/ Effects of pollution/ Effects of Pollution  
*Abstract:* Adverse effects of selenium (Se) in wild aquatic birds have been documented as a consequence of

pollution of the aquatic environment by subsurface agricultural drainwater and other sources. These effects include mortality, impaired reproduction with teratogenesis, reduced growth, histopathological lesions and alterations in hepatic glutathione metabolism. A review is provided, relating adverse biological effects of Se in aquatic birds to altered glutathione metabolism and oxidative stress. Laboratory studies, mainly with an organic form of Se, selenomethionine, have revealed oxidative stress in different stages of the mallard (*Anas platyrhynchos*) life cycle. As dietary and tissue concentrations of Se increase, increases in plasma and hepatic GSH peroxidase activities occur, followed by dose-dependent increases in the ratio of hepatic oxidized to reduced glutathione (GSSG:GSH) and ultimately hepatic lipid peroxidation measured as an increase in thiobarbituric acid reactive substances (TBARS). One or more of these oxidative effects were associated with teratogenesis (4.6 ppm wet weight Se in eggs), reduced growth in ducklings (15 ppm Se in liver), diminished immune function (5 ppm Se in liver) and histopathological lesions (29 ppm Se in liver) in adults. Manifestations of Se-related effects on glutathione metabolism were also apparent in field studies in seven species of aquatic birds. Reduced growth and possibly immune function but increased liver:body weight and hepatic GSSG:GSH ratios were apparent in American avocet (*Recurvirostra americana*) hatchlings from eggs containing 9 ppm Se.  
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**1470. The role of sheep and sheep products in waste management.**

Glenn, J. S.  
*Sheep Research Journal:* 113-115. (1994)  
NAL Call #: SF371.R47;  
ISSN: 1057-1809.  
Notes: Special issue: Role of sheep grazing in natural resource management. Includes references.  
*Descriptors:* sheep feeding/ crop residues/ agricultural byproducts/ wool/ sorption/ oil spills/ mulches/ sheep manure/ rumen fluid/ rumen microorganisms/ biodegradation/ literature reviews  
This citation is from AGRICOLA.

**1471. The role of soil erosion in the movement of pollutants.**

Quinton, J. N. and Rickson, R. J.  
In: Soil monitoring: Early detection and surveying of soil contamination and degradation.  
Basel: Birkhäuser Verlag, 1993; pp. 141-156  
This citation is provided courtesy of CAB International/CABI Publishing.

**1472. The role of soil organic matter in maintaining soil quality in continuous cropping systems.**

Reeves, D. W.  
*Soil and Tillage Research* 43 (1/2): 131-167. (1997)  
NAL Call #: S590.S48;  
ISSN: 0167-1987  
This citation is provided courtesy of CAB International/CABI Publishing.

**1473. The role of spiders as predators of insect pests with particular reference to orchards: A review.**

Bogya, S. and Mols, P. J. M.  
*Acta Phytopathologica et Entomologica Hungarica* 31 (1-2): 83-159. (1996);  
ISSN: 0238-1249  
*Descriptors:* predator prey interactions/ pesticides/ biological control/ Araneae/ Insecta/ Agricultural & general applied entomology  
*Abstract:* Spiders are well known predators of insects (including insect pests) but about their role as biological control agents in agroecosystems (particularly in orchards) little is known. In the last decade new information (especially of the behaviour of spiders in different agroecosystems) has become available and this increased expectations about spiders as beneficial organisms. Spiders are a very heterogeneous group of animals with different hunting tactics and therefore, they play a different ecological role. At family level these tactics are rather similar and one species of the group can be used as representative example for ecological studies for the whole family. On the other hand properties and behaviour found in different species of one family can be seen as characteristic for the whole family. A comprehensive review of spiders as natural enemies of pest species of different crops is given offering information about the expected prey spectrum per family. A qualitative evaluation of pest-spider relationships has been carried out for

a whole range of agroecosystems and the results are transposed to spider groups inhabiting the orchard ecosystem. The effect of pesticides on spiders, both from laboratory and field experiments is discussed and it has been shown to be the most important factor influencing spider occurrence and abundance in the field. Thus the pest management system (conventional or IPM or ecological) determines to a great extent the role of spiders can play in controlling pest organisms. Only from a few species occurring in different ecosystems quantitative information of their searching and predatory potential is available resulting in functional response relationships to prey density. A list of methods for further quantitative evaluation of spider impact on pest in getting insight in predation processes is presented.

