regulations/ pest management/ productivity/ crop yield/ losses/ cost benefit analysis/ elasticities/ integrated pest management/ maize/ soybeans/ wheat/ cotton/ rice/ peanuts/ sorghum/ United States/ pesticide productivity
This citation is from AGRICOLA.

787. **Keeping science in environmental regulations: The role of the animal scientist.**
Powers, W. J.
Journal of Dairy Science 86 (4): 1045-1051. (2003)
NAL Call #: 44.8 J822;
ISSN: 0022-0302
This citation is provided courtesy of CAB International/CABI Publishing.

788. **Killing cover crops mechanically: Review of recent literature and assessment of new research results.**
Creamer, N. G. and Dabney, S. M.
American Journal of Alternative Agriculture 17 (1): 32-40. (2002)
NAL Call #: S605.5.A43;
ISSN: 0889-1893
This citation is provided courtesy of CAB International/CABI Publishing.

789. **Kinetic constraints on the loss of organic chemicals from contaminated soils: Implications for soil-quality limits.**
Beck, Angus J; Wilson, Susan C; Alcock, Ruth E; and Jones, Kevin C
Critical Reviews in Environmental Science and Technology 25 (1): 1-43. (1995)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389
Descriptors: biphenyls/ Hominidae (Hominidae)/ Plantae (Plantae Unspecified)/ animals/ chordates/ humans/ mammals/ plants/ primates/ vertebrates/ diffusion/ human exposure/ pesticides/ phytotoxicity/ polychlorinated biphenyls/ polynuclear aromatic hydrocarbons/ remediation/ solvents/ sorption/ volatile aromatic compounds

790. **Land application of agricultural, industrial, and municipal by-products.**
Power, J. F.
Madison, Wis.: Soil Science Society of America; 653 p. (2000)
Notes: Contents note: Chemical, physical, and biological characteristics of agricultural and forest by-products for land application / J.H. Edwards and Arun V. Someshwar -- Description of food processing by-products / Allen V. Barker, Tara A. O'Brien, and Margie L. Stratton -- Characterization of industrial by-products / D.M. Miller ... [et al.] -- Quantities, characteristics, barriers, and incentives for use of organic municipal by-products / Richard M. Kashmanian ... [et al.] -- Soil and by-product characteristics that impact the beneficial use of by-products / Allen V. Barker, Margie L. Stratton, and Jack E. Rechcigl -- Sustainable use of by-products in land management / Leslie R. Cooperband -- Assessing the impacts of agricultural, municipal, and industrial by-products on soil quality / J. Thomas Sims and Gary M. Pierzynski -- Potential impact of land application of by-products on ground and surface water quality / William F. Ritter -- Odor and other air quality issues associated with organic and inorganic by-products / P.D. Millner and L.L. McConnell -- Composting and beneficial utilization of composted by-product materials / Harold M. Keener, Warren A. Dick, and Harry A.J. Hoitink -- Combining by-products to achieve specific soil amendment objectives / S. Brown and R.L. Chaney -- Estimating the benefits of agricultural use of municipal, animal, and industrial by-products / Wen-Yuan Huang and Yao-Chi Lu -- Examples and case studies of beneficial reuse of beef cattle by-products / B.A. Stewart, C.A. Robinson, and David B. Parker -- Liquid dairy manure utilization in a cropping system: A case study / Deanne Meyer and Lawrence J. Schwankl -- Beneficial use of poultry by-products: Challenges and opportunities / Miguel L. Cabrera and J. Thomas Sims -- Beneficial uses of swine by-products: Opportunities for the future / Robert L. Mikkelsen -- Examples and case studies of beneficial reuse.
NAL Call #: S633-.L364-2000;
ISBN: 0891188347
Descriptors: Fertilizers---Environmental aspects/ Factory and trade waste as fertilizer/ Waste products as fertilizer/ Agricultural wastes---Recycling---Environmental aspects
This citation is from AGRICOLA.

791. **Land application of manure for beneficial resuse.**
Risse, L. M.; Cabrera, M. L.; Franzluebber, A. K.; Gaskin, J. W.; Gilley, J. E.; Killorn, R.; Radcliffe, D. E.; Tollner, W. E.; and Zhang, H
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

792. **Land quality indicators: Research plan.**
Dumanski, J. and Pieri, C.
Agriculture, Ecosystems and Environment 81 (2): 93-102. (Oct. 2000)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO].
Notes: Special issue: Indicators of land quality and sustainable land management / edited by J. Dumanski. Paper presented at a symposium held August 1998, Montpellier, France. Includes references.
Descriptors: land management/ quality/ environmental degradation/ monitoring/ land use/ indicators/ decision making/ economic indicators/ social indicators/ air quality/ water quality/ environment/ crop yield/ environmental management/ literature reviews
Abstract: Indicators of land quality (LQIs) are being developed as a means to better coordinate actions on land related issues, such as land degradation. Economic and social indicators are already in regular use to support decision making at global, national and sub-national levels and in some cases for air and water quality, but few such indicators are available to assess, monitor and evaluate changes in the quality of land resources. Land refers not just to soil but to the combined resources of terrain, water, soil and biotic resources that provide the basis for land use. Land quality refers to the condition of land relative to the requirements of land use, including agricultural production, forestry, conservation, and environmental management. The LQI program addresses the dual objectives of environmental monitoring as well as sector performance monitoring for

managed ecosystems (agriculture, forestry conservation and environmental management). The primary research issue in the LQI program is the development of indicators that identify and characterize the impact(s) of human interventions on the landscape for the major agroecological zones of tropical, sub-tropical and temperate environments. Core LQIs identified for immediate development are: nutrient balance, yield gap, land use intensity and diversity, and land cover; LQIs requiring longer term research include: soil quality, land degradation, and agro-biodiversity; LQIs being developed by other authoritative groups include: water quality, forestland quality, rangeland quality and land contamination/pollution. This citation is from AGRICOLA.

793. **Land-use characterization for nutrient and sediment risk assessment.**
Valk, Arnoud van der; United States. Environmental Protection Agency. Health and Ecological Criteria Division.; United States. Environmental Protection Agency. Wetlands Division.; and United States. Environmental Protection Agency. Office of Water.
In: Methods for evaluating wetland condition; Washington, D.C.: U.S. Environmental Protection Agency, Office of Water, 2003.
Notes: Original title: Land use characterization for nutrient and sediment risk assessment #17; Title from web page. "March 2002." Prepared jointly by: the U.S. Environmental Protection Agency, Health and Ecological Criteria Division (Office of Science and Technology) and Wetland Division (Office of Wetlands, Oceans, and Watersheds). "EPA-822-R-02-025." Description based on content viewed Feb. 28, 2003. Includes bibliographical references.
NAL Call #: QH76.5.N8-V47-2002
http://www.epa.gov/waterscience/criteria/wetlands/17LandUse.pdf
Descriptors: Wetland ecology---Evaluation/ Land use surveys---United States/ Wetland management---United States/ Water quality management---United States
This citation is from AGRICOLA.

794. **Landscape challenges to ecosystem thinking: Creative flood and drought in the American southwest.**
Fisher, Stuart G; Welter, Jill; Schade, John; and Henry, Julia
Scientia Marina 65 (2 [supplement]): 181-192. (2001);
ISSN: 0214-8358
Descriptors: organism (Organisms)/ biogeochemistry/ black box rates/ climate change/ conceptual challenges/ dimensionality/ droughts/ ecosystem functioning/ ecosystem science/ environmental heterogeneity/ floods/ hierarchical structures/ landscape science/ nutrient dynamics/ research objectives/ riparian ecosystems/ sandbars/ spatial patterns/ stream ecology/ system scales
Abstract: Stream ecology is undergoing a transition from ecosystem to landscape science. This change is reflected in many studies; work at Sycamore Creek in Arizona will be used to illustrate the challenges of this transition and several applications. Conceptual challenges involve clear determination of the organization of research objectives. Ecosystem science is largely concerned with how things work while landscape ecology focuses on the influence of spatial pattern and heterogeneity on system functioning. Questions of system scale, hierarchical structure, dimensionality, and currency must be resolved in order to productively execute research objectives. The new stream ecology is more integrative, more realistic spatially, deals with streams at a larger scale, and treats them as branched system more than former approaches. At Sycamore Creek, studies of sand bar patches and their influence on organisms and nutrient cycling illustrate how variations in patch shape and configuration can alter system outputs. Beyond sandbars, inclusion of riparian zones as integral parts of streams produces a more coherent view of nutrient dynamics than previous studies that began at the water's edge. Integration of streams with the landscape they drain requires that streams be viewed as branched structures, not linear systems. This view in ecology is in its infancy but it provides an opportunity to identify processing hot spots along flow paths and to reveal presumptive effects of climate change in terms of spatial shifts in biogeochemical activity rather than black-box rate changes.

795. **Landscape cohesion: An index for the conservation potential of landscapes for biodiversity.**
Opdam, P.; Verboom, J.; and Pouwels, R.
Landscape Ecology 18 (2): 113-126. (2003)
NAL Call #: QH541.15.L35L36;
ISSN: 0921-2973.
Notes: Number of References: 72
Descriptors: Environment/ Ecology/ biodiversity/ habitat fragmentation/ landscape cohesion/ landscape indices/ landscape planning/ metapopulation persistence/ network cohesion/ spatial cohesion/ habitat fragmentation/ agricultural landscape/ metapopulations/ populations/ connectivity/ birds/ survival/ reserves/ dynamics/ woodland
Abstract: In urbanising landscapes, planning for sustainable biodiversity occurs in a context of multifunctional land use. Important conditions for species persistence are habitat quality, the amount and configuration of habitat and the permeability of the landscape matrix. For planning purposes, these determinants should be integrated into simple indicators for spatial conditions of persistence probability. We propose a framework of three related indices. The cohesion index is based on the ecology of metapopulations in a habitat network. We discuss how an indicator for species persistence in such a network could be developed. To translate this network index into an area index, we propose the concept of spatial cohesion. Habitat cohesion and spatial cohesion are defined and measured for single species or, at best, for species profiles. Since species differ in their perception of the same landscape, different species will rate different values of these indices for the same landscape. Because landscapes are rarely planned for single species, we further propose the index of landscape cohesion, which integrates the spatial cohesion indices of different species. Indices based on these concepts can be built into GIS tools for landscape assessment. We illustrate different applications of these indices, and emphasise the

distinction between ecological and political decisions in developing and applying such tools.
© Thomson ISI

796. **A landscape ecology perspective for research, conservation, and management.**
Freemark, K. E.; Dunning, J. B.; Hejl, S. J.; and Probst, J. R.
In: Ecology and management of neotropical migratory birds: A synthesis and review of critical issues/ Martin, T. E. and Finch, D. M.
New York: Oxford University Press, 1995; pp. 381-427.
ISBN: 0-19-508452-7
This citation is provided courtesy of CAB International/CABI Publishing.

797. **Landscape erosion and evolution modeling.**
Harmon, R. S. and Doe, William W.
New York: Kluwer Academic/Plenum Publishers; xxi, 540 p.: ill., maps l computer optical disc (4 3/4 in.). (2001)
NAL Call #: S627.M36-L36-2001;
ISBN: 0306467186
Descriptors: Soil erosion---Mathematical models/ Soil erosion---United States---Mathematical models
This citation is from AGRICOLA.

798. **Landscape fate of nitrate fluxes and emissions in Central Europe. A critical review of concepts, data, and models for transport and retention.**
Haag, D. and Kaupenjohann, M.
Agriculture, Ecosystems and Environment 86 (1): 1-21. (July 2001)
NAL Call #: S601.A34;
ISSN: 0167-8809 [AEENDO]
Descriptors: landscape/ nitrate/ emission/ simulation models/ nitrogen cycle/ agriculture/ ecosystems/ movement in soil/ streams/ metabolism/ ecotones/ drainage/ riparian vegetation/ quantitative analysis/ spatial variation/ denitrification/ nitrous oxide/ literature reviews/ central Europe
Abstract: Agroecosystems are leaky systems emitting nutrients like nitrate, which affect ecosystems on a range of scales. This paper examines the fate of nitrate on the landscape level focussing on how landscape components either facilitate or impede N translocation from the field to the stream (headwater). According to their role in landscape metabolism, two categories of landscape components are distinguished, ecotones/retention compartments and conduits/corridors. Conduits such as macropores, preferential interflow-paths, drainage tiles and streams rapidly relocate nitrate to headwaters. Retention compartments like the capillary fringe/saturated zone and riparian vegetation eliminate N through denitrification. The differential role of compartments is illustrated with quantitative examples from the literature. On the landscape level retention potential for N is spatially variable and quantitatively limited, while its realisation is uncertain. Notwithstanding, the literature indicates that on a watershed basis the bulk of total N input is retained; thus the potential is discussed for the retention of nitrate on different scales, i.e. the field, landscape, regional and global scale. The transitory retention of excess nitrate in soil and subsoil solution, soil organic matter, groundwater and riparian vegetation may delay nitrate discharge to the aquatic system for decades, contributing to the low emission factors on basin scale. The adverse effects arising from denitrification are discussed, presenting data on the emission of nitrous oxide from the entirety of the different landscape compartments. It is concluded that reliance on landscape metabolism and self-purification postpones the problem of global N overload and partially transfers it to the atmosphere. An assessment scheme is presented which in the face of the unpredictability of ecosystem and landscape behaviour is risk oriented (instead of impact oriented). The scheme uses a budget approach, which accounts for the critical role of corridors and considers the scale and scope of N emissions. A conceptual framework for the remediation of N overload is presented which rests on the realisation of cycling principles and zero-emission approaches on all scales of agricultural production and which pleads for regional approaches that transcend sectoral boundaries and take account of overall regional N fluxes.
This citation is from AGRICOLA.

799. **Landscape Indicators of Human Impacts to Riverine Systems.**
Gergel, S. E.; Turner, M. G.; Miller, J. R.; Melack, J. M.; and Stanley, E. H.
Aquatic Sciences 64 (2): 118-128. (2002);
ISSN: 1015-1621
Descriptors: Water Pollution Effects/ Human Population/ Rivers/ Bioindicators/ Ecological Effects/ Hydrology/ Watershed Management/ Man induced effects/ Environmental impact/ Land use/ Catchment area/ Riparian zone/ landscape indicators/ Effects of pollution/ Conservation/ Mechanical and natural changes
Abstract: Detecting human impacts on riverine systems is challenging because of the diverse biological, chemical, hydrological and geophysical components that must be assessed. We briefly review the chemical, biotic, hydrologic and physical habitat assessment approaches commonly used in riverine systems. We then discuss how landscape indicators can be used to assess the status of rivers by quantifying land cover changes in the surrounding catchment, and contrast landscape-level indicators with the more traditionally used approaches. Landscape metrics that describe the amount and arrangement of human-altered land in a catchment provide a direct way to measure human impacts and can be correlated with many traditionally used riverine indicators, such as water chemistry and biotic variables. The spatial pattern of riparian habitats may also be an especially powerful landscape indicator because the variation in length, width, and gaps of riparian buffers influences their effectiveness as nutrient sinks. The width of riparian buffers is also related to the diversity of riparian bird species. Landscape indicators incorporating historical land use may also hold promise for predicting and assessing the status of riverine systems. Importantly, the relationship between an aquatic system attribute and a landscape indicator may be non-linear and thus exhibit threshold responses. This has become especially apparent from landscape indicators quantifying the percent impervious surface (or urban areas) in a watershed, a landscape indicator of hydrologic and geomorphic change.
© Cambridge Scientific Abstracts (CSA)

800. **A landscape level analysis of potential excess nitrogen in East-Central North Carolina, USA.**
Garten, C. T. and Ashwood, T. L.
Water, Air and Soil Pollution 146 (1-4): 3-21. (2003)

NAL Call #: TD172.W36;
ISSN: 0049-6979.
Notes: Number of References: 46; Publisher: Kluwer Academic Publ
Descriptors: Environment/ Ecology/ landscape ecology/ mass balance model/ eutrophication/ environmental health/ water pollution/ harmful algal blooms/ Neuse River estuary/ riparian zones/ United States/ nitrate/ export/ waters/ denitrification/ groundwaters/ phosphorus/ dynamics
Abstract: The objective of this research was to arrive at an assessment of potential excess nitrogen (N) under different land cover categories in the Neuse River Basin (North Carolina, USA) on a seasonal basis. Data on five processes (atmospheric N deposition, fertilization, net soil N mineralization, plant uptake, and denitrification) that contribute to potential excess N under different land cover categories were obtained from a literature review. Factors were also estimated to apportion annual N fluxes among different seasons of the year. Potential excess N was calculated as the difference between inputs to and outputs from an inorganic N pool. If inputs exceeded outputs, then the difference was assumed to represent N at risk of loss from the landscape to surface receiving waters and groundwaters. Land covers that were classified as potential N sources were influenced by soil N inventories and rates of net soil N mineralization (which is a natural process). The results indicated that there are large land areas in the Neuse River Basin that could be classified as either a N source or a N sink. Such areas are potentially sensitive because future changes in land use, or small alterations in N fluxes, could convert areas that are essentially in balance with respect to N biogeochemistry into the N source or N sink category. In this respect, model predictions indicate that the timing of N inputs and outputs on the landscape can be a critical determinant of potential excess N.

801. **A landscape perspective of surface-subsurface hydrological exchanges in river corridors.**
Malard, Florian; Tockner, Klement; Dole, Olivier Marie Jose; and Ward, J V
Freshwater Biology 47 (4): 621-640. (2002)
NAL Call #: QH96.F6;
ISSN: 0046-5070
Descriptors: organic matter/ terminal electron acceptors/ invertebrate (Invertebrata)/ Animals/ Invertebrates/ bed topography/ biodiversity/ biogeochemical processes/ ecological refugia/ flood events/ fluvial action/ ground water/ hyporheic zones/ landscape ecology/ nutrient cycling/ patch shape/ patch size/ river corridors/ sediment permeability/ spatial variations/ streams/ surface-subsurface hydrological exchanges/ water temperature
Abstract: 1. River corridors can be visualised as a three-dimensional mosaic of surface-subsurface exchange patches over multiple spatial scales. Along major flow paths, surface water downwells into the sediment, travels for some distance beneath or along the stream, eventually mixes with ground water, and then returns to the stream. 2. Spatial variations in bed topography and sediment permeability result in a mosaic of patch types (e.g. gravel versus sandy patches) that differ in their hydrological exchange rate with the surface stream. Biogeochemical processes and invertebrate assemblages vary among patch types as a function of the flux of advected channel water that determines the supply of organic matter and terminal electron acceptors. 3. The overall effect of surface-subsurface hydrological exchanges on nutrient cycling and biodiversity in streams not only depends on the proportion of the different patch types, but also on the frequency distribution of patch size and shape. 4. Because nutrients are essentially produced or depleted at the downwelling end of hyporheic flow paths, reach-scale processing rates of nutrients should be greater in stretches with many small patches (e.g. short compact gravel bars) than in stretches with only a few large patches (e.g. large gravel bars). 5. Based on data from the Rhone River, we predict that a reach with many small bars should offer more hyporheic refugia for epigean fauna than a reach containing only a few large gravel bars because benthic organisms accumulate preferentially in sediments located at the upstream and downwelling edge of bars during floods. However, large bars are more stable and may provide the only refugia during severe flood events. 6. In river floodplain systems exhibiting pronounced expansion/contraction cycles, hyporheic assemblages within newly created patches not only depend on the intrinsic characteristics of these patches but also on their life span, hydrological connection with neighbouring patches, and movement patterns of organisms. 7. Empirical and theoretical evidence illustrate how the spatial arrangement of surface-subsurface exchange patches affects heterogeneity in stream nutrient concentration, surface water temperature, and colonisation of dry reaches by invertebrates. 8. Interactions between fluvial action and geomorphic features, resulting from seasonal and episodic flow pulses, alter surface-subsurface exchange pathways and repeatedly modify the configuration of the mosaic, thereby altering the contribution of the hyporheic zone to nutrient transformation and biodiversity in river corridors.