© Cambridge Scientific Abstracts (CSA)

**1474. The role of stability in fine pesticide droplet dispersion in the atmosphere: A review of physical concepts.**

Thistle, H. W.  
*Transactions of the ASAE* 43 (6): 1409-1413. (Nov. 2000-Dec. 2000)  
NAL Call #: 290.9-Am32T;  
ISSN: 0001-2351 [TAAEAJ]  
*Descriptors:* pesticides/ droplet studies/ meteorological factors  
*Abstract:* The investigation of the role of atmospheric stability in the atmospheric dispersion of pesticide sprays and powders has largely been approached from an empirical standpoint. This article discusses the physical basis underlying the observed results relying on work done by boundary layer meteorologists and air pollution engineers. An examination of the turbulence equation, atmospheric turbulence spectra, and simple applied modeling techniques based on accumulated data all lead to the conclusion that atmospheric stability will influence droplet dispersion through reduced mixing as the atmosphere becomes more stable. The magnitude and interaction of stability with spray application parameters requires further study.

This citation is from AGRICOLA.

**1475. The role of synthetic amino acids in monogastric animal production: Review.**

Han, In K and Lee, J H  
*Asian Australasian Journal of Animal Sciences* 13 (4): 543-560. (2000)  
NAL Call #: SF55.A78A7;  
ISSN: 1011-2367  
*Descriptors:* immunoproteins: synthesis/ nitrogen/ protein: dietary/ synthetic amino acids: dietary supplementation/ threonine/ poultry (Aves)/ swine (Suidae): piglet/ Animals/ Artiodactyls/ Birds/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ amino acid nutrition/ environmental manure pollutants/ growth performance/ immunocompetency/ monogastric animal production/ nutrient excretion  
*Abstract:* The present paper gives a general overview on amino acid nutrition mainly focused on the concept of ideal protein and amino acid requirements in swine and poultry. Also, the nutritional, economic and environmental roles of synthetic amino acids are presented. A special emphasis has been given to the protein sparing effect by the supplementation of synthetic amino acids into diet and to the effect of this supplementation on growth performance and reduction of environmental pollutants in swine and poultry manure. It is concluded that the supplementation of limited amounts of synthetic amino acids (0.1 to 0.3%) to diets for swine and poultry could spare 2 to 3 percentage units of dietary protein and substantially reduce nutrient excretion, especially nitrogen. Immunocompetency as affected by amino acid nutrition is also introduced and the importance of threonine for the synthesis of immunoproteins in colostrum and milk to maintain piglets' health and intestinal integrity has been emphasized. Finally, some speculation on the future of global amino acids market is presented in conclusion.

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**1476. The role of traditional and novel toxicity test methods in assessing stormwater and sediment contamination.**

Burton, G Allen Jr; Pitt, Robert; and Clark, Shirley  
*Critical Reviews in Environmental Science and Technology* 30 (4): 413-447. (2000)

NAL Call #: QH545.A1C7;  
 ISSN: 1064-3389  
 Descriptors: suspended solids:  
 pollutant, toxin/ UV light/ biological  
 responses/ carcinogenicity/  
 ecotoxicology/ elutriate exposure  
 [extract exposure]/ endocrine  
 disruption/ fluctuating stressors/  
 indigenous communities/ lethality/  
 mutagenicity/ physicochemical  
 conditions/ pore water [interstitial  
 water]/ sediment contamination/  
 stormwater contamination /  
 subcellular responses/ temperature/  
 teratogenicity/ water column toxicity  
 © Thomson