802. **Landscape sensitivity in time and space: An introduction.**
Thomas, Michael F
Catena 42 (2-4): 83-98. (2001)
NAL Call #: GB400.C3;
ISSN: 0341-8162
Descriptors: earth surface systems/ inherited features/ landscape mosaics/ landscape sensitivity/ sediments/ spatial sensitivity/ stratigraphy/ temporal sensitivity
Abstract: Landscape sensitivity may be discussed in terms of the response of landscape systems to perturbation on different time and spatial scales. Unstable systems behave chaotically but may show self organised criticality, while stable systems resist change until threshold values of system parameters are exceeded. Spatial sensitivity is expressed in different rates of change, between landscape components or elements. This leads to divergence between landscape elements, and the inheritance of palaeoforms in present-day landscape mosaics. Temporal sensitivity reflects the magnitude and frequency of individual events nested within patterns of longer term environmental changes occurring on different timescales. The resulting landscape complexity reflects the spatio-temporal sensitivity of earth surface systems over ten orders of scale magnitude. The connectivity within landscapes ensures that site instabilities can be propagated within multievent feedback systems.

Landscapes record their own histories in sediments and soils, but interpretation of event stratigraphy may not be straightforward, while soil profiles can absorb individual events without erosion. Although we are increasingly able to model the present, environmental management is dominantly about conserving inherited properties of landscapes: forests, soils, floodplains, coastlines. Landscape sensitivity for landscape management must, therefore, address not only active, largely nonlinear, environmental systems, but also the mosaics and palimpsests that are the inheritance from past environments.

803. **Landscape variables affecting livestock impacts on water quality in the humid temperate zone.**
Clark, E Ann
Canadian Journal of Plant Science 78 (2): 181-190. (1998)
NAL Call #: 450-C16;
ISSN: 0008-4220
Descriptors: beef cattle (Bovidae)/ Animals/ Artiodactyls/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ agriculture/ humid temperate zone/ landscape variables/ livestock impacts/ pasture fertility/ riparian ecosystem/ soil conservation/ water conservation/ water quality
Abstract: The potential for impact by grazing livestock on unprotected watercourses may vary with climate, with landscape level factors including the landform within which the pasture is located, with the biophysical characteristics of the water-course itself, and with pasture and grazing management practices. Policies seeking to implement cost-effective measures to protect downstream water quality need to acknowledge large-scale as well as small-scale processes which can moderate or exacerbate potential sources of pollution. Applied and scholarly evidence suggest that unrestricted livestock access accounts for a relatively modest share of watercourse pollution in humid temperate regions, as compared with such watershed-specific factors as leaking septic tanks and confinement feeding systems. A wide variety of evidence suggests that the degree of compatibility of grazing livestock with a healthy riparian ecosystem should be viewed as an hypothesis that is testable on a site-specific basis. Greater understanding of the factors causal to livestock behavior in, and impact on, watercourses may help to better focus preventative and remediation efforts by both producers and policymakers.

804. **Landscapes to Riverscapes: Bridging the Gap between Research and Conservation of Stream Fishes.**
Fausch, K. D.; Torgersen, C. E.; Baxter, C. V.; and Li, H. W.
Bioscience 52 (6): 483-498. (2002)
NAL Call #: 500 Am322A;
ISSN: 0006-3568.
Notes: Publisher: American Institute of Biological Sciences
Descriptors: Scaling/ Population ecology/ Movements/ Research programs/ Management/ Conservation/ Streams/ Reviews/ Fishery management/ Environment management/ River fisheries/ Nature conservation/ Habitat/ freshwater fish/ Fish/ Stock assessment and management
Abstract: In this article we draw together threads of recent theoretical and empirical results to argue for studying and managing lotic fishes and their habitats in the context of riverscapes (a term coined by Ward 1998 for riverine landscapes). We first explore the interface between landscape ecology and stream ecology and incorporate it with ideas from Schlosser (1991, 1995a) to propose a new approach for stream fish ecology that explicitly embraces the continuous, hierarchical, and heterogeneous nature of these linear aquatic habitats. Second, we consider what new empirical data support this view, focusing on the heterogeneous nature of stream habitat at intermediate spatial and temporal scales and the role of fish movement in linking the habitat patches together through time. We then use these ideas to advance five principles for more effective research and conservation of stream fishes. We conclude by identifying emerging challenges in stream fish management that will require integrating information across scales using the riverscape approach that we advocate.

805. **Large-scale headcut erosion testing.**
Robinson, K. M. and Hanson, G. J.
Transactions of the ASAE 38 (2): 429-434. (Mar. 1995-Apr. 1995)
NAL Call #: 290.9-Am32T;
ISSN: 0001-2351 [TAAEAJ]
Descriptors: erosion/ spillways/ damage/ simulation models/ literature reviews/ headcuts
Abstract: The development and movement of gully headcuts can cause major damage in earth emergency spillways. A 1.8-m-wide and 29-m-long flume with 2.4-m-high sidewalls was constructed to perform research on headcut advance. Headcut advance tests were conducted holding discharge, overfall height, and backwater level constant while varying soil properties. Two soil types were examined, and the soil properties were altered by compacting the material in the flume at varying moisture and density conditions. The observed headcut advance rates varied by a factor of more than 100 depending on the placement conditions. By placing a sand layer under the upstream half of the fill, the influence of a sand layer on headcut advance was also examined. Headcut advance and failure mechanics were observed and described.
This citation is from AGRICOLA.

806. **Large wood and fluvial processes.**
Gurnell, A M; Piegay, H; Swanson, F J; and Gregory, S V
Freshwater Biology 47 (4): 601-619. (2002)
NAL Call #: QH96.F6;
ISSN: 0046-5070
Descriptors: climatic regimes/ flow hydraulics/ flow velocity/ fluvial processes/ geomorphology/ hydrology/ mineral transfer/ organic sediment transfer/ physical characteristics/ riparian zones/ river channels: geometry/ river management/ wood: accumulation, breakage, buoyancy, delivery, mobility, morphology, retention, size, storage/ woodland river ecosystems
Abstract: 1. Large wood forms an important component of woodland river ecosystems. The relationship between large wood and the physical characteristics of river systems varies greatly with changes in the tree species of the marginal woodland, the climatic and hydrological regime, the fluvial geomorphological setting and the river and woodland management

context. 2. Research on large wood and fluvial processes over the last 25 years has focussed on three main themes: the effects of wood on flow hydraulics; on the transfer of mineral and organic sediment; and on the geomorphology of river channels. 3. Analogies between wood and mineral sediment transfer processes (supply, mobility and river characteristics that affect retention) are found useful as a framework for synthesising current knowledge on large wood in rivers. 4. An important property of wood is its size when scaled to the size of the river channel. 'Small' channels are defined as those whose width is less than the majority of wood pieces (e.g. width < median wood piece length). 'Medium' channels have widths greater than the size of most wood pieces (e.g. width < upper quartile wood piece length), and 'Large' channels are wider than the length of all of the wood pieces delivered to them. 5. A conceptual framework defined here for evaluating the storage and dynamics of wood in rivers ranks the relative importance of hydrological characteristics (flow regime, sediment transport regime), wood characteristics (piece size, buoyancy, morphological complexity) and geomorphological characteristics (channel width, geomorphological style) in 'Small', 'Medium' and 'Large' rivers. 6. Wood pieces are large in comparison with river size in 'small' rivers, therefore they tend to remain close to where they are delivered to the river and provide important structures in the stream, controlling rather than responding to the hydrological and sediment transfer characteristics of the river. 7. For 'Medium' rivers, the combination of wood length and form becomes critical to the stability of wood within the channel. Wood accumulations form as a result of smaller or more mobile wood pieces accumulating behind key pieces. Wood transport is governed mainly by the flow regime and the buoyancy of the wood. Even quite large wood pieces may require partial burial to give them stability, so enhancing the importance of the sediment transport regime. 8. Wood dynamics in 'Large' rivers vary with the geometry of the channel (slope and channel pattern), which controls the delivery, mobility and breakage of wood, and also the characteristics of the riparian zone, from where the greatest volume of wood is introduced. Wood retention depends on the channel pattern and the distribution of flow velocity. A large amount is stored at the channel margins. The greater the contact between the active channel and the forested floodplain and islands, the greater the quantity of wood that is stored.

807. **Legal Issues Related to Livestock Watering in Federal Grazing Districts.**
Baldwin, P.
Congressional Research Service (CRS) [Also available as: CRS Report for Congress 94-688a], 1994 (text/html)
http://cnie.org/NLE/CRSreports/water/h2o-14.cfm
Descriptors: range management/ rangelands/ livestock production/ grazing management/ water resources/ public water supply/ reservoirs/ water rights/ agricultural law/ environmental law/ public lands/ water policy/ agricultural policy/ United States/ Taylor Grazing Act/ TGA
Abstract: In response to several congressional inquiries on the subject, this Report examines the legal history of livestock watering in federal grazing districts. Little analysis of this history appears to have been done in the past, despite the crucial importance of water to the management of the federal rangelands. Livestock watering has been the subject of a distinct sequence of Congressional enactments that imposed federal policies different from those that pertain to water rights in the context of homesteading and settlement. The Department of the Interior has recently proposed regulations that in part relate to water rights in grazing districts. The proposed regulations also raise the controversial issue of state versus federal authority over the public lands and water.

808. **Legal structures governing animal waste management.**
Centner, T. J.; Lichtenberg, E.; Richardson, J. J.; and Grossman, M. R.
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

809. **Legitimizing fluvial ecosystems as users of water: An overview.**
Naiman, Robert J; Bunn, Stuart E; Nilsson, Christer; Petts, Geoff E; Pinay, Gilles; and Thompson, Lisa C
Environmental Management 30 (4): 455-467. (2002)
NAL Call #: HC79.E5E5;
ISSN: 0364-152X
Descriptors: aquatic biota evolution/ aquatic ecosystems: topographical uniqueness/ basic ecological principles: effective implementation challenges, effective implementation opportunities/ biodiversity/ biogeochemistry/ catchment scale processes/ climate/ cumulative effects/ ecological processes: evolution/ effective assessment procedures: formulation/ effective monitoring procedures: formulation/ fluvial ecosystems: water use legitimization/ fresh water/ land/ long term ecological vitality maintenance/ multidisciplinary knowledge/ multidisciplinary models/ natural flow regime/ physical processes/ riparian communities/ river biotic community/ river flow regime/ water regime changes: ecological consequences
Abstract: We suggest that fluvial ecosystems are legitimate users of water and that there are basic ecological principles guiding the maintenance of long-term ecological vitality. This article articulates some fundamental relationships between physical and ecological processes, presents basic principles for maintaining the vitality of fluvial ecosystems, identifies several major scientific challenges and opportunities for effective implementation of the basic ecological principles, and acts as an introduction to three specific articles to follow on biodiversity, biogeochemistry, and riparian communities. All the objectives, by necessity, link climate, land, and fresh water. The basic principles proposed are: (1) the natural flow regime shapes the evolution of aquatic biota and ecological processes, (2) every river has a characteristic flow regime and an associated biotic community, and (3) aquatic ecosystems are topographically unique in occupying the lowest position in the landscape, thereby integrating catchment-scale processes. Scientific challenges for

the immediate future relate to quantifying cumulative effects, linking multidisciplinary knowledge and models, and formulating effective monitoring and assessment procedures. Additionally, forecasting the ecological consequences of changing water regimes is a fundamental challenge for science, especially as environmental issues related to fresh waters escalate in the next two to three decades.

810. **Legumes and diversification of the rice-wheat cropping system.**
Lauren JG; Shrestha R; Sattar MA; and Yadav RL
Journal of Crop Production 3 (2): 67-102; 173 ref. (2000)
NAL Call #: SB1.J683

811. **Lessons learned while extending physiological principles from growth chambers to satellite studies.**
Waring, R. H.
Tree Physiology 18 (8/9): 491-497. (Aug. 1998-Sept. 1998)
NAL Call #: QK475.T74;
ISSN: 0829-318X [TRPHEM].
Notes: In the special issue: Forest at the limit: environmental constraints on forest function / edited by P.J. Dye. Paper presented at a workshop held May 11-17, 1997, Skukuza, Kruger National Park, South Africa. Includes references.
Descriptors: trees/ plant physiology/ forestry/ research/ interdisciplinary research/ management/ ecosystems/ ecology/ plant water relations/ mathematical models/ integrated pest management/ climatic change/ literature reviews
Abstract: Over the last three decades, physiological principles established in laboratory studies have been applied to systems at progressively larger scales and are now firmly merged into the fields of ecology, ecosystem modeling, forest protection, and global change research. To expand the vision of any field requires that scientists from different disciplines build a bridge across the chasm that normally exists between the knowledge bases and perspectives of different fields. Bridges are built most quickly when representatives of different disciplines see the possibility of mutual advantage in collaboration and seek to quickly demonstrate that potential. Usually, however, the process is laborious because approaches and techniques must be modified to address problems at a different level of integration. Successful bridge builders have, almost without exception, established credibility in their own field and have then identified a kindred spirit with similar credentials in another. They usually establish a pilot study that involves apprentices as well as established scientists. If the approach is successful, the younger members of the team often take the lead in further advancements. Managers of large centralized programs should foster interdisciplinary exchange, particularly at times when advancement in one field languishes. To expand collaboration, it is often necessary for scientists to seek common properties that simplify relations across a wide range of biological and physical conditions. This integrative perspective is essential and is fostered by participating in cross-disciplinary workshops and conferences and by reading outside one's field.

812. **Lidar remote sensing for ecosystem studies.**
Lefsky, Michael A; Cohen, Warren B; Parker, Geoffrey G; and Harding, David J
Bioscience 52 (1): 19-30. (2002)
NAL Call #: 500 Am322A;
ISSN: 0006-3568
Descriptors: Douglas fir western hemlock forest stands/ aboveground biomass [AGBM]/ canopy surface topology/ coastal erosion/ ecosystem studies/ land topography/ leaf area index [LAI]/ three dimensional plant canopy distribution/ vegetation structure estimation

813. **Linkages among diverse aquatic ecosystems: A neglected field of study.**
Gorham, Eville
In: Freshwater ecosystems: Revitalizing educational programs in limnology.
Washington, D.C.: National Academy Press, 1996; pp. 203-217
http://www.nap.edu/books/0309054435/html/
Descriptors: diverse aquatic ecosystems linkages/ education/ freshwater ecology/ functional couplings/ lakes/ neglected field study/ research/ rivers/ streams/ teaching/ wetlands

814. **Linkages between aquatic sediment biota and life above sediments as potential drivers of biodiversity and ecological processes.**
Palmer, Margaret A; Covich, Alan P; Lake, Sam; Biro, Peter; Brooks, Jacqui J; Cole, Jonathan; Dahm, Cliff; Gibert, Janine; Goedkoop, Willem; Martens, Koen; Verhoeven, Jos; and Bund, Wouter J van de
Bioscience 50 (12): 1062-1075. (2000)
NAL Call #: 500 Am322A;
ISSN: 0006-3568
Descriptors: algae (Algae)/ annelids (Annelida)/ aschelminthes (Helminthes)/ bacteria (Bacteria)/ bivalves (Pelecypoda)/ crustaceans (Crustacea)/ fish (Pisces)/ fungi (Fungi)/ insects (Insecta)/ mites (Acarina)/ plants (Plantae)/ protozoa (Protozoa)/ Algae/ Animals/ Annelids/ Arthropods/ Bacteria/ Chelicerates/ Chordates/ Crustaceans/ Eubacteria/ Fish/ Fungi/ Helminths/ Insects/ Invertebrates/ Microorganisms/ Mollusks/ Nonhuman Vertebrates/ Nonvascular Plants/ Plants/ Protozoans/ Vertebrates/ aquatic sediments/ biological interactions/ chemical interactions/ environmental linkages/ food resources/ habitat degradation/ hydrology/ microbial effects/ physical interactions/ shading effects/ species diversity/ structural effects/ terrestrial ecosystems

815. **Linkages in the landscape. The role of corridors and connectivity in wildlife conservation.**
Bennett, A. F.; x, 254 p. (1999);
ISBN: 2-8317-0221-6

816. **Linking Actions to Outcomes in Wetland Management: An Overview of U.S. State Wetland Management.**
La Peyre, M. K.; Reams, M. A.; and Mendelssohn, I. A.
Wetlands 21 (1): 66-74. (2001)
NAL Call #: QH75.A1W47;
ISSN: 0277-5212
Descriptors: Wetlands / Government policy/ Surveys/ Environment management/ Planning/ Ecology/

Ecosystem management/ Regional planning/ Mapping/ Nature conservation/ Resource conservation/ Environmental protection/ Policies/ Management/ United States/ Government policies/ Resource management/ Land Management/ Environmental Quality/ Resources Management/ State Jurisdiction/ United States/ Assessments/ Resource conservation/ Environmental Law, Regulations & Policy/ Conservation, wildlife management and recreation/ Management / Environmental action/ Evaluation process
Abstract: Despite a national focus on saving wetland systems in the U.S., evaluations of wetland resources and management outcomes have been limited. A fifty-state survey of wetland managers was conducted in order to collect information on (1) wetland resources, (2) management actions taken, and (3) management impact on the resources (wetlands). An overview of the general status of state knowledge of the quantity and quality of their wetland resources is presented. Results indicate that most states have a rough estimate of the resources and most have wetland conservation plans and intend to develop better databases of wetland resources. However, few states track management actions relevant to wetlands and fewer have any idea of the success or impact of past management actions. The ability to assess program effectiveness is key to implementing adaptive management frameworks. A number of lessons learned suggest a basic framework for future wetland management that includes state planning, better quantification (mapping) of wetlands, development of methods to measure wetland quality, and tracking of wetland management actions and outcomes. This framework could also be used as an outline for the development of a more adaptive approach to wetland management.

817. **Linking landscape and water quality in the Mississippi river basin for 200 years.**
Turner, R. E. and Rabalais, N. N.
Bioscience 53 (6): 563-572. (June 2003)
NAL Call #: 500 Am322A;
ISSN: 0006-3568.
Notes: Number of References: 66
Descriptors: Biology/ Mississippi River/ water quality/ agriculture / sustainability/ environmental history/ Gulf of Mexico/ United States/ nitrogen/ nitrate/ hypoxia/ eutrophication/ consequences/ soil/ land
Abstract: Two centuries of land use in the Mississippi River watershed are reflected in the water quality of its streams and in the continental shelf ecosystem receiving its discharge. The most recent influence on nutrient loading-intense and widespread farming and especially fertilizer use-has had a more significant effect on water quality than has land drainage or the conversion of native vegetation to cropland and grazing pastures. The 200-year record of nutrient loading to offshore water is reflected in the paleoreconstructed record of plankton in dated sediments. This record illustrates that the development of fair, sustained management of inland ecosystems is linked to the management of offshore systems. Land use in this fully occupied watershed is under the strong influence of national policies affecting all aspects of the human ecosphere. These policies can be modified for better or worse, but water quality will probably change only gradually because of the strong buffering capacity of the soil ecosystem.

818. **Linking the hydrologic and biogeochemical controls of nitrogen transport in near-stream zones of temperate-forested catchments: A review.**
Cirmo, C. P. and McDonnell, J. J.
Journal of Hydrology 199 (1/2): 88-120. (Dec. 1997)
NAL Call #: 292.8-J82;
ISSN: 0022-1694 [JHYDA7]
Descriptors: watersheds/ nitrogen cycle/ forest soils/ transport processes
Abstract: We review the status of research concerning the links between hydrologic flowpaths and the biogeochemical environment controlling Nitrogen cycling and transport in near-stream saturated zones, centering on stream environments of the northern, temperate-forested zone. N retention, transformation and mobilization occur in streamside wetlands, floodplains, riparian zones, seepage faces, and the hyporheic zone. These areas are the focal point in non-point source loading of N to stream channels. They also represent areas where rapid changes in water-table and hydrologic flowpaths occur during rainfall-runoff events. It is the combination of an abrupt change in biogeochemical environment, encountering a hydrologic boundary (the terrestrial/aquatic interface or ecotone), that make the near-stream/saturated zone critical for elucidating controls of N transport and transformation. We review published studies concerning the hydrologic controls of N transport in near-stream zones, and subsequently present several geomorphic and hydrodynamic scenarios relating N biogeochemistry and its response to hydrologic events (of both varying magnitude and seasons). It is at the critical junction between temporal and spatial conditions affecting N cycling in the near-stream zone, that research priorities must now be focused. This citation is from AGRICOLA.

819. **Liquid manure application systems conference: Design, management, and environmental assessment (Held December 1-2, 1994 at Rochester, New York.).**
Ithaca, NY: Northeast Regional Agricultural Engineering Service, 1994. iv, 220 p.: ill. NRAES 79.
NAL Call #: S675.N72-no.79
Descriptors: Manure handling/ Manures/ Animal waste/ Organic fertilizers
Abstract: This is the proceedings from the Liquid Manure Application Systems conference that was held in December 1994. It includes twenty-six papers and is divided into five categories: livestock manure systems for the 21st century, design of liquid manure systems, planning environmentally compatible systems, custom application, and managing for economic and environmental sustainability.

820. **Liquid manure application systems design manual.**
Dougherty, Mark.
Ithaca, N.Y. Northeast Regional Agricultural Engineering Service; Series: NRAES 89; 168 p. (1998)
Notes: Includes bibliographical references (p. 162-167).
NAL Call #: S675-.N72-no.89;
ISBN: 0935817247
Descriptors: liquid manure/ fertilizer

application/ application methods/ animal manure management/ manure storage/ odor control
Abstract: The comprehensive guide discusses basic design components -- such as a variety of pumps, pipes, hoses, and irrigation nozzles -- of commonly used liquid manure application systems. Field application methods covered include tankers, hard-hose reel systems, drag hose/soft hose ground application, and center pivot irrigation. The design manual also discusses such management issues as environmental assessment, nutrient management, liquid manure storage and handling, application rate strategies, environmental assessment, odor control, and safety. Included are 69 illustrations and 20 tables, plus work sheets, suggested readings, and a list of manufacturers.

821. **A literature review on the environmental effects of postfire logging.**
McIver, J. D. and Starr, L.
Western Journal of Applied Forestry 16 (4): 159-168. (Oct. 2001)
NAL Call #: SD388.W6;
ISSN: 0885-6095
Descriptors: forest fires/ salvage felling and logging/ forest ecology/ environmental impact/ fire effects/ slash/ soil/ disturbed land/ erosion/ runoff/ establishment/ growth/ botanical composition/ insect pests/ infestation/ dead trees/ wildlife/ habitats/ forest management/ literature reviews
Abstract: Literature on logging after wildfire is reviewed, with a focus on environmental effects of logging activity and the removal of large woody structure. As in unburned stands, log retrieval systems vary considerably in their immediate effect on soils in the postfire environment, with ground-based systems generally causing more disturbance than aerial systems. Timber harvest methods used by managers can mitigate erosion effects--for example, logging residue can decrease erosion by impeding overland flow. Ground disturbance from postfire logging can encourage establishment of different plant species (including nonnatives) and can influence the growth of trees. The removal of large woody structures typical in postfire logging operations can change plant species composition, reduce plant species richness, and increase conifer growth in the first years after logging, but can also reduce the probability that insect pest populations will build up and infest adjacent stands. Removal of large woody structures can cause declines in the abundance of several cavity-nesting bird species, including mountain bluebird, and black-backed, hairy, and three-toed woodpeckers; Lewis' woodpecker tends to increase after postfire logging. Overall, studies on the environmental effects of postfire logging are limited, arguing for the use of adaptive management to monitor effects of logging and to adjust practices accordingly.
This citation is from AGRICOLA.

822. **Literature review: Possible funding sources for proper closure of abandoned water wells on private lands in the South Central Region.**
National Water Management Center (U.S.).
Washington, D.C.: USDA-NRCS, National Water Management Center. (1998)
Notes: Title from caption. Includes bibliographical references.
NAL Call #: aTD223.5-.L58-1998
http://wmc.ar.nrcs.usda.gov/technical/GW/litreviewfunding.html
Descriptors: Wells---Abandonment---Southern States/ Wells---Abandonment---Economic aspects---Southern States
Abstract: Summarizes research the staff at the National Water Management Center has conducted to document possible sources of funding for proper abandonment of water wells on private lands. Included are sections discussing background information on abandoned well hazards, ground-water use, the theory behind proper well plugging, the agencies regulating water well abandonment and their responsibilities, possible sources of assistance for decommissioning abandoned water wells, selected references with a brief description, a listing of State agencies and their addresses, and a glossary of related terminology.
This citation is from AGRICOLA.

823. **Livestock impacts on the herbaceous components of sage grouse habitat: A review.**
Hockett, Glenn A
Intermountain Journal of Sciences 8 (2): 105-114. (2002);
ISSN: 1081-3519
Descriptors: Artemisia spp. [sagebrush] (Compositae)/ Centrocercus urophasianus [sage grouse] (Galliformes)/ forb (Angiospermae): food/ grass (Gramineae)/ insect (Insecta): food, prey/ livestock (Mammalia)/ Angiosperms/ Animals/ Arthropods/ Birds/ Chordates/ Dicots/ Insects/ Invertebrates/ Mammals/ Monocots/ Nonhuman Mammals/ Nonhuman Vertebrates/ Plants/ Spermatophytes/ Vascular Plants/ Vertebrates/ climax vegetation/ cover composition/ feeding sites/ food supply/ grazing intensity/ herbaceous understories/ livestock impacts/ riparian meadows: habitat/ seasonality/ springs/ streams
Abstract: Sage grouse are a bird of climax vegetation. Productive sage grouse habitat is more than a "sea of sagebrush." The grass/forb understory supplies food and cover components seasonally. Within the sagebrush community, a dense, residual herbaceous understory increases the likelihood of sage grouse nest success. Forbs and insects are essential foods for sage grouse from early spring to early fall. Although riparian areas typically make up less than 2 percent of the sagebrush landscape, interspersed springs, streams, and meadows offer watering and feeding sites for sage grouse during summer and early fall. Livestock selectively remove grasses and forbs within the sagebrush landscape while showing a strong preference for riparian meadows once upland vegetation cures. Livestock use can impact the amount and composition of herbaceous understory depending on the class of livestock, season of use, and grazing intensity. I reviewed the literature regarding sage grouse habitat and livestock impacts to the herbaceous understory. Ungrazed comparison areas, based on the seasonal needs of sage grouse, are lacking. Controls are recommended to advance our understanding of grazing impacts.

824. **Livestock influences on riparian zones and fish habitat: Literature classification.**
Larsen, R. E.; Krueger, W. C.; George, M. R.; Barrington, M. R.; Buckhouse, J. C.; and Johnson, D. E.
Journal of Range Management 51 (6): 661-664. (1998)
NAL Call #: 60.18 J82;
ISSN: 0022-409X
This citation is provided courtesy of CAB International/CABI Publishing.

825. **Livestock manure: Foe or fertilizer?**
Glover, T.
Agricultural Outlook (AO) (AO-230): 30-35. (1996)
NAL Call #: aHD1751.A422
This citation is provided courtesy of CAB International/CABI Publishing.

826. **Livestock manure production and disposition: South Dakota feedlots-farms-ranches.**
Taylor, Donald C. and South Dakota State University. Economics Dept.
Brookings, S.D.: Economics Dept., South Dakota State University; 70 p.: ill.; 28 cm.; Series: Research report (South Dakota State University. Economics Dept. no. 94-4. (1994)
Notes: "November 1994." Includes bibliographical references (p. 54-62).
NAL Call #: HD1775.S8R47--no.94-4
Descriptors: Animal waste---South Dakota/ Agricultural waste---South Dakota/ Feedlots---South Dakota/ Waste disposal in the ground---South Dakota
This citation is from AGRICOLA.

827. **Livestock nutrient management concerns: Regulatory and legislative overview.**
Meyer, D. and Mullinax, D. D.
Journal of Animal Science 77 (suppl.2): 51-62. (1999)
NAL Call #: 49-J82;
ISSN: 0021-8812 [JANSAG].
Notes: Paper presented at the 1998 ADSA-ASAS Joint Meeting, July 27-31, Fort Collins, CO.
Includes references.
Descriptors: animal manures/ feedlot wastes/ livestock numbers/ application to land/ environmental legislation/ federal government/ agricultural law/ waste disposal/ pollution control/ heavy metals/ water pollution/ literature reviews
Abstract: A greater focus on manure nutrient disposition from concentrated animal-feeding operations has developed from environmentalists, concerned citizens, and regulatory agencies. The establishment and enforcement of manure nutrient regulations will alter the future of livestock production. Proposed legislation and strategies may provide a false sense of security regarding environmental preservation or restoration and may impose monitoring and record keeping on the livestock operators. Existing regulations and proposed regulations and strategies are presented. Implications of legislation and proposed strategies, policies, and regulations are discussed. Livestock operations will need to comply with regulations to remain in business and to minimize environmental liability.
This citation is from AGRICOLA.

828. **Livestock waste facilities handbook.**
Midwest Plan Service. Livestock Wastes Subcommittee.
Ames, Iowa: Midwest Plan Service, Iowa State University; 112 p. (1993)
Notes: 3rd edition; Cover title.
NAL Call #: TD930-.L58-1993;
ISBN: 0893730890 (pbk.)
Descriptors: Animal waste/ Livestock Housing/ Animal waste---Recycling
Abstract: Recommendations, federal regulations, and design procedures for almost all manure handling and management alternatives for livestock today are discussed in this handbook, including scrape systems, gravity drain gutters, gravity flow channels, infiltration areas, and waste transfer to storage.

829. **The long-term effects of manures and fertilisers on soil productivity and quality: A review.**
Edmeades, D. C.
Nutrient Cycling in Agroecosystems 66 (2): 165-180. (June 2003)
NAL Call #: S631.F422;
ISSN: 1385-1314.
Notes: Number of References: 62
Descriptors: Agriculture/ Agronomy/ environment/ fertilisers/ manures/ organic/ productivity/ quality/ soils/ organic matter/ new zealand/ superphosphate fertilizer/ microbial biomass/ field experiments/ poultry litter/ phosphorus/ pasture/ runoff/ management
Abstract: The results from 14 field trials comparing the long-term (20 to 120 years) effects of fertilisers and manures (farmyard manure, slurry, and green manure) on crop production and soil properties are reviewed. In total there were 24 paired comparisons of the effects of manure and fertiliser. Some of the trials also contained a control (no nutrient inputs) treatment. The input of nutrients as either fertilisers or manures had very large effects (150-1000%) on soil productivity as measured by crop yields. Manured soils had higher contents of organic matter and numbers of microfauna than fertilised soils, and were more enriched in P, K, Ca and Mg in topsoils and nitrate N, Ca and Mg in subsoils. Manured soils also had lower bulk density and higher porosity, hydraulic conductivity and aggregate stability, relative to fertilised soils. However, there was no significant difference ($P < 0.05$) between fertilisers and manures in their long-term effects on crop production. In the context of this set of international trials, the recent evidence from the Rothamsted classical long-term trials appears to be exceptional, due to the larger inputs of manures and larger accumulation of soil OM in these trials. It is suggested therefore that manures may only have a benefit on soil productivity, over and above their nutrient content, when large inputs are applied over many years. The evidence from these trials also shows that, because the ratio of nutrients in manures is different from the ratio of nutrients removed by common crops, excessive accumulation of some nutrients, and particularly P and N, can arise from the long-term use of manures, relative to the use of fertilisers. Under these conditions greater runoff of P, and leaching of N may result, and for soils with low P retention and/or in situations where organic P is leached, greater P leaching losses may occur. The use of manures, relative to fertilisers, may also contribute to poor water quality by increasing its chemical oxygen demand. It is concluded therefore that it cannot generally be assumed that the long-term use of manures will enhance soil quality - defined in terms of productivity and potential to adversely affect water quality - in the long term, relative to applying the same amounts of nutrients as fertiliser.

830. **Long-term potential of conservation tillage on the Canadian prairies.**
Lafond, G. P. and Derksen, D. A.
Canadian Journal of Plant Pathology 18 (2): 151-158. (1996)
NAL Call #: SB599.C35;
ISSN: 0706-0661
This citation is provided courtesy of CAB International/CABI Publishing.

831. **A long-term, watershed-scale, evaluation of the impacts of animal waste BMPs on indicator bacteria concentrations.**
Inamdar SP; Mostaghimi S; Cook MN; Brannan KM; and McClellen PW
Journal of the American Water Resources Association 38 (3): 819-833; 35 ref. (2002)
NAL Call #: GB651.W315
This citation is provided courtesy of CAB International/CABI Publishing.

832. **Luminescence methods in pesticide analysis. Applications to the environment.**
Aaron, J J and Coly, A
Analusis 28 (8): 699-709. (2000)
NAL Call #: QD71.A52;
ISSN: 0365-4877
Descriptors: pesticides: analysis, detection/ environmental samples: chemical analysis/ photochemistry: applications
Abstract: Current luminescence-based methods for determining pesticides in different sample matrices are reviewed. The paper is devoted mainly to fluorimetric techniques with emphasis on the description of direct and indirect fluorimetric methods, including chemical and photochemical derivatization. The use of fluorescence detection in TLC, HPLC and FIA as well as applications to environmental samples is described. The potential of phosphorimetry for pesticide analysis is also presented. The main advantages and draw-backs of luminescence detection for pesticide determination are discussed.
© Thomson

833. **Major Herbicides in Ground Water: Results From the National Water-Quality Assessment.**
Barbash, J. E.; Thelin, G. P.; Kolpin, D. W.; and Gilliom, R. J.
Journal of Environmental Quality 30 (3): 831-845. (2001)
NAL Call #: QH540.J6;
ISSN: 0047-2425
Descriptors: USA/ Pollutant Identification/ Data Collections/ Databases/ Data Interpretation/ Groundwater Pollution/ Herbicides/ Spatial Distribution/ Water Quality Standards/ Hydrology/ Atrazine/ Agrochemicals/ Water sampling/ Basins/ cyanazine/ simazine/ alachlor/ acetochlor/ metolachlor/ Water quality/ Pollution surveys/ Pollutant persistence/ Agricultural pollution/ Public health/ Water supply/ United States/ Identification of pollutants/ Freshwater pollution/ Behavior and fate characteristics/ Public health/ medicines/ dangerous organisms
Abstract: To improve understanding of the factors affecting pesticide occurrence in ground water, patterns of detection were examined for selected herbicides, based primarily on results from the National Water-Quality Assessment (NAWQA) program. The NAWQA data were derived from 2227 sites (wells and springs) sampled in 20 major hydrologic basins across the USA from 1993 to 1995. Results are presented for six high-use herbicides--atrazine (2-chloro-4-ethylamino-6-isopropylamino-s-triazine), cyanazine (2-[4-chloro-6-ethylamino- 1,3,5-triazin-2-yl]amino]-2-methylpropionitrile), simazine (2-chloro-4,6-bis-[ethylamino]-s-triazine), alachlor (2-chloro-N-[2,6-diethylphenyl] -N-[methoxymethyl]acetamide), acetochlor (2-chloro-N-[ethoxymethyl]-N- [2-ethyl-6-methylphenyl]acetamide), and metolachlor (2-chloro-N-[2-ethyl-6-methylphenyl] -N-[2-methoxy-1-methylethyl]acetamide)--as well as for prometon (2,4-bis[isopropylamino]-6-methoxy-s-triazine), a nonagricultural herbicide detected frequently during the study. Concentrations were <1 mu g L super(-1) at 98% of the sites with detections, but exceeded drinking-water criteria (for atrazine) at two sites. In urban areas, frequencies of detection (at or above 0.01 mu g L super(-1)) of atrazine, cyanazine, simazine, alachlor, and metolachlor in shallow ground water were positively correlated with their nonagricultural use nationwide (P < 0.05). Among different agricultural areas, frequencies of detection were positively correlated with nearby agricultural use for atrazine, cyanazine, alachlor, and metolachlor, but not simazine. Multivariate analysis demonstrated that for these five herbicides, frequencies of detection beneath agricultural areas were positively correlated with their agricultural use and persistence in aerobic soil. Acetochlor, an agricultural herbicide first registered in 1994 for use in the USA, was detected in shallow ground water by 1995, consistent with previous field-scale studies indicating that some pesticides may be detected in ground water within 1 yr following application. The NAWQA results agreed closely with those from other multistate studies with similar designs.
© Cambridge Scientific Abstracts (CSA)

834. **Mammalian toxicology of organophosphorus pesticides.**
Sultatos, L. G.
Journal of Toxicology and Environmental Health 43 (3): 271-289. (Nov. 1994)
NAL Call #: RA565.A1J6;
ISSN: 0098-4108 [JTEHD6]
Descriptors: organophosphorus pesticides/ toxicity/ adverse effects/ acetylcholinesterase/ enzyme activity/ inhibition/ metabolism/ metabolites/ mammals/ toxicology/ carcinogenesis/ literature reviews/ metabolic activation
This citation is from AGRICOLA.