**1477. The role of trees in sustainable agriculture: An overview.**

Prinsley, R. T.  
*Forestry Sciences* 43: 87-115. (1993)  
 NAL Call #: SD1.F627;  
 ISSN: 0924-5480.  
 Notes: In the series analytic: The role  
 of trees in sustainable agriculture /  
 edited by R. T. Prinsley. Papers  
 presented at a conference held Oct  
 1991, Albury, Victoria, Australia.  
 Includes references.  
 Descriptors: agroforestry/  
 sustainability/ shelterbelts/  
 rehabilitation/ erosion control/ wind/  
 Australia  
 This citation is from AGRICOLA.

**1478. The role of turfgrasses in environmental protection and their benefits to humans.**

Beard, J. B. and Green, R. L.  
*Journal of Environmental Quality*  
 23 (3): 452-460.  
 (May 1994-June 1994)  
 NAL Call #: QH540.J6;  
 ISSN: 0047-2425 [JEVQAA]  
 Descriptors: lawns and turf/  
 environmental protection/ erosion/  
 erosion control/ soil stabilization/  
 groundwater recharge/ water quality/  
 literature reviews  
 Abstract: Turfgrasses have been  
 utilized by humans to enhance their  
 environment for more than 10  
 centuries. The complexity and  
 comprehensiveness of these  
 environmental benefits that improve  
 our quality-of-life are just now being  
 quantitatively documented through  
 research. Turfgrass benefits may be  
 divided into (i) functional, (ii)  
 recreational, and (iii) aesthetic  
 components. Specific functional  
 benefits include: excellent soil erosion  
 control and dust stabilization thereby  
 protecting a vital soil resource;

improved recharge and quality  
 protection of groundwater, plus flood  
 control: enhanced entrapment and  
 biodegradation of synthetic organic  
 compounds; soil improvement that  
 includes CO<sub>2</sub> conversion; accelerated  
 restoration of disturbed soils;  
 substantial urban heat dissipation-  
 temperature moderation; reduced  
 noise, glare and visual pollution  
 problems; decreased noxious pests  
 and allergy-related pollens; safety in  
 vehicle operation on roadsides and  
 engine longevity on airfields; lowered  
 fire hazard via open, green turfed  
 firebreaks; and improved security of  
 sensitive installations provided by  
 high visibility zones. The recreational  
 benefits include a low-cost surface for  
 outdoor sport and leisure activity  
 enhanced physical health of  
 participants, and a unique low-cost  
 cushion against personal impact  
 injuries. The aesthetic benefits include  
 enhanced beauty and attractiveness;  
 a complimentary relationship to the  
 total landscape ecosystem of flowers,  
 shrubs and trees; improved mental  
 health with a positive therapeutic  
 impact, social harmony and stability;  
 improved work productivity; and an  
 overall better quality-of-life, especially  
 in densely populated urban areas.  
 This citation is from AGRICOLA.

**1479. The roles of spent mushroom substrate for the mitigation of coal mine drainage.**

Stark, Lloyd R and  
 Williams, Frederick M  
*Compost Science and Utilization*  
 2 (4): 84-94. (1994)  
 NAL Call #: TD796.5.C58;  
 ISSN: 1065-657X  
 Descriptors: iron/ manganese/  
 carbon/ nitrogen/ sulfate/  
 Basidiomycetes (Fungi Unspecified)/  
 fungi/ microorganisms/ nonvascular  
 plants/ plants/ acidity/ iron/ limestone  
 dissolution/ manganese/ nitrogen/  
 organic carbon/ pH/ sulfate reduction/  
 water quality  
 Abstract: Spent mushroom substrate  
 (SMS) has been used widely in coal  
 mining regions of the USA as the  
 primary substrate in constructed  
 wetlands for the treatment of coal  
 mine drainage. Such mine drainage is  
 usually acidic and contains high  
 concentrations of dissolved Fe and,  
 less commonly, Mn. In laboratory and  
 mesocosm studies, SMS has  
 emerged as one of the substrates for  
 mine water treatment, owing to its  
 high organic carbon and limestone