835. **Management and utilization of poultry wastes.**
Williams CM; Barker JC; and Sims JT
Reviews of Environmental Contamination and Toxicology 162: 105-157. (1999).
Notes: 16 pp. of ref
This citation is provided courtesy of CAB International/CABI Publishing.

836. **Management for butterflies in the northern Great Plains: A literature review and guidebook for land managers.**
Moffat, Mary.; McPhillips, Nell.; and U.S. Fish and Wildlife Service. Ecological Services. South Dakota State Office.
Pierre, S.D.: U.S Fish and Wildlife Service, Ecological Services, South Dakota State Office; i, 19 p. (1993)
Notes: Cover title. Shipping list no.: 93-0394-P. "March 1993." "SD-ES-93-05." Includes bibliographical references (p. 18-19). SUDOCS: I 49.6/2:B 97.
NAL Call #: QL551.A14M64--1993
Descriptors: Butterflies---Great Plains---Ecology---Handbooks, manuals, etc/ Butterflies---Great Plains---Effect of habitat modification on---Handbooks, manuals, etc/

Prairie ecology---Great Plains---Handbooks, manuals, etc
This citation is from AGRICOLA.

837. **Management guide for estimating nitrate and pesticide leaching potential.**
Illinois. Dept. of Agriculture; Illinois. Environmental Protection Agency; and United States. Soil Conservation Service.
Illinois: Illinois Dept. of Agriculture: Illinois Environmental Protection Agency; 17 p. (1997)
Notes: Cover title. "This project is a cooperation effort between the Illinois Department of Agriculture and the Illinois Environmental Protection Agency. Technical information and assistance provided by the USDA Soil Conservation Service"--P. 17.
NAL Call #: S592.6.P43-M36-1997
Descriptors: Soils---Pesticide content---Illinois---Measurement/ Soils---Nitrate content---Illinois---Measurement/ Soil management---Illinois
This citation is from AGRICOLA.

838. **Management of agricultural drainage water quality.**
Madramootoo, Chandra Alastair; Johnston, William R.; Willardson, Lyman S.; International Commission on Irrigation and Drainage; and Food and Agriculture Organization of the United Nations.
Rome: International Commission on Irrigation and Drainage; Food and Agriculture Organization of the United Nations; xii, 94 p.: ill.; Series: Water reports 1020-1203 (13). (1997)
Notes: Includes bibliographical references (p. 85-94).
NAL Call #: NBU TC812-M366-1997; TC812.M366-1997;
ISBN: 9251040583
http://www.fao.org/docrep/W7224E/W7224E00.htm
Descriptors: Irrigation---Management/ Drainage---Management/ Water quality
This citation is from AGRICOLA.

839. **Management of agricultural insects with physical control methods.**
Vincent, C.; Hallman, G.; Panneton, B.; and Fleurat Lessard, F.
Annual Review of Entomology 48: 261-281. (2003)
NAL Call #: 421-An72;
ISSN: 0066-4170 [ARENAA]
Descriptors: insect pests/ pest management/ integrated pest management/ insect control/ physical control/ control methods/ plant protection/ literature reviews/ passive-vs-active control methods
This citation is from AGRICOLA.

840. **Management of agricultural landscapes for the conservation of neotropical migratory birds.**
Koford, R. R. and Best, L. B.
In: Management of Midwestern landscapes for the conservation of neotropical migratory birds, General Technical Report NC-781/ Thompson, F. R. United States Department of Agriculture, Forest Service, North Central Experiment Station, 1996. pp. 68-88.
http://www.npwrc.usgs.gov/resource/othrdata/landscap/landscap.htm
Descriptors: Supporting science
Abstract: Discussed management strategies for the management of avian habitat in agricultural landscapes.

841. **Management of agroforestry for the conservation and utilization of land and water resources.**
Kiepe, P. and Rao, M. R.
Outlook on Agriculture 23 (1): 17-25. (1994)
NAL Call #: 10 Ou8;
ISSN: 0030-7270
This citation is provided courtesy of CAB International/CABI Publishing.

842. **Management of animal waste: Environmental health problems and technological solutions.**
El Ahraf, Amer. and Willis, William V.
Westport, Conn.: Praeger; xv, 185 p. (1996)
Notes: Includes bibliographical references (p. [145]-180) and index.
NAL Call #: TD932.E42--1996;
ISBN: 0275935299 (alk. paper)
Descriptors: Animal waste---Management/ Animal waste---Health aspects
This citation is from AGRICOLA.

843. **Management of excretion of phosphorus, nitrogen and pharmacological level minerals to reduce environmental pollution from animal production.**
Paik IK
Asian Australasian Journal of Animal Sciences 14 (3): 384-394; 39 ref. (2001)
NAL Call #: SF55.A78A7
This citation is provided courtesy of CAB International/CABI Publishing.

844. **Management of irrigation and drainage systems: A service approach.**
Malano, Hector M. and Hofwegen, Paul J. M. van.
Rotterdam; Brookfield, Vt.: A. A. Balkema; viii, 149 p.: ill.; Series: IHE monograph 3. (1999)
Notes: Includes bibliographical references (p. [145]-149).;
ISBN: 9054104821; 905410483X (pbk.)
Descriptors: Irrigation---Management/ Drainage---Management
This citation is from AGRICOLA.

845. **Management of livestock in riparian areas.**
Winward, A. H.
Natural Resources and Environmental Issues 1: 49-52. (1994);
ISSN: 1069-5370.
Notes: Proceedings of the symposium on riparian resources, 18-19 April 1991, Eccles Conference Center, Utah State University, Logan, Utah, USA
This citation is provided courtesy of CAB International/CABI Publishing.

846. **Management of phosphorus, potassium, and sulfur in intensive, irrigated lowland rice.**
Dobermann, A.; Cassman, K. G.; Mamaril, C. P.; and Sheehy, J. E.
Field Crops Research 56 (1/2): 113-138. (1998)
NAL Call #: SB183.F5;
ISSN: 0378-4290 [FCREDZ].
Notes: Special issue: Nutrient use efficiency in rice cropping systems / edited by K.G. Cassman and H.R. Lafitte. Includes references.
Descriptors: oryza sativa/ lowland areas/ irrigation/ intensive cropping/ crop management/ phosphorus/ potassium/ sulfur/ soil fertility/ crop yield/ agricultural production/ nutrient requirements/ nutrient deficiencies/ cultivars/ nutrient-nutrient interactions/ sustainability/ literature reviews
This citation is from AGRICOLA.

847. **Management of soil-borne plant pathogens with organic soil amendments: A disease control strategy salvaged from the past.**
Lazarovits G
Canadian Journal of Plant Pathology 23 (1): 1-7; 23 ref. (2001)
NAL Call #: SB599.C35
This citation is provided courtesy of CAB International/CABI Publishing.

848. **Management of threatened bird species: Evaluation of the hands-on approach.**
Cade, T. J. and Temple, S. A.
Ibis 137 (Supplement 1): S161-S172. (1995);
ISSN: 0963-0856.
Notes: Conference: British Ornithologists' Union Conference on Bird Conservation: The Science and the Action, Shuttleworth College, Bedford (UK), 6-10 Apr 1994
Descriptors: Aves/ endangered species/ resource management/ methodology/ Methodology general/ Conservation/ Birds
Abstract: Intensive manipulations of rare birds can be important conservation tools when traditional management practices, such as legal protection and habitat preservation, are insufficient to halt population declines and save endangered species from extinction. Nonetheless, this "hands-on" methodology has been criticized as scientifically unsound, ineffective, costly and a diversion from preservation of habitats and ecosystems. We consider the effectiveness of manipulative management by reviewing 30 presentations at the Symposium on Management Techniques for Preserving Endangered Birds in 1977. Examination of the outcome of these efforts in 1993 indicates that 43% have contributed to improved population viability through an increase in breeding numbers, another 23% have helped to stabilize numbers or to slow the rate of population decline, while the outcome of five others (17%) is inconclusive, and the same number ended in failure. Our evaluation of these and other similar projects is that the hands-on approach has proved to be a justified and effective stopgap procedure to help critically endangered species through a crisis, to reintroduce species into previously occupied range and to reinforce locally diminished populations. As such, it often needs to be part of an integrated program for avian conservation.

849. **Management of water and nitrogen in high density apple orchards.**
Neilsen, D.; Neilsen, G. H.; Guak, S.; Parchomchuk, P.; and Hogue, E. J.
Compact Fruit Tree 35 (3): 92-96. (2002)

850. **Management options to limit nitrate leaching from grassland.**
Cuttle, S P and Scholefield, D
Journal of Contaminant Hydrology 20 (3-4): 299-312. (1995);
ISSN: 0169-7722
Descriptors: clover (Leguminosae)/ livestock (Mammalia Unspecified)/ Bovidae (Bovidae)/ Gramineae (Gramineae)/ angiosperms/ animals/ artiodactyls/ chordates/ dicots/ mammals/ monocots/ nonhuman mammals/ nonhuman vertebrates/ plants/ spermatophytes/ vascular plants/ vertebrates/ nitrate/ nitrogen/ nitrogen fixation/ fertilizer/ grazing/ manure production/ mineralization
Abstract: Nitrate leaching can be reduced by the adoption of less intensive grassland systems which, though requiring a greater land area to achieve the same agricultural output, result in less nitrate leaching per unit of production than do intensively managed grasslands. The economic penalties associated with reductions in output can be partly offset by greater reliance on symbiotic nitrogen fixation and the use of clover-based swards in place of synthetic N fertilisers. Alternatively, specific measures can be adopted to improve the efficiency of nitrogen use in intensively managed systems in order to maintain high outputs but with reduced losses. Controls should take account of other forms of loss and flows of nitrogen between grassland and other components of the whole-farm system and, in most instances, should result in an overall reduction in nitrogen inputs. Removing stock from the fields earlier in the grazing season will reduce the accumulation of high concentrations of potentially leachable nitrate in the soil of grazed pastures but will increase the quantity of manure produced by housed animals and the need to recycle this effectively. Supplementing grass diets with low-nitrogen forages such as maize silage will reduce the quantity of nitrogen excreted by livestock but may increase the potential for nitrate leaching elsewhere on the farm if changes to cropping patterns involve more frequent cultivation of grassland. Improved utilisation by the sward of nitrogen in animal excreta and manures and released by mineralisation of soil organic matter will permit equivalent reductions to be made in fertiliser inputs, provided that adequate information is available about the supply of nitrogen from these non-fertiliser sources.

851. **Management practices and soil biota.**
Roper, M M and Gupta, V V S R
Australian Journal of Soil Research 33 (2): 321-339. (1995)
NAL Call #: 56.8 Au7;
ISSN: 0004-9573
Descriptors: bacteria (Bacteria General Unspecified)/ fungi (Fungi Unspecified)/ microbes (Microorganisms Unspecified)/ protozoa (Protozoa Unspecified)/ Animalia (Animalia Unspecified)/ Protozoa (Protozoa Unspecified)/ animals/ bacteria/ eubacteria/ fungi/ invertebrates/ microorganisms/ nonvascular plants/ plants/ protozoans/ disease/ ecosystem function/ macro fauna/ meso fauna/ organic matter decomposition/ pesticide use/ soil structure/ tillage

852. **The Management Systems Evaluation Areas Program: Tillage and water quality research.**
Ward, A. D.; Hatfield, J. L.; Lamb, J. A.; Alberts, E. E.; Logan, T. J.; and Anderson, J. L.
Soil and Tillage Research 30 (1): 49-74. (1994)
NAL Call #: S590.S48;
ISSN: 0167-1987

853. **Managing diffuse environmental contamination from agricultural pesticides: An economic perspective on issues and policy options, with particular reference to Europe.**
Falconer, K E
Agriculture, Ecosystems and Environment 69 (1): 37-54. (1998)
NAL Call #: S601 .A34;
ISSN: 0167-8809
Descriptors: agricultural pesticide/ diffuse environmental contamination/ economics/ pest control/ policy options/ resource management
Abstract: There are widely held

concerns over environmental contamination from agricultural pesticide applications, and a current policy objective in many Western European countries is to reduce usage levels. However, it appears that existing arrangements to control usage, and thence contamination, are inadequate to achieve the levels of environmental quality currently demanded; policy innovation and reform are needed. This review examines some of the problems of controlling pesticide contamination, and the potential policy instruments for achieving pesticide use reduction for environmental improvement. Particular attention is given to the role of market mechanisms to achieve environmental policy aims, especially through the introduction of financial incentives for producers to switch to integrated pest management practices involving the use of less pesticides. Instruments such as input taxes seem administratively and politically feasible, but need careful design and implementation if environmental objectives with regard to pesticides are to be achieved. Environmental economics can make an important contribution to practical agri-environmental resource management if linked with more explicit acknowledgement of the characteristics of agro-ecosystems.
© Thomson

854. **Managing drinking water supplies.**
Cooke, G Dennis and Kennedy, Robert H
Lake and Reservoir Management 17 (3): 157-174. (2001)
NAL Call #: TC401.L3;
ISSN: 1040-2381
Descriptors: algal toxins: pollutant, toxin/ disinfection by products [DBPs]: formation, pollutant, toxin/ drinking water supplies: management/ ecotoxicology/ eutrophication/ odor problems/ reservoir management/ source water quality/ trophic conditions/ water taste/ watershed management
Abstract: Efforts to provide safe drinking water cannot begin at the treatment plant. Processes occurring in the watershed can adversely influence drinking water reservoirs, and understanding linkages between these processes and reservoir water quality provides the basis for protecting or improving source water quality. Since the presence of molecules responsible for taste, odor and algal toxin problems, and for the formation of disinfection by-products (DBP) is often related to reservoir trophic conditions, sound and cost-effective water treatment approaches must include considerations for reservoir management. Source water management efforts should include both watershed management, as a means to reduce the loading of materials to the reservoirs, and in-reservoir treatments that ameliorate or minimize the symptoms of eutrophication. Discussed here are considerations for maintaining safe drinking water, water, quality assessment approaches, and common methods for managing reservoir water quality.
© Thomson

855. **Managing farming systems for nitrate control: A research review from management systems evaluation areas.**
Power, J. F.; Wiese, R.; and Flowerday, D.
Journal of Environmental Quality 30 (6): 1866-1880. (2001)
NAL Call #: QH540.J6;
ISSN: 0047-2425
This citation is provided courtesy of CAB International/CABI Publishing.

856. **Managing for biodiversity conservation in native grasslands on farms.**
Dorrough, J.; Turner, V.; Yen, A.; Clark, S.; Crosthwaite, J.; and Hirth, J.
Wool Technology and Sheep Breeding 50 (4): 760-765. (2002);
ISSN: 0043-7875
This citation is provided courtesy of CAB International/CABI Publishing.

857. **Managing high selenium in agricultural drainage water by agroforestry systems: Role of selenium volatilization.**
Terry, Norman.; Lin, Zhiqing.; and University of California, Berkeley. Dept. of Plant and Microbial Biology. California. Office of Water Conservation.
Berkeley, CA: Dept. of Plant and Microbial Biology, University of California, Berkeley; 59, 9 p.: ill., maps. (1999)
Notes: Cover title. "March 1999." "State of California, Department of Water Resources, Division of Local Assistance, Water Conservation Office." Includes bibliographical references. DWR B-80665.
NAL Call #: TD224.C2-T47-1999
Descriptors: Water---Pollution---California/ Selenium/ Agroforestry systems---California
This citation is from AGRICOLA.

858. **Managing large-scale application of pesticides to prevent contamination of drinking water.**
United States. Environmental Protection Agency. Office of Water.
Washington, D.C.: Environmental Protection Agency, Office of Water; Series: Source water protection practices bulletin. (2001)
Notes: Title from web page. "July 2001." "EPA 916-F-01-030." Description based on content viewed July 10, 2002. Includes bibliographical references.
NAL Call #: TD370-.M362-2001
http://www.epa.gov/safewater/protect/pdfs/lspesticides.pdf
Descriptors: Water quality management/ Wellhead protection/ Pesticides---Environmental aspects/ Drinking water---Contamination---Prevention
This citation is from AGRICOLA.

859. **Managing livestock, poultry, and horse waste to prevent contamination of drinking water.**
U.S. Environmental Protection Agency, Office of Water.
U.S. Environmental Protection Agency [Also available as: EPA 916-F-01-026], 2001 (application/pdf)
NAL Call #: TD930.2 .M36 2001
http://www.sonoma-horse-council.com/ACRSD%20docs/epa_swp_livestock.pdf
Descriptors: Animal waste---United States---Management/ Animal industry---Waste disposal---United States/ Feedlot runoff---United States---Management/ Wellhead protection---United States/ Water quality management---United States/ Water---Pollution---United States
This citation is from AGRICOLA.

860. **Managing manure nutrients through multi-crop forage production.**
Newton, G. L.; Bernard, J. K.; Hubbard, R. K.; Allison, J. R.; Lowrance, R. R.; Gascho, G. J.; Gates, R. N.; and Vellidis, G.
Journal of Dairy Science 86: 2243-2252. (2003)
NAL Call #: 44.8 J822;
ISSN: 0022-0302.
Notes: Number of References: 66
Descriptors: Food Science/ Nutrition/

manure/ forages/ water quality/ riparian buffers/ water quality/ dairy manure/ agricultural watersheds/ management strategies/ riparian forest/ nitrogen/ impacts/ wetland/ compost/ farms
Abstract: Concentrated sources of dairy manure represent significant water pollution potential. The southern United States may be more vulnerable to water quality problems than some other regions because of climate, typical farm size, and cropping practices. Dairy manure can be an effective source of plant nutrients and large quantities of nutrients can be recycled through forage production, especially when multi-cropping systems are utilized. Linking forage production with manure utilization is an environmentally sound approach for addressing both of these problems. Review of two triple-crop systems revealed greater N and P recoveries for a corn silage-bermudagrass hay-rye haylage system, whereas forage yields and quality were greater for a corn silage-corn silage-rye haylage system, when manure was applied at rates to supply N. Nutrient uptake was lower than application during the autumn-winter period, and bermudagrass utilized more of the remaining excess than a second crop of corn silage. Economic comparison of these systems suggests that the added value of the two corn silage crop system was not enough to off-set its increased production cost. Therefore, the system that included bermudagrss demonstrated both environmental and economic advantages. Review of the N and P uptake and calculated crop value of various single, double, and triple crop forage systems indicated that the per hectare economic value as well as the N and P uptakes tended to follow DM yields, and grasses tended to out-perform broadleaf forages. Taken across all systems, systems that included bermudagrass tended to have some of the highest economic values and uptakes of N and P. Manure applied at rates to supply N results in application of excess P, and production will not supply adequate quantities of forage to meet the herd's needs. Systems that lower manure application and supply supplemental N to produce all necessary forage under manure application will likely be less economically attractive due to additional costs of moving manure further and applying it to greater land areas, but will be environmentally necessary in most cases. Intensive forage systems can produce acceptable to high quality forage, protect the environment, and be economically attractive. The optimal manure-forage system will depend on the farm characteristics and specific local conditions. Buffers and nutrient sinks can protect streams and water bodies from migrating nutrients and should be included as a part of crop production systems.

861. **Managing nitrogen for water quality: Lessons from management systems evaluation area.**
Power, J. F.; Wiese, R.; and Flowerday, D.
Journal of Environmental Quality 29 (2): 355-366. (Mar. 2000-Apr. 2000)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA]
Descriptors: nitrate/ nitrate nitrogen/ leaching/ water quality/ water management/ water pollution/ pollution control/ north central states of USA/ fertilizer management
Abstract: The Management Systems Evaluation Area (MSEA) project was initiated in 1990 to evaluate existing and develop new N management technologies to reduce the potential adverse impacts of agricultural practices on surface and ground water quality. Field research sites were established in nine Midwestern states. Results from MSEA research showed that nitrate leaching was greatly reduced by changing from furrow to sprinkler irrigation. At least 95% of the nitrate N percolating through tiled soils was intercepted and discharged into surface waters. Computer models indicated that routing tile discharge through wetlands would greatly reduce the nitrate load. Nitrate losses also were reduced by establishing controlled water tables using drainage lines for subirrigation. Preplant and presidedress soil nitrate tests were effective in determining proper N fertilizer rates and reducing nitrate losses. Banding ammoniated fertilizers slowed nitrification rates and nitrate leaching, especially if soil over the bands was packed. A major new technology was proof that crop greenness can be used to monitor crop N sufficiency, and that N deficiencies after the V8 stage can be corrected by sidedressing or fertigation (reactive N management). Inexpensive sensors or aerial photographs can be used to assess crop greenness. Using Global Positioning Systems (GPS), N-deficient areas of the field can be managed differently from the remainder of the field. These results point to the need to develop site-specific or precision farming systems to control nitrate losses to water resources and reduce the impact of natural variability in both soils and weather.
This citation is from AGRICOLA.

862. **Managing North American waterfowl in the face of uncertainty.**
Nichols, J. D.; Johnson, F. A.; and Williams, B. K.
Annual Review of Ecology and Systematics 26: 177-199. (1995)
NAL Call #: QH540.A55;
ISSN: 0066-4162 [ARECBC]
Descriptors: waterfowl/ anatidae/ population dynamics/ wildlife conservation/ wildlife management/ hunting/ reviews/ decision making/ objectives/ North America/ adaptive management
This citation is from AGRICOLA.

863. **Managing nutrients across regions of the United States.**
Nelson, C J
Journal of Animal Science 77 (2 [supplement]): 90-101. (1999)
NAL Call #: 49 J82;
ISSN: 0021-8812
Descriptors: nitrogen / phosphorus/ livestock (Mammalia)/ Animals/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ climate variation/ geographic differences/ nutrient management guidelines/ soil/ watershed/ Clean Water Action Plan
Abstract: Nutrient balance in the ecosystem involves profitability of the agricultural enterprise and commitments to resource management to maintain quality of air, water, and land resources. Phosphorus and N are the two nutrients of major concern, and they behave differently in soils. Most P adheres strongly to soil particles and moves laterally with the soil during erosion processes, but with high concentrations more P remains in soluble forms and moves in the water fraction. Most N is soluble and moves laterally or downward with soil water. Soil scientists and agronomists have researched soil processes, plant

nutrition, cropping systems, and water quality issues mainly on a field and farm level, but now the movement is to management and regulation of nonpoint problems on a watershed basis as proposed in the Clean Water Action Plan. The plan recognizes the vast diversity of soil parent materials and climates among geographic areas, even among and within watersheds, that determine crop adaptation and cropping systems, the role of states in regulatory processes, and the need for local citizens to have operational involvement. This process insures that nutrient management guidelines will be more site-specific and solutions can be focused on the direct problem. Directed efforts will be needed to educate local citizens, landowners, and caretakers of agricultural enterprises, and regulatory agencies. Several factors, including economic and social incentives for implementation must be considered along with the technologies available. The solutions are multidisciplinary, will require long-term research to accommodate climate variation, and should be associated with a strong commitment to education. Public funding will be needed to support the effort.

864. **Managing nutrients in manure: General principles and applications to dairy manure in New York.**
Bouldin, D. R. and Klausner, S. D.
In: Animal waste utilization: Effective use of manure as a soil resource/ Hatfield, J. L. and Stewart, B. A., 1998; pp. 65-88
NAL Call #: S655.A57 1998
This citation is provided courtesy of CAB International/CABI Publishing.

865. **Managing runoff following manure application.**
Gilley, J. E.; Risse, L. M.; and Eghball, B.
Journal of Soil and Water Conservation 57 (6): 530-533. (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: animal manures/ application to land/ pollution control/ runoff/ losses from soil/ contour cultivation/ grass strips/ ponds/ sediment/ crop management/ terraces/ terracing/ strip cropping/ sediment trapping ponds
This citation is from AGRICOLA.

866. **Managing Saskatchewan rangeland.**
Saskatchewan. Agriculture and Food.
Saskatchewan, Canada: Saskatchewan Agriculture and Food; 99 p.: ill. (some col.), col. map. (1995)
Notes: Rev. ed.; Cover title. "Saskatchewan Agriculture and Food ... [et al.]"--Cover p. [4]. Includes bibliographical references.
NAL Call #: SF84.4.M36--1995
Descriptors: Range management--- Saskatchewan
This citation is from AGRICOLA.

867. **Managing soil biophysical properties for environmental protection.**
Stepniewski, W.; Horn, R.; and Martyniuk, S.
Agriculture, Ecosystems and Environment 88 (2): 175-181. (Feb. 2002)
NAL Call #: S601-.A34;
ISSN: 0167-8809 [AEENDO].
Notes: Special issue: Soil health as an indicator of sustainable management / edited by J.W. Doran and S.I. Stamatiadis. Paper presented at a workshop held June 24-25, 1999, Athens/Kifissia, Greece.
Includes references.
Descriptors: soil/ environmental protection/ soil physical properties/ soil biology/ quality/ soil management/ soil chemistry/ biochemistry/ movement in soil/ permeability/ diffusivity/ methane/ soil air/ oxygen/ nitrogen/ nitrous oxide/ temporal variation/ clay fraction/ sesquioxides/ solubility/ nutrient availability/ literature reviews
Abstract: The aim of the paper is to show a possibility of management of soil physical properties for environmental protection. In order to do this a proposal for classification of soil properties into such groups as: physical, chemical, biological, physicochemical, biochemical, and biophysical has been presented. A special emphasis was placed on the physical and biophysical properties. The physical properties were subdivided into capacity and intensity parameters. The capacity parameters cannot be used for the definition of any soil or site specific process since they only define, e.g. the amount of soil mass per volume as the bulk density, but not the arrangement of the mass in the volume. Biophysical soil properties are related to the links between physical and biological fluxes. These fluxes are the consequence of gradients caused by biological sources/sinks and by the transport parameters (conductivity, permeability, diffusivity). In addition, it is also necessary to consider the various phases existing in the soil. Thus, in the gas phase, the biophysical fluxes concern CH4, CO2, O2, N2, N2O, etc. They are described by the Fick's law, in which the driving force of the flux is the concentration change in space and time (deltaC/deltax, t) and by the Darcy's law, where the driving force is the pressure change in space and time (deltap/deltax, t). In the liquid phase, there are such flux phenomena as advection and diffusion, described by Darcy's and Fick's laws with pressure (deltap/deltax, t) and concentration (deltaC/deltax, t) gradients as the driving forces. The biophysical phenomena in the solid phase are related, e.g. migration of organic matter, clay particles, sesquioxides, solubility and. re-precipitation of minerals, etc. A special group of biophysical phenomena is related to the heat transfer driven by the temperature gradient variable in time (deltaT/deltax, t) and described by the Fourier's law. The biophysical soil properties are important from the environmental point of view, as they are decisive for absorption/emission of oxygen, carbon dioxide, methane, nitrous oxide, NO(x), etc. in the soil. Biophysical processes are also essential for functioning of a soil as a biofilter for solids, liquids, and gases. A general example of the role of soil biophysical processes in determination of efficiency of methane oxidation in soil layers, usually, covering re-cultivated municipal landfills, is presented. The example shows a great potential for management of these properties for the protection of the environment.
This citation is from AGRICOLA.

868. **Managing soil denitrification.**
Mosier, A. R.; Doran, J. W.; and Freney, J. R.
Journal of Soil and Water Conservation 57 (6): 505-512. (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: denitrification/ denitrifying microorganisms/ nitrous oxide/ emission/ losses from soil/ nitrification/ soil bacteria/ soil biology/ soil pore system/ soil water/ soil water filled pore space
This citation is from AGRICOLA.

869. **Managing soil fertility decline.**
Campbell, L. C.
Journal of Crop Production 1 (2): 29-52. (1998)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Nutrient Use in Crop Production / edited by Z. Rengel. Includes references.
Descriptors: soil fertility/ soil degradation/ plants/ production/ overgrazing/ immobilization/ volatilization/ leaching/ erosion/ intensive husbandry/ fertilizers/ liming/ acidification/ fallow/ rotations/ agricultural policy/ sustainability/ literature reviews
This citation is from AGRICOLA.

870. **Managing soils to achieve greater water use efficiency: A review.**
Hatfield, J. L.; Sauer, T. J.; and Prueger, J. H.
Agronomy Journal 93 (2): 271-280. (Mar. 2001-Apr. 2001)
NAL Call #: 4-AM34P;
ISSN: 0002-1962 [AGJOAT].
Notes: Paper presented at the symposium "Improving crop water use efficiency and yield: Management influences" held November 2, 1999, Salt Lake City, Utah.
Includes references.
Descriptors: soil management/ water use efficiency/ water availability/ irrigation/ farming systems/ evapotranspiration/ soil water content/ air/ soil fertility/ nitrogen/ phosphorus/ plant physiology/ tillage/ literature reviews
Abstract: Water use efficiency (WUE) represents a given level of biomass or grain yield per unit of water used by the crop. With increasing concern about the availability of water resources in both irrigated and rainfed agriculture, there is renewed interest in trying to develop an understanding of how WUE can be improved and how farming systems can be modified to be more efficient in water use. This review and synthesis of the literature is directed toward understanding the role of soil management practices for WUE. Soil management practices affect the processes of evapotranspiration by modifying the available energy, the available water in the soil profile, or the exchange rate between the soil and the atmosphere. Plant management practices, e.g., the addition of N and P, have an indirect effect on water use through the physiological efficiency of the plant. A survey of the literature reveals a large variation in measured WUE across a range of climates, crops, and soil management practices. It is possible to increase WUE by 25 to 40% through soil management practices that involve tillage. Overall, precipitation use efficiency can be enhanced through adoption of more intensive cropping systems in semiarid environments and increased plant populations in more temperate and humid environments. Modifying nutrient management practices can increase WUE by 15 to 25%. Water use efficiency can be increased through proper management, and field-scale experiences show that these changes positively affect crop yield.
This citation is from AGRICOLA.

871. **Managing water in plant nurseries: A guide to irrigation, drainage and water recycling in containerised plant nurseries.**
Rolfe, Chris; Yiasoumi, William.; Keskula, Edda.; and NSW Agriculture.
New South Wales: NSW Agriculture; vii, 279 p.: ill. (some col.). (2000)
Notes: 2nd ed.; Includes bibliographical references (p. 265-266) and index.
NAL Call #: SB118.5-.M35-2000;
ISBN: 0734711808
Descriptors: Nursery stock---Irrigation/ Plants, Potted---Irrigation/ Drainage---Management/ Water reuse/ Nurseries---Horticulture---Management/ Nurseries---Horticulture---Environmental aspects/ Water in agriculture/ Potted plant industry---Environmental aspects/ Environmental protection
This citation is from AGRICOLA.

872. **Manipulation of animal diets to affect manure production, composition and odor: State of the science.**
Sutton, A.; Applegate, T.; Hankins, S.; Hill, B.; Allee, G.; Greene, W.; Kohn, R; Meyer D; Powers, W. J.; and Kempen, T. van
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

873. **Manure and microbes: Public and animal health problem?**
Pell AN
Journal of Dairy Science 80 (10): 2673-2681; 60 ref. (1997)
NAL Call #: 44.8 J822
This citation is provided courtesy of CAB International/CABI Publishing.

874. **Manure and wastewater management for cattle feedlots.**
Sweeten, J. M.
Reviews of Environmental Contamination and Toxicology 167: 121-153. (2000)
NAL Call #: TX501.R48;
ISSN: 0179-5953 [RCTOE4]
Descriptors: cattle manure/ runoff/ waste utilization/ application to land/ pollution control/ water quality/ water pollution/ literature reviews
This citation is from AGRICOLA.

875. **Manure characteristics.**
Lorimor, Jeffery.
Ames, Iowa: Iowa State University; Series: Manure management systems series MWPS-1; 23 p.: ill. (2000)
Notes: Includes bibliographical references (p. [24]).
NAL Call #: S655-.M35-2000
Descriptors: Farm manure/ Farm manure---Composition
Abstract: The publication provides up-to-date information about all aspects of solid, semi-solid, slurry, and liquid manure handling characteristics. It also contains extensive information about sampling and testing manure and about nutrient content.

876. **Manure management: A systems approach.**
Grusenmeyer, D. C. and Cramer, T. N.
Journal of Dairy Science 80 (10): 2651-2654. (1997)
NAL Call #: 44.8 J822;
ISSN: 0022-0302
This citation is provided courtesy of CAB International/CABI Publishing.

877. **Manure management alternatives: A supplemental manual.**
Kittelson, John.; Woodward Clyde Consultants; and Minnesota. Dept. of Agriculture
St. Paul, Minn.: Minnesota Dept. of Agriculture; iv, 52 p.: ill. (1995)
Notes: Cover title. "June 1995"--P. [iv]. Prepared by Woodward-Clyde Consultants: John Kittelson ... [et al.]; with assistance from Robert Mensch of Mensch Engineering; Contents note: Composting -- Vegetative filter strips -- Mechnical separation -- Anaerobic digestion -- Gasification -- Order prevention, reduction and control alternatives.
NAL Call #: TD811.M37--1995
Descriptors: Farm manure---Minnesota/ Farm manure---Environmental aspects---Minnesota
This citation is from AGRICOLA.

878. **Manure management for minor classes of livestock in the United States.**
Power, J. F. and Eghball, B.
Journal of Soil and Water Conservation 49 (2): 123-125. (1994)
NAL Call #: 56.8 J822;
ISSN: 0022-4561
This citation is provided courtesy of CAB International/CABI Publishing.

879. **Manure management in harmony with the environment and society: Manure Management 1998.**
Manure Management in Harmony with the Environment and Society and Soil and Water Conservation Society (U.S.).
Ankeny, Iowa: Soil and Water Conservation Society; v, 417 p.: ill. (1998)
Notes: Extended abstracts of papers and posters presented at Manure Management in Harmony with the Environment and Society held in 1998 at Ames, Iowa.
NAL Call #: S655-.M363-1998
Descriptors: Manure handling---Environmental aspects---Congresses/ Manures---Environmental aspects---Congresses/ Agricultural wastes---Environmental aspects---Congresses/ Animal waste---Environmental aspects---Congresses
This citation is from AGRICOLA.

880. **Manure management strategies/ technologies.**
Lorimore, J.; Fulhage, C.; Zhang, R. H.; Funk, T; Sheffield, R.; Sheppard, D. C.; and Newton, G. L.
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

881. **Manure management system design strategies: How and why.**
Moore, J. A. and Hart, J. M.
Journal of Dairy Science 80 (10): 2655-2658. (1997)
NAL Call #: 44.8 J822;
ISSN: 0022-0302
This citation is provided courtesy of CAB International/CABI Publishing.

882. **Manure management: Treatment strategies for sustainable agriculture.**
Burton, C. H.; xiv, 181 p. (1997)
NAL Call #: S655.M362-1997;
ISBN: 0-9531282-0-2
This citation is provided courtesy of CAB International/CABI Publishing.

883. **Manure storage and treatment alternatives: Environmentally assured.**
McGuire, Kellie. and National Pork Producers Council (U.S.).
Des Moines, Iowa: National Pork Producers Council; 220 p. in various pagings: ill. (1997)
Notes: Cover title. "Environmentally assured"--cover. "Environmental Assurance Program (EAP)." Includes bibliographical references.
NAL Call #: TD930-.M363-1997
Descriptors: Swine---Manure---Handling/ Swine---Manure---Environmental aspects/ Animal waste---Environmental aspects/ Farm manure, liquid---Environmental aspects/ Compost
This citation is from AGRICOLA.

884. **Manure Storages.**
Fulhage, C.; Hoehne, J.; Jones, D.; and Koelsch, R.
Ames, Iowa: Midwest Plan Service, Iowa State University; Series: MWPS-18, S2; 117 p. (2001);
ISBN: 0-89373-080-7
Descriptors: animal manures/ animal manure management/ manure storage/ runoff/ waste lagoons
Abstract: Chapters include: Selecting a Manure Storage; Sizing Storages and Runoff Control; Siting and Site Preparation; Constructing Earthen Impoundments; Monitoring and Managing; and Abandonment and Closure of Earthen Impoundment Storages. The publication provides up-to-date information on manure storage facilities and considerations for their design. It is a valuable resource for livestock and poultry producers, engineers, cooperative extension agents, consultants working on manure management systems, and employees of regulatory agencies.