content. Processes that are  
 responsible in waterlogged SMS for  
 the successful treatment of acidity  
 and Fe include limestone dissolution,  
 sulfate reduction, and Fe oxidation.  
 Provided the pH of the mine water  
 does not fall below 3.0, SMS can be  
 used in the mitigation plan. However,  
 neither Mn nor dissolved ferric Fe  
 appears to be treatable using  
 reducing SMS wetlands. Care must  
 be taken to create reducing conditions  
 in the SMS wetlands, since if the SMS  
 volume is too low, oxidizing conditions  
 will obtain throughout the profile of the  
 SMS, and eventually the SMS will fail  
 to treat the water. Since after a few  
 years much of the nonrefractive  
 organic carbon in SMS will have been  
 decomposed and metabolized, carbon  
 supplementation can significantly  
 extend the life of the SMS treatment  
 wetland and improve water treatment.  
 Several species of plants thrive in  
 SMS under mine water conditions, but  
 none improve water quality over the  
 short term in excess of the treatment  
 provided by SMS. Nitrogen leakage  
 from SMS wetlands is not problematic  
 after several weeks of operation.  
 © Thomson

**1480. Rolled erosion control systems for hillslope surface protection: A critical review, synthesis and analysis of available data.**

Sutherland, R. A.  
*Land Degradation and Development*  
 9 (6): 465-486. (Nov. 1998-Dec. 1998)  
 NAL Call #: S622.L26 S622.L26;  
 ISSN: 1085-3278 [LDDEF6].  
 Notes: Subtitle: I. Background and  
 formative years.  
 Descriptors: erosion control/ upland  
 areas/ data analysis/ literature  
 reviews/ vegetation/ ground cover/  
 United States  
 This citation is from AGRICOLA.

**1481. Root aeration in wetland trees and its ecophysiological significance.**

Grosse, W.; Buchel, H. B.; and  
 Lattermann, S.  
 In: Coastally restricted forests; Series:  
 Biological resources management  
 series.  
 New York: Oxford University Press,  
 1998; pp. 293-305.  
 ISBN: 0195075676  
 NAL Call #: QK115.C63-1998  
 Descriptors: forest trees/ roots/  
 flooding/ stress factors/ stress  
 response/ wetlands/ forest ecology/

species diversity/ coastal areas/  
literature reviews

This citation is from AGRICOLA.

**1482. Root zone solute dynamics under drip irrigation: A review.**

Mmolawa, K. and Or, D.

*Plant and Soil* 222 (1/2): 163-190. (2000)

NAL Call #: 450 P696;

ISSN: 0032-079X

This citation is provided courtesy of CAB International/CABI Publishing.

**1483. Rootzone processes and the efficient use of irrigation water.**

Clothier, Brent E and

Green, Steven R

*Agricultural Water Management*

25 (1): 1-12. (1994)

NAL Call #: S494.5.W3A3;

ISSN: 0378-3774

*Descriptors:* kiwifruit (Actinidiaceae)/ angiosperms/ dicots/ plants/ spermatophytes/ vascular plants/ horticulture/ hydraulic conductivity/ infiltration/ macropores/ plant water uptake

*Abstract:* The need for more-efficient agricultural use of irrigation water arises out of increased competition for water resources, and the greater pressure on irrigation practices to be environmentally friendly. In this review for the 25th Jubilee volume of *Agricultural Water Management* we focus on three rootzone processes that determine water-use efficiency in irrigation. Firstly, we discuss the role of macropores in preferentially-transporting irrigation water to depth during infiltration under both sprinkler and flood systems. It is suggested that more-uniform entry of irrigation water into the rootzone will result either by matching the sprinkler rate to the soil's matrix hydraulic conductivity, or by modifying the soil-surface's macroporosity prior to flood irrigation. Secondly, the environmentally-deleterious leaching of chemicals by irrigation is shown to be reduced if the applied fertilizer is first washed into dry soil by a small amount of water. This first pulse of water is drawn by capillarity into the soil's microporosity, and it carries with it the dissolved fertilizer which becomes resident there. These nutrients are then available for plant uptake, yet less prone to subsequent leaching by heavy rains. Meanwhile, initially-resident solutes in the dry soil, such as salts, will be more-effectively displaced by the infiltrating irrigation