885. **Mass reduction of standing and flat crop residues by selected tillage implements.**
Wagner, L. E. and Nelson, R. G.
Transactions of the ASAE 38 (2): 419-427. (Mar. 1995-Apr. 1995)
NAL Call #: 290.9-Am32T;
ISSN: 0001-2351 [TAAEAJ]
Descriptors: zea mays / wheat/ crop residues/ disc harrows/ tillage/ plows/ literature reviews/ erosion control
Abstract: Field data were collected to determine the mass reduction of standing residue by selected tillage operations and to develop a set of coefficients that could represent changes in mass between standing, flat, and buried residue pools caused by those tillage operations. Tillage implements used in this study were tandem-disk harrows, chisel plows, and wide-sweep plows. A range of pre-tillage corn and wheat residue conditions were studied, with standing and flat residue pools sampled separately before and after each tillage operation. The data show that 7% of standing corn residue was flattened with a wide-sweep plow, 89 to 100% with tandem-disk harrows, 29% with a straight-shank chisel plow, and 76% with a twisted-point chisel plow. Wheat residue data indicated that 53 to 55% of the standing residue was flattened with the wide-sweep plows, 86% for a wide-sweep plow

outfitted with a rolling harrow treader attachment, and 86 to 95% for the tandem-disk harrows. The two straight-shanked chisel plows, one outfitted with a drag harrow attachment using coil-spring wire teeth and one without an attachment, flattened 90% and 22% of the standing wheat residue, respectively. A set of transfer equations also was developed to represent changes in mass between standing, flat, and buried residue pools from tillage operations. Only three coefficients (flattening, burial, and surfacing) are necessary to describe the transfer of mass from one residue pool to another. Coefficient values, determined via a constrained optimization procedure, are presented for each tillage implement on both corn and wheat residues.
This citation is from AGRICOLA.

886. **Mass transfer of pesticides into the atmosphere by volatilization from soils and plants: Overview.**
Bedos, Carole; Cellier, Pierre; Calvet, Raoul; Barriuso, Enrique; and Gabrielle, Benoit
Agronomie 22 (1): 21-33. (2002)
NAL Call #: SB7.A3;
ISSN: 0249-5627
Descriptors: fonofos: volatilization/ pesticides: physico chemical characteristics, volatilization/ prometon: volatilization/ plant (Plantae): crop / Plants/ atmosphere/ crop management practices/ environmental conditions/ mass transfer/ soil
Abstract: Volatilization may represent a major dissipation pathway for pesticides applied to soils or crops, accounting for up to 90% of the application dose in some cases. This paper collects and discusses recent data in the literature about this process. On the day of application, pesticide volatilization rates ranged from 0.1 gcntdotha-1cntdoth-1 for prometton compound to 80 gcntdotha-1cntdoth-1 for fonofos, for example. In general, pesticides are volatilized from plant surfaces to a greater extent and faster than from the soil. Volatilization continues for from a few days to several weeks (or sometimes even more), occasionally displaying a diurnal cycle. According to the experimental studies reported in the literature, the main factors affecting this process during the first few days after treatment have been identified as follows: the physico-chemical characteristics of the compound and the environmental conditions (temperature, soil moisture, nature of the soil or the crop) are key parameters, along with management practices.
© Thomson

887. **Materials for subsurface land drainage systems.**
Stuyt, L. C. P. M.; Dierickx, W.; Martinez Beltran, J.; and Food and Agriculture Organization of the United Nations.
Rome: Food and Agriculture Organization of the United Nations; xiv, 183 p.: ill.; Series: FAO irrigation and drainage paper 0254-5284 (60). (2000)
Notes: Includes bibliographical references (p. 119-130).
NAL Call #: S612-.I754-no.-60;
ISBN: 9251044260
Descriptors: Subsurface drainage--- Materials
This citation is from AGRICOLA.

888. **Maximising water-use efficiency for sustainable crop production in arid ecosystem.**
Singh, Y. V.
In: Recent advances in management of arid ecosystem: Proceedings of a symposium held in India, March 1997. Faroda, A. S.; Joshi, N. L.; Kathju, S.; and Amal, K. (eds.); pp. 427-434; 1999.
Notes: Other number: 81-901024-0-0181-7233-217-3
This citation is provided courtesy of CAB International/CABI Publishing.

889. **Maximizing the economic and environmental benefit of land application of animal manures: Final report.**
University of Saskatchewan. Canada Saskatchewan Agri Food Innovation Fund.
Saskatchewan: Agri-Food Innovation Fund; 1 v. (unpaged): ill. (2001)
Notes: Cover title. "June 2001." "102-03852"--Mounted on label. "19960131."
NAL Call #: S655-.M39-2001
Descriptors: Cattle Manure--- Saskatchewan/ Swine---Manure--- Saskatchewan/ Manure handling--- Saskatchewan
This citation is from AGRICOLA.

890. **The Measurement of River Bank Erosion and Lateral Channel Change: A Review.**
Lawler, D. M.
Earth Surface Processes and Landforms 18 (9): 777-821. (1993);
ISSN: 0197-9337
Descriptors: rivers/ bank erosion/ erosion rates/ river mechanics/ channel morphology/ meanders/ river banks/ fluvial morphology/ channels/ Erosion and sedimentation/ Topography and morphology
Abstract: A detailed review and chronological survey is presented of the various techniques which have been used for the measurement of river bank erosion and channel change. The techniques are classified according to the time scales involved (long, intermediate and short) and each is discussed with respect to accuracy and repeatability. The methods covered include sedimentological evidence, botanical evidence, historical sources, planimetric resurvey, repeated cross-profiling, erosion pins and terrestrial photogrammetry. Prospects for future developments are also discussed.
© Cambridge Scientific Abstracts (CSA)

891. **Measuring biodiversity value for conservation.**
Humphries, C. J.; Williams, P. H.; and Vane Wright, R. I.
Annual Review of Ecology and Systematics 26: 93-111. (1995)
NAL Call #: QH540.A55;
ISSN: 0066-4162 [ARECBC]
Descriptors: species diversity/ wildlife/ wildlife conservation/ zoogeography/ reviews/ species richness
This citation is from AGRICOLA.

892. **Mechanisms, rates and assessment of N2O in groundwater, riparian zones and rivers.**
Groffman, P. M.; Gold, A. J.; Kellogg, D. Q.; and Addy, K.
In: Non-CO2 greenhouse gases: Scientific understanding, control options and policy aspects: Proceedings of the Third International Symposium. (Held 21 Jan 2002-23 Jan 2002 at Maastricht, Netherlands.) Ham, J. van; Baede, A. P. M.; Guicherit, R.; and Williams-Jacobse, J. G. (eds.)

Rotterdam, Netherlands: Millpress Science Publishers; pp. 159-166; 2002. *ISBN:* 90-77017-70-4
This citation is provided courtesy of CAB International/CABI Publishing.

893. **Mechanistic models of ammonia release from liquid manure: A review.**
Ni JiQin and Ni JQ
Journal of Agricultural Engineering Research 72 (1): 1-17; 44 ref. (1999)
NAL Call #: 58.8-J82
This citation is provided courtesy of CAB International/CABI Publishing.

894. **Mediating mutualisms: Farm management practices and evolutionary changes in symbiont co-operation.**
Kiers, E. T.; West, S. A.; and Denison, R. F.
Journal of Applied Ecology 39 (5): 745-754. (2002)
NAL Call #: 410 J828;
ISSN: 0021-8901
This citation is provided courtesy of CAB International/CABI Publishing.

895. **A Meta-Analysis of Forest Cover, Edge Effects, and Artificial Nest Predation Rates.**
Hartley, MJ and Hunter, ML Jr
Conservation Biology 12 (2): 465-469. (1998)
NAL Call #: QH75.A1C5;
ISSN: 0888-8892
Descriptors: forests/ predation/ edge effect/ Aves/ Birds
Abstract: Landscape fragmentation has been among the most intensely studied topics in conservation biology for decades. The influence of habitat edge has often been investigated as an important feature in fragmented areas, especially with respect to bird nesting success, as evidenced by three recent reviews. Paton (1994) concluded that "current evidence, although equivocal, suggests that predation and parasitism rates are often significantly greater within 50 m of an edge." Andren (1995) examined edge (or patch size) effects in a review of 40 papers and concluded that "edge-related increase in predation seems to be most commonly found inside forests surrounded by farmland and was rarely found in forest mosaics." Major and Kendal (1996) showed that a preponderance of studies "demonstrated a positive correlation between predation rate and the degree of habitat fragmentation," but found "more variable results" regarding edge effects. We believe that none of these papers adequately addressed the issue of whether or not predation rates and edge effects differ between deforested versus forested landscapes. Thus, we decided to evaluate relationships between degree of forest cover in a landscape and (1) avian nest success rates and (2) the existence of elevated predation rates near habitat edges. We combined data from 13 previous studies in 33 U.S. landscapes to explore patterns of nest predation and landscape composition.
© Cambridge Scientific Abstracts (CSA)

896. **Meteorological modeling for air-quality assessments.**
Seaman, Nelson L
Atmospheric Environment 34 (12-14): 2231-2259. (2000)
NAL Call #: TD881.A822;
ISSN: 1352-2310
Descriptors: North American Research Strategy for Tropospheric Ozone [NARSTO]/ air pollution/ air quality assessment meterological modeling: dynamical models, four dimensional data assimilation/ environmental pollution
Abstract: Meteorological fields are required inputs for air-quality models, but they can contain significant errors which contribute to uncertainties in simulations of airborne chemical species, aerosols and particulate matter. Atmospheric states can be diagnosed from observations or simulated by dynamical models (with or without four-dimensional data assimilation, FDDA). In general, diagnostic models are straightforward to operate, but obtaining sufficient observations to analyze regional-scale features is costly, may omit key variables and often lack sufficient spatial or temporal density to describe the fields adequately. Dynamical models, although still imperfect, have improved in recent years and are now widely accepted for many air-quality modeling applications. Examination of the current state of dynamical models used as meteorological pre-processors indicates that useful simulations for real cases are feasible for scales at least as fine as 1 km. Introduction of faster computers and practical FDDA techniques already allow simulations of regional episodes lasting up to 5-10 d with fine resolutions (5 km or less). As technology has improved, however, a need has developed for better parameterizations to represent vital physical processes, such as boundary layer fluxes, deep convection and clouds, at these finer grid scales. Future developments in meteorological modeling for air-quality applications will include advanced model physics and data assimilation, better coupling between meterological and chemical models, and could lead eventually to widespread use of fully integrated meteorological-chemical models for simulating and predicting air quality.
© Thomson

897. **Methane and nitrous oxide emission from irrigated rice fields: Proposed mitigation strategies.**
Majumdar, D.
Current Science 84 (10): 1317-1326. (May 2003)
NAL Call #: 475 SCI23;
ISSN: 0011-3891.
Notes: Number of References: 126
Descriptors: Multidisciplinary/ encapsulated calcium carbide/ flooded rice/ nitrification inhibitors/ Louisiana rice/ N2O emissions/ paddy fields/ Nitrosomonas europaea/ fertilizer management/ agricultural fields/ water management
Abstract: Rice fields are major sources of CH4 and N2O. A number of practices have been suggested to minimize the emission of either of these gases, but simultaneous mitigation of these gases are not widely discussed. Mitigating CH4 emission may increase N2O emissions and vice versa. Reducing their emission and making the cumulative radiative forcing a minimum is a priority. The strategies should be effective, applicable on a large scale, technically feasible, economic, less time-consuming, environment friendly and should be easily acceptable. On the basis-of the available literature on CH4 and N2O mitigation, the following measures are suggested by the author to mitigate the emissions of these two gases simultaneously from irrigated rice fields: (1) Application of mid-season drainage which does not coincide with high ammonium in soil, (2) application of urea and NH4+-based fertilizers in 4 splits with nitrification inhibitors to increase N use efficiency, (3) replacement of ammonium sulphate with other sulphate sources to minimize CH4 and N2O emissions,

(4) replacement of N broadcasting by foliar-N spray application, (5) sub-surface application of urea supergranules, (6) incorporation or deep placement of prilled urea instead of surface application, (7) application of well-composted organic matter in place of fresh organic matter and green manure, (8) use of single superphosphate (SSP) basally, which in addition to supplying phosphorus, could mitigate CH4 production by supplying sulphur to soil and (9) cultivation of rice varieties with low gas transport capacities and low exudate formation. These practices can be taken up without much difficulty in irrigated rice fields and can reduce CH4 and N2O emission simultaneously.
© Thomson ISI

898. **Methane emission from natural wetlands.**
Wang, Zhengping; Zeng, Dong; and Patrick, William H.
Environmental Monitoring and Assessment 42 (1-2): 143-161. (1996)
NAL Call #: TD194.E5;
ISSN: 0167-6369
Descriptors: methane/ carbon/ air pollution/ global carbon cycle/ greenhouse gas/ methanogenesis/ northern wetlands/ temperate wetlands/ tropical wetlands
Abstract: Methane is considered one of the most important greenhouse gases in the atmosphere. Because of the strict anaerobic conditions required by CH-4-generating microorganisms, natural wetland ecosystems are one of the main sources of biogenic CH-4. The total natural wetland area is estimated to be 5.3 to 5.7 times 10-12 m-2, making up less than 5% of the Earth's land surface. However, natural wetland plays a disproportionately large role in CH-4 emissions. Wetlands are likely the largest natural sources of CH-4 to the atmosphere, accounting for about 20% of the current global annual emission. Out of the total amount of CH-4 emitted, northern wetlands contribute 34%, temperate wetlands 5%, and tropical systems about 60%. Because of the unique characteristics and high productivity, wetland ecosystems are important in the global carbon cycle. Natural wetlands are permanently or temporarily saturated. Strict anaerobic conditions consequently develop, which allows methanogenesis to occur. But the thin oxic layer and the oxic plant rhizosphere promote activity of CH-4-oxidizing bacteria or methanotrophs. Thus, both CH-4 formation and consumption in wetland systems are microbiological processes and are controlled by many factors. Eight of the controlling factors, including carbon supply, soil oxidation-reduction status, pH, temperature, vegetation, salinity and sulfate content, soil hydrological conditions and CH-4 oxidation are discussed in this paper.
© Thomson

899. **Methane oxidation in non-flooded soils as affected by crop production.**
Hutsch, B. W.
European Journal of Agronomy 14 (4): 237-260. (July 2001)
NAL Call #: SB13.E97;
ISSN: 1161-0301
Descriptors: crops/ methane/ oxidation/ soil biology/ climatic change/ soil bacteria/ uptake/ arable soils/ grasslands/ land use/ forests/ tillage/ ammonium/ urea/ soil management/ inhibition/ crop residues/ carbon nitrogen ratio/ slurries/ animal manures/ pH/ conservation tillage/ growth/ pesticides/ literature reviews/ methanotrophic bacteria
Abstract: Methane is an important greenhouse gas, which contributes approximately 20% to global warming. The atmospheric CH4 concentration is increasing rapidly, resulting from an imbalance between CH4 production and consumption. The only known biological CH4 sinks are soils where methanotrophic bacteria consume CH4 by oxidizing it. For several reasons the CH4 uptake potential, particularly of arable soils and grassland, is only partly exploited, as several agricultural practices have adverse impacts on the activity of the CH4 oxidizing bacteria. The kind of land use in general has a remarkable influence with much higher oxidation rates under forest than under grassland or arable soil. Regular soil cultivation by ploughing and fertilization with ammonium or urea have been identified as main factors. Immediately after ammonium application the methanotrophic enzyme system is blocked, resulting in an inhibition of CH4 oxidation. In addition to this short-term effect a long-term effect exists after repeated ammonium fertilization, which is most likely caused by a shift in the population of soil microbes. Crop residues affect CH4 oxidation differently, depending on their C/N ratio: with a wide C/N ratio no effects are expected, whereas with a narrow C/N ratio strong inhibition was observed. Animal manure, particularly slurry, can cause CH4 emission immediately after application, whereas in the long run farmyard manure does not seem to have adverse impacts on CH4 oxidation. The methanotrophic activity decreased markedly with soil pH, although in many cases liming of acidified soils did not show a positive effect. Arable soils have a rather small pH range which allows CH4 oxidation, and the inhibitory effect of ammonium can partly result from a concomitant decrease in soil pH. Reduced tillage was identified as a measure to improve the methanotrophic activity of arable land, set aside of formerly ploughed soil points into the same direction. Plant growth itself is not primarily responsible for observed effects on CH4 oxidation, but secondary factors like differential pesticide treatments, changes in pH, or cultivation effects are more likely involved. Although for the overall CH4 fluxes the oxidation processes in agricultural soils are of minor importance, all available possibilities should be exhausted to improve or at least preserve their ability to oxidize CH4.
This citation is from AGRICOLA.

900. **Methane Production and Methane Consumption: A Review of Processes Underlying Wetland Methane Fluxes.**
Segers, R.
Biogeochemistry 41 (1): 23-51. (1998)
NAL Call #: QH345.B564;
ISSN: 0168-2563
Descriptors: Methane/ Wetlands/ Fluctuations/ Atmosphere/ Atmospheric gases/ Atmospheric chemistry/ Peat/ Oxidation/ Methanogenesis/ Greenhouse effect/ Climatic changes/ Soils/ Anoxic conditions/ Biogeochemical cycle/ soil microorganisms/ greenhouse gases/ Microorganisms/ General/ Atmospheric chemistry/ Ecosystems and energetics/ General/ Physiology, biochemistry, biophysics/ Habitat community studies
Abstract: Potential rates of both methane production and methane consumption vary over three orders of

magnitude and their distribution is skew. These rates are weakly correlated with ecosystem type, incubation temperature, in situ aeration, latitude, depth and distance to oxic /anoxic interface. Anaerobic carbon mineralisation is a major control of methane production. The large range in anaerobic CH sub(4):CO sub(2) production rates indicate that a large part of the anaerobically mineralised carbon is used for reduction of electron acceptors, and, hence, is not available for methanogenesis. Consequently, cycling of electron acceptors needs to be studied to understand methane production. Methane and oxygen half saturation constants for methane oxidation vary about one order of magnitude. Potential methane oxidation seems to be correlated with methanotrophic biomass. Therefore, variation in potential methane oxidation could be related to site characteristics with a model of methanotrophic biomass.

901. **Methane recovery from animal manures: A current opportunities casebook.**
Regional Biomass Energy Program.
Washington, D.C.: Regional Biomass Energy Program, U.S. Dept. of Energy; viii, 90 p.: ill. (1995)
Notes: "August 1995." "DOE/EE-0062." Includes bibliographical references.
NAL Call #: TP359.M4-M47-1995
Descriptors: Farm manure in methane production---United States---Case studies/ Methane---Recycling---United States---Case studies
This citation is from AGRICOLA.

902. **Methodologies for interrill soil erosion studies.**
Agassi, M and Bradford, J M
Soil and Tillage Research 49 (4): 277-287. (1999)
NAL Call #: S590.S48;
ISSN: 0167-1987
Descriptors: interrill soil erosion/ natural rainstorms/ rainfall intensity/ soil loss/ study methodology
Abstract: Due to wide range of experimental techniques reported in the literature for determining interrill erodibility and soil loss values, meaningful comparisons between experiments often cannot be made. Furthermore, inaccurate concepts are developed because erosion processes are dependent upon methodologies. The purpose of this paper is to discuss problems related to both laboratory and field rainfall simulator experiments. Rainfall simulators cannot duplicate a wide range of rainfall intensities and, at the same time, have similar energies as natural rainstorms, unless several different nozzles are used. Rainfall intensity in most simulators is created by varying the frequency of spray oscillation. This intermittent spray characteristic of most simulators, and the constant drop size characteristic of other simulators, greatly affects results. Erosion pan design for laboratory studies and preparation of soil samples placed in the pans also can influence erosion results. We conclude that standardization of rainfall simulator design and test procedures will allow better comparison of erosion results to be made among researchers.

903. **Methods for evaluating wetland condition: Wetland biological assessment case studies.**
Danielson, T. J. and Hoskins, D. G.
U.S. Environmental Protection Agency, Office of Water [Also available as: EPA-822-R-03-013], 2003.
Notes: 104 pp.; #14 in series (application/pdf)
http://www.epa.gov/waterscience/criteria/wetlands/14Casestudies.pdf
Descriptors: wetlands / environmental assessment/ nutrient enrichment/ monitoring/ water quality analysis/ water quality standards/ Florida/ Maine/ Maryland/ Massachusetts/ Michigan/ Minnesota/ Montana/ North Dakota/ Ohio/ Oregon/ Pennsylvania/ Vermont/ Washington/ Wisconsin

904. **Methods for the examination of organismal diversity in soils and sediments.**
Hall, G. S.; Lasserre, Pierre.; Hawksworth, D. L.; C.A.B. International; UNESCO; and International Union of Biological Sciences
Wallingford, Oxon, UK; New York, NY, USA: CAB International in association with United Nations Educational, Scientific, and Cultural Organization and the International Union of Biological Sciences; xii, 307 p.: ill. (1996)
NAL Call #: S593.M44525--1996;
ISBN: 0851991491
Descriptors: Soils---Analysis/ Sediments---Geology---Analysis/ Soil microbiology
This citation is from AGRICOLA.

905. **Methods of analysis by the U.S. Geological Survey National Water Quality Laboratory: Determination of pesticides in water by graphitized carbon-based solid-phase extraction and high-performance liquid chromatography/mass spectrometry.**
Furlong, Edward T.; Geological Survey (U.S.); and National Water Quality Laboratory (U.S.).
Denver, Colo.: U.S. Dept. of the Interior, U.S. Geological Survey; vii, 73 p.: ill.; Series: Water-resources investigations report 01-4134. (2001)
Notes: Shipping list no.: 2002-0081-P. Includes bibliographical references (p. 72-73). SUDOCS: I 19.42/4:01-4134.
NAL Call #: GB701 .W375 no. 2001-4134
Descriptors: Pesticides---Environmental aspects---United States/ Water quality management---United States---Methodology/ Liquid chromatography/ Mass spectrometry/ Water Pesticide content---Measurement
This citation is from AGRICOLA.

906. **Methods of analysis of dithiocarbamate pesticides: A review.**
Malik, Ashok Kumar and Faubel, Werner
Pesticide Science 55 (10): 965-970. (1999)
NAL Call #: SB951.P47;
ISSN: 0031-613X
Descriptors: dithiocarbamate: pesticide/ commercial samples/ environmental samples
Abstract: This review incorporates a brief introduction to methods for the analysis of dithiocarbamate pesticides followed by a more detailed discussion of individual methods. Determination of dithiocarbamate residues from foodstuffs, water and commercial samples and in various environmental samples using different techniques is a key feature.

907. **Methods to estimate forest health.**
Innes, J. L.
Silva Fennica 27 (2): 145-157. (1993);
ISSN: 0037-5330
This citation is provided courtesy of CAB International/CABI Publishing.

908. **Metolachlor, S-metolachlor and their role within sustainable weed-management.**
O'Connell, Peter J; Harris, Christian T; and Allen, James R F
Crop Protection 17 (3): 207-212. (1998)
NAL Call #: SB599.C8;
ISSN: 0261-2194
Descriptors: metolachlor: herbicide/ S metolachlor: herbicide/ crops (Angiospermae)/ weeds (Tracheophyta): pest/ Angiosperms/ Plants/ Spermatophytes/ Vascular Plants/ crop tolerance/ half life/ residual activity/ sustainable weed management
Abstract: The herbicide metolachlor has been widely used for over 20 years for selective weed control in more than 70 crops worldwide. Its favourable soil behaviour and low risk for developing weed resistance means that metolachlor integrates well into sustainable weed-management practices, such as conservation tillage. Metolachlor consists of four stereoisomers, with herbicidal activity coming mainly from the S-isomer pair. A new catalyst system developed allows the commercial production of enantiomerically-enriched S-metolachlor (ISO draft common name). In field trials carried out 1995-1996 S-metolachlor demonstrated equivalent efficacy on major grass weeds and tolerance to different maize cultivars at 65% the use rate of metolachlor. In laboratory studies in different soils degradation half-lives were similar for metolachlor and S-metolachlor. The mean half life of S-metolachlor was 23 days in dissipation studies at different European field sites. At the lower use rates and with highly concentrated formulations containing up to 96% (w/v) active ingredient, the use of S-metolachlor will result in a substantial reduction of risk to applicators, consumers and the environment and the herbicide will continue to play an important role in sustainable weed-management.
© Thomson

909. **Microbes as a source of earthy flavours in potable water: A review.**
Wood, S; Williams, S T; and White, W R
International Biodeterioration and Biodegradation 48 (1-4): 26-40. (2001)
NAL Call #: QH301.I54;
ISSN: 0964-8305
Descriptors: geosmin: production/ methylisoborneol: production/ actinomycetes (Actinomycetes and Related Organisms)/ cyanobacteria (Cyanobacteria) / fungi (Fungi)/ microbe (Microorganisms)/ Bacteria/ Cyanobacteria/ Eubacteria/ Fungi/ Microorganisms/ Nonvascular Plants/ Plants/ earthy flavors/ marginal vegetation/ potable water taint/ sediment/ soil/ water
Abstract: The possible significance of various microbes, including actinomycetes, cyanobacteria and fungi, in the production of earthy tastes and odours in potable water is discussed. Emphasis is placed on those which have been shown to produce geosmin and methylisoborneol in culture. Evidence for the production of these compounds in water, sediment, marginal vegetation and soil is considered. The potential of these sites as sources of taints in potable water is assessed.
© Thomson

910. **Microbial ecology of organic aggregates in aquatic ecosystems.**
Simon, M.; Grossart, H. P.; Schweitzer, B.; and Ploug, H.
Aquatic Microbial Ecology 28 (2): 175-211. (2002);
ISSN: 0948-3055
This citation is provided courtesy of CAB International/CABI Publishing.

911. **Microbial management for restoring soil fertility.**
Raghubanshi, A. S. and Singh, H.
Restoration of Degraded Land: Concepts and Strategies: 49-63. (1993)
This citation is provided courtesy of CAB International/CABI Publishing.

912. **Microbial pathogens within aquifers: Principles and protocols.**
Pillai, Suresh D.
Berlin; New York: Springer; 154 p.: ill.; Series: Environmental intelligence unit. (1998)
NAL Call #: QR105.5.M527-1998;
ISBN: 1570595208 (alk. paper); 3540638911 (alk. paper)
Descriptors: Groundwater---Microbiology/ Groundwater---Microbiology---Laboratory manuals
This citation is from AGRICOLA.

913. **Microbial source tracking: State of the science.**
Simpson, J. M.; Domingo, J. W. S.; and Reasoner, D. J.
Environmental Science and Technology 36: 5279-5288. (2002)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X [ESTHAG].
Notes: Publisher: American Chemical Society
Descriptors: water quality
This citation is from AGRICOLA.

914. **Microbiological safety of drinking water: United States and global perspectives.**
Ford, Timothy Edgcumbe
Environmental Health Perspectives 107 (1 [supplement]): 191-206. (1999)
NAL Call #: RA565.A1E54;
ISSN: 0091-6765
Descriptors: human (Hominidae)/ Animals/ Chordates/ Humans/ Mammals/ Primates/ Vertebrates/ drinking water microbial safety: global perspectives/ water pollution/ waterborne disease statistics: pathogen identification, underreporting
Abstract: Waterborne disease statistics only begin to estimate the global burden of infectious diseases from contaminated drinking water. Diarrheal disease is dramatically underreported and etiologies seldom diagnosed. This review examines available data on waterborne disease incidence both in the United States and globally together with its limitations. The waterborne route of transmission is examined for bacterial, protozoal, and viral pathogens that either are frequently associated with drinking water (e.g., Shigella spp.), or for which there is strong evidence implicating the waterborne route of transmission (e.g., Leptospira spp.). In addition, crucial areas of research are discussed, including risks from selection of treatment-resistant pathogens, importance of environmental reservoirs, and new methodologies for pathogen-specific monitoring. To accurately assess risks from waterborne disease, it is necessary to understand pathogen distribution and survival strategies within water distribution systems and

to apply methodologies that can detect not only the presence, but also the viability and infectivity of the pathogen.

915. **Microbiological tests of the effects of plant protection products in soil: Experience and proposals to improve ecotoxicological significance.**
Malkomes, H P
Bulletin OEPP 31 (2): 159-167. (2001);
ISSN: 0250-8052
Descriptors: dehydrogenase activity/ nitrogen/ applied microbiological test parameters/ sensitivity/ significance/ biomass related microbial activities/ dehydrogenase activity/ substrate induced respiration/ ecotoxicological significance experience/ improvement proposals/ nitrogen transformation mineralization/ nitrification/ plant protection products/ dose dependent effects/ ecotoxicological testing/ soil microorganism risk potential/ test design parameters/ dosage/ ecological conditions/ incubation time/ mode of application/ reference compounds/ soils
Abstract: One objective of ecotoxicological testing of plant protection products within authorization procedures is to assess, under standardized conditions, potential risks for soil microorganisms. This is only possible if some essential conditions are considered. In the past 10 years, experience has been obtained, either from authorization procedures or ecotoxicological research, which may stimulate discussion of existing or planned test methods. This includes applied microbiological test parameters (e.g. sensitivity, significance), design of the tests (e.g. dosage, mode of application, reference compounds, soils, ecological conditions, incubation time) as well as the interpretation of results. The size of tests is necessarily reduced in routine authorization procedures as compared with those within ecotoxicological research and these tests must therefore be optimized and updated to reach sufficient efficiency. From our experience, the combination of biomass-related microbial activities (e.g. substrate-induced respiration, dehydrogenase activity) with nitrogen transformation (mineralization followed by nitrification) is especially useful to identify dose-dependent effects.

916. **Micrometeorologic methods for measuring the post-application volatilization of pesticides.**
Majewski, M S
Water, Air and Soil Pollution 115 (1-4): 83-113. (1999)
NAL Call #: TD172.W36;
ISSN: 0049-6979
Descriptors: pesticides: pollutant, toxin/ aerodynamic profile/ atmospheric science/ ecotoxicology/ eddy correlation/ energy balance/ environmental disturbance/ integrated horizontal flux/ micrometeorological measurements/ post volatilization flux/ relaxed eddy accumulation/ steady state conditions/ surficial characteristics/ temperature gradients/ theoretical profile shape/ trajectory simulations/ wind speed
Abstract: A wide variety of micrometeorological measurement methods can be used to estimate the postapplication volatilization of pesticides from treated fields. All these estimation methods require that the entire study area have the same surficial characteristics, including the area surrounding the actual study site, and that the pesticide under investigation be applied as quickly and as uniformly as possible before any measurements are made. Methods such as aerodynamic profile, energy balance, eddy correlation, and relaxed eddy accumulation require a large (typically 1 or more hectare) study area so that the flux measurements can be made in a well developed atmospheric boundary-layer and that steady-state conditions exist. The area surrounding the study plot should have similar surficial characteristics as the study plot with sufficient upwind extent so the wind speed and temperature gradients are fully developed. Mass balance methods such as integrated horizontal flux and trajectory simulations do not require a large source area, but the area surrounding the study plot should have similar surficial characteristics. None of the micrometeorological techniques for estimating the postapplication volatilization fluxes of pesticides disturb the environment or the soil processes that influence the gas exchange from the surface to the atmosphere. They allow for continuous measurements and provide a temporally averaged flux value over a large area. If the behavior of volatilizing pesticides and the importance of the volatilization process in redistributing pesticides in the environment are to be fully understood, it is critical that we understand not only the processes that govern pesticide entry into the lower atmosphere, but also how much of the millions of kilograms of pesticides that are applied annually are introduced into, and redistributed by, the atmosphere. We also must be aware of the assumptions and limitations of the estimation techniques used, and adapt the field of pesticide volatilization flux measurements to advances in atmospheric science.

917. **Mineralization of manure nutrients.**
Eghball, B.; Wienhold, B. J.; Gilley, J. E.; and Eigenberg, R. A.
Journal of Soil and Water Conservation 57 (6): 470-473. (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: animal manures/ composts/ mineralization/ nutrients/ macronutrients/ nitrogen/ phosphorus/ trace elements/ soil fertility/ nutrient availability/ ammonium nitrogen/ nitrate nitrogen/ soil flora/ biological activity in soil/ soil biology/ composted manure
This citation is from AGRICOLA.

918. **Minerals and Mine Drainage.**
Turney, W. R. and Thomson, B. M.
Water Environment Research 65 (6): 410-413. (1993)
NAL Call #: TD419.R47
Descriptors: Acid mine drainage/ Literature review/ Mine drainage/ Mine wastes/ Reviews/ Wastewater treatment/ Water pollution control/ Water pollution prevention/ Drilling fluids/ Environmental protection/ Management planning/ Mineral industry/ Regulations/ Rehabilitation/ Remediation/ Soil contamination/

Waste disposal/ Water reuse/ Wastewater treatment processes/ Water quality control
Abstract: The environmental challenges facing the mining industry are summarized in a case study which found that a company must evaluate the environmental, social, and economic consequences of a proposed operation and attempt to mitigate these impacts during the planning process. Increasing pressure from regulatory agencies has generated interest in developing processes for the treatment of mining and milling wastes. When considering remediation in areas with high mining activity, naturally occurring background levels of metals should be identified before establishing cleanup standards. The causes and potential control strategies for managing acid mine drainage (AMD) continue to be heavily investigated. Iron oxidation and AMD stream interception have been proposed to reduce the effects of AMD. Criminalization of the environmental regulatory process presents serious consequences to independent oil and gas producers who use a variety of substances in drilling and production and who generate a number of waste streams. Surface disposal of spent drilling fluid used in petroleum and natural gas exploration causes surface soil contamination that severely inhibits plant succession and artificial revegetation efforts. Metal contamination of soils from mine tailings has caused elevated trace metals in forage and cattle. A successful strategy aimed at minimizing contamination levels of effluents through optimization of reagent selection and reduction of effluent volumes by maximizing water reuse was achieved at a gold mine in Ontario, Canada. Strategies for management and remediation of cyanide contamination continue to be developed. (Geiger-PTT) 35 012614019

919. **Minerals and Mine Drainage.**
Thomson, B. M. and Turney, W. R.
Water Environment Research 66 (4): 417-432. (1994)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ environmental effects/ mine drainage/ mine wastes/ mineral industry/ acid mine drainage/ toxicity/ bioindicators/ heavy metals/ regulations/ monitoring/ water pollution/ groundwater pollution/ reclamation/ indicator species/ mine tailings/ Sources and fate of pollution/ Behavior and fate characteristics

920. **Minerals and Mine Drainage.**
Thomson, B. M. and Turney, W. R.
Water Environment Research 67 (4): 527-529. (1995)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ minerals/ mine drainage/ regulations/ water quality/ acid mine drainage/ industrial wastes/ model studies/ artificial wetlands/ mine tailings/ drainage water/ environmental impact/ acidification/ wetlands/ wastewater treatment/ Sources and fate of pollution/ Behavior and fate characteristics

921. **Minerals and Mine Drainage.**
Thomson, B. M. and Turney, W. R.
Water Environment Research 68 (4): 542-545. (1996)
NAL Call #: TD419.R47;
ISSN: 1061-4303.
Notes: 1996 literature review
Descriptors: literature review/ minerals/ mine wastes/ environmental effects/ national parks/ regulations/ remediation/ dusts/ environmental protection/ public health/ nuisance/ mine drainage/ Water quality control
Abstract: Cleanup standards for abandoned mines must consider the local geology and historic mining activity (Anon. 1995). An illustration of these factors was presented in the context of developing remediation alternatives for the abandoned Summitville open-pit gold mine Colorado. There are two steps involved in evaluating potential impacts of mine wastes on ground and surface water: characterization of the mine waste and assessment of potential impacts. General guidelines for a mine waste characterization strategy were provided by (Herzog and Forsgren, 1995). The environmental and regulatory conflicts associated with constructing a new gold mine near Yellowstone National Park were described (Maxwell, 1995; Anon., 1995b; Anon. 1995c). The U.S. Forest Service is expected to make a decision regarding approval of the mine sometime in 1996. Excess dust, produced and blown from quarries and surface mines, is often perceived as a potential environmental problem (Merefield et al. 1995). The Environmental Protection Act of 1990 allows regulatory action to be taken by local authorities to control other dusts considered to pose nuisance or health risks. The overall intention is to provide site operators and regulators with the means to eliminate dusts nuisance from disputes over planning and license applications before it becomes a serious hazard.

922. **Minerals and Mine Drainage.**
Smith, D. P.; Young, L. G.; and Holtzen, M. L.
Water Environment Research 69 (4): 631-637. (1997)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Literature Review/ Minerals/ Mine Drainage/ Mine Wastes/ Leachates/ Acid Mine Drainage/ Soil Contamination/ Metals/ Analytical Methods/ Toxicity/ Effects of pollution

923. **Minimizing Agricultural Nonpoint-Source Impacts: A Symposium Overview.**
Sharpley, A. and Meyer, M.
Journal of Environmental Quality 23 (1): 1-3. (1994)
NAL Call #: QH540.J6;
ISSN: 0047-2425.
Notes: Conference: Symp. "Minimizing Agricultural Nonpoint-Source Impacts", at American Society of Agronomy Annu. Meet., Minneapolis, MN (USA), 2 Nov 1992
Descriptors: agricultural runoff/ nonpoint pollution/ environmental impact/ water quality/ Freshwater pollution/ groundwater contamination/ groundwater pollution/ water quality control/ nonpoint pollution sources/ environmental effects / environmental policy/ agricultural pollution/ pollution control/ chemical pollution / watersheds/ pollution legislation/ Freshwater pollution/ Water quality control/ Prevention and control
Abstract: Increased public awareness of the role of agriculture and associated chemical use in nonpoint-source pollution has prompted an urgency in obtaining information on the impact of current and proposed

agricultural management practices on water quality. Because of easier identification and control of point sources of pollution, agricultural nonpoint sources now account for a larger share of all discharges than a decade ago. Consequently, there is a need to identify critical sources for control; target specific controls for different water quality objectives within different watersheds; and evaluate and implement cost-effective management practices that minimize the potential loss of agricultural chemicals to surface and groundwaters. This paper provides a brief overview of agricultural nonpoint-source issues and options presented at a special symposium, "Minimizing Agricultural Nonpoint-Source Impact," held during the American Society of Agronomy meetings in November 1992. Several papers that were given at this symposium and presented in this issue are introduced.