water. Finally, our time domain reflectometry (TDR) observations of the changing soil water content in the rootzone of a kiwifruit vine, and our direct measurements of sap flow within individual roots, both reveal that plants can rapidly change their spatial pattern of water uptake in response to the application of irrigation water. The prime uptake role of near-surface roots is highlighted. Consideration of all three of these rootzone processes reinforces the claim that more-efficient and environmentally-sustainable water management will arise through higher-frequency applications of smaller amounts of irrigation.

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**1484. Ruminant methane emission measurements and estimates: From gut to globe.**

Clark, H.

*Proceedings of the New Zealand Society of Animal Production*

62: 206-210. (2002);

ISSN: 0370-2731

This citation is provided courtesy of CAB International/CABI Publishing.

**1485. Ruminant nutrition from an environmental perspective: Factors affecting whole-farm nutrient balance.**

Horn, H. H. van; Newton, G. L.; and Kunkle, W. E.

*Journal of Animal Science* 74 (12):

3082-3102. (1996)

NAL Call #: 49 J82;

ISSN: 0021-8812

This citation is provided courtesy of CAB International/CABI Publishing.

**1486. Safeguarding the welfare of livestock grazing on nature conservation sites.**

Grayson, F. W.

*Animal Welfare* 12 (4): 685-688.

(2003);

ISSN: 0962-7286

This citation is provided courtesy of CAB International/CABI Publishing.

**1487. Salinisation: A major threat to water resources in the arid and semi-arid regions of the world.**

Williams, W D

*Lakes and Reservoirs: Research and Management* 4 (3-4): 85-91. (1999);

ISSN: 1320-5331

*Descriptors:* human (Hominidae)/ Animals/ Chordates/ Humans/ Mammals/ Primates/ Vertebrates/ agricultural wastewater discharge/ annual mean rainfall/ aquatic

ecosystems/ arid regions/ biodiversity/ catchments/ dryland salinity/ ecological productivity/ economic impact/ environmental impact/ freshwaters/ global threat/ groundwaters/ human pressure/ irrigation/ natural salt lakes/ resource management/ river/ salinization: secondary/ semi arid regions/ social impact/ vegetation clearance/ water resources/ wetlands

*Abstract:* Semi-arid and arid regions (i.e. drylands with annual mean rainfall between 25 and 500 mm) cover approximately one-third of the world's land area and are inhabited by almost 400 million people. Because they are a resource in short supply, waters in drylands are under increasing human pressures, and many are threatened by rising salinities (salinisation) in particular. Rising salinities result from several causes. The salinities of many large natural salt lakes in drylands are rising as water is diverted from their inflows for irrigation and other uses. The excessive clearance of natural, deep-rooted vegetation from catchments and the discharge of saline agricultural wastewater causes the salinity of many freshwater lakes, wetlands and rivers to rise. The salinisation of some fresh waters is caused by rising saline groundwaters. And in some regions, increasing climatic aridity may be a cause of salinisation. Whatever the cause, salinisation has significant economic, social and environmental impacts. They are usually deleterious and often irreparable. Decreased biodiversity, changes in the natural character of aquatic ecosystems, and lower productivity are frequent ecological effects. In some dryland countries, salinisation is viewed as the single most important threat to water resources. However, the extent and importance of salinisation as a global threat has been greatly underestimated. Recognition of this is the first step in any attempt to manage it effectively. The aims of the present paper, therefore, are three-fold. First, it aims to define the problem and indicate its extent; second, it aims to outline the causes and effects of salinisation; third, it aims to highlight the social, economic and environmental costs and comment on management responses. An overarching aim is to draw attention to the importance of