924. **Mixing and Transport.**
Mossman, D. J. and Roig, L. C.
Water Environment Research 66 (4): 477-489. (1994)
NAL Call #: TD419.R47;
ISSN: 1061-4303.
Notes: Special issue: Literature review
Descriptors: surface water/ literature review/ fluid mechanics/ solute transport/ sediment transport/ flow/ model studies/ water currents/ data acquisition/ transport processes/ pollution dispersion/ groundwater pollution/ Sources and fate of pollution/ Characteristics, behavior and fate
Abstract: Papers reviewed herein are limited to surface water flow phenomena and fluid mechanics relating to the mixing and transport of pollutants. The American Society of Civil Engineers Hydraulics Division Research Committee identified the following research needs relating to surface water mixing and transport issues: density-stratified flows, secondary currents, interactions of flows with beds and banks, model development, data acquisition for field data, and the transport of solutes and sediments.

925. **Mobility Assessment of Agrichemicals: Current Laboratory Methodology and Suggestions for Future Directions.**
Cleveland, C. B.
Weed Technology 10 (1): 157-168. (1996)
NAL Call #: SB610.W39;
ISSN: 0890-037X
Descriptors: fate of pollutants/ agricultural chemicals/ laboratories/ pesticides/ literature review/ Sources and fate of pollution
Abstract: The current state of registration requirements for mobility assessments of pesticides is described and the various uses for mobility estimates are outlined. A survey of recent literature on mobility assessments is presented along with a suggestion for a refocus on K sub(d) rather than K sub(F). A proposal for a different, yet standard, more efficient approach as a replacement for the current requirements is outlined. The suggested approach could fit well within a registration package or a limited research budget as well as provide more information for model input.

926. **Modeling erosion by water and wind.**
Rose, C. W.
In: Methods for assessment of soil degradation/ Lal, R.; Blum, W. H.; Valentine, C.; and Stewart, B. A. Boca Raton, Fla.: CRC Press, 1998; pp. 57-88.
ISBN: 084937443X
NAL Call #: S623.M435-1998
Descriptors: wind erosion/ water erosion/ simulation models/ computer simulation/ mathematical models/ reviews
This citation is from AGRICOLA.

927. **Modeling excessive nutrient loading in the environment.**
Reckhow, K H and Chapra, S C
Environmental Pollution 100 (1-3): 197-207. (1999)
NAL Call #: QH545.A1E52;
ISSN: 0269-7491
Descriptors: organic carbon/ environmental pollution/ error propagation/ excessive environmental nutrient loading modeling/ generalized sensitivity analysis/ hydrodynamics/ model confirmation/ sediment diagenesis/ surface water modeling
Abstract: Models addressing excessive nutrient loading in the environment originated over 50 years ago with the simple nutrient concentration thresholds proposed by Sawyer (1947. Fertilization of lakes by agricultural and urban drainage. New Engl. Water Works Assoc. 61, 109-127). Since then, models have improved due to progress in modeling techniques and technology as well as enhancements in scientific knowledge. Several of these advances are examined here. Among the recent approaches in modeling techniques we review are error propagation, model confirmation, generalized sensitivity analysis, and Bayesian analysis. In the scientific arena and process characterization, we focus on advances in surface water modeling, discussing enhanced modeling of organic carbon, improved hydrodynamics, and refined characterization of sediment diagenesis. We conclude with some observations on future needs and anticipated developments.

928. **Modeling Mobility and Effects of Contaminants in Wetlands.**
Dixon, K. R. and Florian, J. D. Jr
Environmental Toxicology and Chemistry 12 (12): 2281-2292. (1993)
NAL Call #: QH545.A1E58;
ISSN: 0730-7268
Descriptors: wetlands / contaminants/ transport/ models/ reviews/ ecosystem models/ model studies/ sediment transport/ solute transport/ pollutants/ pollution dispersion/ mathematical models/ spatial models/ Modeling/ mathematics/ computer applications/ Wetlands/ Toxicity testing/ Sources and fate of pollution/ Freshwater pollution/ Behavior and fate characteristics/ Pollution/ Organisms/ Ecology/ Toxicology
Abstract: Early efforts at modeling wetland ecosystems were aimed primarily at reflecting biomass or nutrient dynamics. A number of models have been developed for different wetland types, including coastal salt marshes, mangrove wetlands, freshwater marshes, swamps, and riparian wetlands. The early ecosystem models were mostly simple compartment models with linear, constant-coefficient differential equations used to simulate biomass or nutrient dynamics. Practically no contaminant flux was incorporated into these models. With few exceptions, the ecosystems were considered spatially homogeneous. At

the same time that the ecosystem models were being developed, considerable effort was given to modeling various wetland processes, such as circulation and sediment transport. Other process-level modeling included plant and animal uptake and elimination of both organic chemicals and heavy metals. The level of detail in these process models, however, has not been applied to most ecosystem models. There has been a recent trend, however, to increase the complexity of ecosystem-level models and to incorporate spatial dynamics. These developments should greatly enhance the ability to simulate contaminant transport and effects in wetlands.

929. **Modeling phosphorus transport in agricultural watersheds: Processes and possibilities.**
Sharpley, A. N.; Kleinman, P. J. A.; McDowell, R. W.; Gitau, M.; and Bryant, R. B.
Journal of Soil and Water Conservation 57 (6): 425-439. (Nov. 2002-Dec. 2002)
NAL Call #: 56.8 J822;
ISSN: 0022-4561 [JSWCA3]
Descriptors: phosphorus/ transport processes/ losses from soil/ water erosion/ animal manures/ watersheds/ agricultural land/ water pollution/ soil fertility/ phosphorus fertilizers/ overland flow/ subsurface runoff/ simulation models/ mathematical models
This citation is from AGRICOLA.

930. **Modeling post-tillage soil structural dynamics: A review.**
Or, D. and Ghezzehei, T. A.
Soil and Tillage Research 64 (1/2): 41-59. (2002)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

931. **Modelling land use and cover as part of global environmental change.**
Riebsame, William E; Meyer, William B; and Turner, B L II
Climatic Change 28 (1-2): 45-64. (1994)
NAL Call #: QC980 .C55;
ISSN: 0165-0009
Descriptors: Plantae (Plantae Unspecified)/ plants/ agriculture/ biodiversity/ forests/ range land/ resource management

932. **Modelling of atmospheric transport and deposition of pesticides.**
Jaarsveld, J. A. van and Pul, W. A. J. van.
Water, Air and Soil Pollution 115 (1/4): 167-182. (Oct. 1999)
NAL Call #: TD172.W36;
ISSN: 0049-6979 [WAPLAC].
Notes: Special section: Fate of pesticides in the atmosphere: Implications for environmental risk assessment. Proceedings of a workshop held April 22-24, 1998, Driebergen, The Netherlands. Includes references.
Descriptors: pesticides/ pesticide residues/ dispersal/ dispersion/ deposition/ wind/ simulation models/ mathematical models/ atmosphere/ air pollution/ air pollutants/ emission/ polluted soils/ literature reviews
This citation is from AGRICOLA.

933. **Modelling of rainfall, flow and mass transport in hydrological systems: An overview.**
O'Connell, P. E. and Todini, E.
Journal of Hydrology 175 (1/4): 3-16. (Feb. 1996)
NAL Call #: 292.8-J82;
ISSN: 0022-1694 [JHYDA7].
Notes: In the special issue: Modelling of rainfall, flow and mass transport in hydrological systems / edited by P.E. O'Connell and E. Todini. Includes references.
Descriptors: hydrology/ rain/ overland flow/ water flow/ macropore flow/ groundwater flow/ catchment hydrology/ flooding/ watersheds/ simulation models/ computer simulation/ literature reviews
Abstract: Contemporary themes and research directions in hydrological modelling are reviewed in brief, to provide a suitable backcloth against which the Special Issue can be viewed. Some leading modelling issues are discussed and future research directions contemplated.
This citation is from AGRICOLA.

934. **Modelling Pollution Dispersion, the Ecosystem and Water Quality in Coastal Waters: A Review.**
James, I. D.
Environmental Modelling and Software with Environment Data News 17 (4): 363-385. (2002);
ISSN: 1364-8152
Descriptors: Reviews/ Water quality/ Coastal waters/ Pollution dispersion/ Sediment pollution/ Oil spills/ Mathematical models/ Path of Pollutants/ Model Studies/ Ecosystems/ Water Pollution/ Modelling (Pollution)/ Water quality (Natural waters)/ Ecology/ Oil spills/ Contaminated sediments/ Literature reviews/ Petroleum hydrocarbons/ Oil pollution/ Dissolved chemicals/ Environmental impact/ Fate/ Marine pollution/ Sources and fate of pollution/ Water Quality/ Behavior and fate characteristics/ Environmental Modeling
Abstract: 4This review is intended as a comprehensive but concise summary of present capabilities in coastal pollutant, ecosystem and water quality modelling. It reflects the recent rapid developments in multidisciplinary modelling in shelf seas. The behaviour of conservative pollutants that act as passive tracers is contrasted with those that have more complex behaviours, including oil spills. The importance of sediment modelling is emphasised, since contaminants commonly exist in both a dissolved and a particulate state, or adhere to sediments. Recently developed ecological models can have great complexity, reflecting the complexity of the real ecosystem. These models are now being linked to physical models of coastal waters and run with the same resolution. This has become possible only recently because of increases in computer power, particularly the availability of parallel systems at reasonable cost. The main advances in physical modelling are likely to come through greater understanding of turbulence and other sub-grid-scale processes as well as increased resolution. In the coastal seas there is often a lack of oceanographic data, which is even greater for the many biological and chemical variables than it is for physical variables. This is probably

the single most important factor limiting the progress of operational water quality models.

935. **Modelling soil water dynamics under trickle emitters: A review.**
Lubana, P. P. S. and Narda, N. K.
Journal of Agricultural Engineering Research 78 (3): 217-232. (Mar. 2001)
NAL Call #: 58.8-J82;
ISSN: 0021-8634 [JAERA2]
Descriptors: trickle irrigation/ soil water/ infiltration/ spatial distribution/ water uptake/ mathematical models/ literature reviews
Abstract: Information on moisture distribution patterns under point-source trickle emitters is a pre-requisite for the design and operation of trickle-irrigation systems. The distribution pattern is influenced by the properties and the manner water is applied and withdrawn from the soil profile. Flow from a point-source trickle emitter, because of its multi-dimensional nature and high frequency of water application, leads to complexities in modelling soil moisture dynamics. In addition, the plant rooting patterns under such conditions also exhibit drastic variations in withdrawal patterns from those in conventional irrigation practice, thereby making the prediction of the behaviour of moisture patterns quite difficult. An extensive review is presented of research work pertaining to modelling of various processes associated with moisture distribution patterns under point-source trickle emitters. This review promotes better understanding, facilitates a more rational analysis of the soil water dynamics processes under point-source trickle emitters and helps to identify topics for more emphasis in future modelling activity.
This citation is from AGRICOLA.

936. **Modelling the Interaction Between Buffer Zones and the Catchment.**
Merot, P. and Durand, P.
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. 208-217; 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: model studies/ zones/ catchment areas/ water quality control/ biogeochemistry/ reviews/ hydrologic cycle/ vegetation/ buffer zones/ hedges/ Water quality control
Abstract: The classical agricultural non-point source pollution models, such as ANSWERS or AGNPS, usually do not explicitly use the buffer zone concept, although their modular, or distributed, conception allows it in theory. In practice, the main obstacle is that hydrology and biogeochemistry are much more complex and less understood in buffer zones than in cultivated fields. Attempts to model this concept, usually in relation to the riparian area functioning, can be classified in two ways. (1) Empirical models. Some descriptors of buffer zones are linked by stochastic relationships with biological or biogeochemical functions. For example, relationships have been established between the relative area of forested riparian zones and the streamwater chemical or biological quality; and between the hydrological regimes of the wetlands and their productivity. Furthermore, the seasonal or inter-annual variability of the stream discharge can be related to the functioning of the wetlands. (2) Deterministic models. These are essentially hydrological models based on the concept of variable contributing area. These models are distributed or semi-distributed (e.g. based on distribution functions of spatial variables). Some of them are mechanistic models (e.g., IHDM), but the most widely used and developed, currently, are conceptual models of the TOPMODEL type. In this case, a simple description of the topographic control on the extension of the saturated area generally allows an adequate simulation of the hydrology of the saturated zone and of the catchment. Some attempts have been made to couple these models with water quality descriptions, but usually in a very crude way that does not actually describe the specific biogeochemistry of the saturated zone. The main reason for this is probably the important heterogeneity of this zone, in terms of soils, biogeochemistry and water pathways. Other landscape structures that could act as buffer zones, such as hedges, have been very rarely considered in the models. Some studies have tried to describe the role of hedges in modifying the surface flow route and enhancing infiltration. A few models simulate the water cycle in hedges. The role of hedges as pollutant sinks is not yet modelled, and actually very little investigated. The main conclusion of this review is that the interactions between the catchment and buffer zones have mostly been seen by modellers as the hydrological control of the catchment via the variable saturated area concept. They have not yet fully taken into account the control of water quality within a catchment by the different potential buffer zones.

937. **Modelling water relations of horticultural crops: A review.**
Jones, H. G. and Tardieu, F.
Scientia Horticulturae 74 (1/2): 21-46. (Apr. 1998)
NAL Call #: SB13.S3;
ISSN: 0304-4238 [SHRTAH].
Notes: Special issue: Crop models in horticulture / edited by L.F.M. Marcelis and E.P. Heuvelink.
Includes references.
Descriptors: horticultural crops/ plant water relations/ simulation models/ growth models/ growth/ crop quality/ crop yield/ water content/ irrigation/ water uptake/ evaporation/ water stress/ root hydraulic conductivity/ plant height/ leaves/ water deficit/ xylem/ stomata/ literature reviews/ transpiration
This citation is from AGRICOLA.

938. **Models for evaluating water quality and BMP (Best Management Practice) effectiveness at the watershed scale.**
Whittemore R; Ice G; and Heathwaite L.
In: Impact of land-use change on nutrient loads from diffuse sources: Proceedings of an International Symposium. (Held 18 Jul 1999-30 Jul 1999 at Birmingham, UK.); pp. 265-271; 1999.
Notes: IAHS Publication No. 257; Symposium held during IUGG 99: The XXII General Assembley of the International Union of Geodesy and Geophysics.
This citation is provided courtesy of CAB International/CABI Publishing.

939. **Models of 'appropriate' practice in private dam safety assurance.**
Pisaniello, J. D. and McKay, J. M.
Water Policy 5: 525-550. (1998);
ISSN: 1366-7017.
Notes: Publisher:
Elsevier Science Inc.
Descriptors: Dams/ Dam Failure/ Hydraulic Structures/ Safety/ Environmental Policy/ Legislation/ Structural engineering/ Government policies/ safety regulations/ safety engineering/ Hydraulics/ Legislation (on industry and trade)/ Structures/ Civil/ Structural Engineering/ Underground Services and Water Use
Abstract: Large dams are generally built and managed by governments and private dams are built by individual owners. A number of horrific failures of both types have triggered serious concerns over the safety of dams in each country. For the larger dams, the response has been to spend vast amounts on structural upgrading works. Unfortunately, only a few countries have developed mature dam safety assurance schemes for smaller private dams as identified here. Dam safety legislation is often considered too "extreme" and alternative action is proposed but rarely follows. This is largely because there are no uniform systematic guidelines on determining the level of assurance policy that is "appropriate" for varying circumstances. This paper establishes such guidelines together with eclectic policy models of "appropriate" practice, based on a comprehensive review and analysis of international best practice.
© Cambridge Scientific Abstracts (CSA)

940. **The modular soil erosion system (MOSES).**
Meyer, C. R.; Wagner, L. E.; Yoder, D. C.; and Flanagan, D. C.
In: Soil erosion research for the 21st century: Proceedings of the International Symposium. (Held 3 Jan 2001-5 Jan 2001 at Honolulu, Hawaii.) Ascough, J. C. and Flanagan, D. C. (eds.)
St Joseph, Mo.: American Society of Agricultural Engineers; pp. 358-361; 2001. *ISBN:* 1-892769-16-6
This citation is provided courtesy of CAB International/CABI Publishing.

941. **Molecular strategies for improving waterlogging tolerance in plants.**
Dennis, E. S.; Dolferus, R.; Ellis, M.; Rahman, M.; Wu, Y.; Hoeren, F. U.; Grover, A.; Ismond, K. P.; Good, A. G.; and Peacock, W. J.
Journal of Experimental Botany 51 (342): 89-97. (Jan. 2000)
NAL Call #: 450-J8224;
ISSN: 0022-0957 [JEBOA6].
Notes: Special issue: Molecular physiology: Engineering crops for hostile environments / edited by M. Parry, C. Foyer, and B. Forde. Paper presented at a conference held December 14-16, 1998, Rothamsted. Includes references.
Descriptors: crops/ waterlogging/ tolerance/ genetic resistance/ anaerobic conditions/ survival/ oxygen/ rain/ flooding/ weather/ soil air/ irrigation/ genes/ plant proteins/ promoters/ transcription factors/ genetic regulation/ literature reviews
Abstract: Plants, like animals, are obligate aerobes, but due to their inability to move, have evolved adaptation mechanisms that enable them to survive short periods of low oxygen supply, such as those occurring after heavy rain or flooding. Crop plants are often grown on soils subject to waterlogging and many are sensitive to waterlogging of the root zone. The combination of unfavourable weather conditions and suboptimal soil and irrigation techniques can result in severe yield losses. The molecular basis of the adaptation to transient low oxygen conditions has not been completely characterized, but progress has been made towards identifying genes and gene products induced during low oxygen conditions. Promoter elements and transcription factors involved in the regulation of anaerobically induced genes have been characterized. In this paper an account is presented of the molecular strategies that have been used in an attempt to increase flooding tolerance of crop plants.
This citation is from AGRICOLA.

942. **The Molecularly-Uncharacterized Component of Nonliving Organic Matter in Natural Environments.**
Hedges, J. I.; Eglinton, G.; Hatcher, P. G.; Kirchman, D. L.; Arnosti, C.; Derenne, S.; Evershed, R. P.; Koegel-Knabner, I.; De Leeuw, J. W.; Littke, R.; Michaelis, W.; and Rullkoetter, J.
Organic Geochemistry 31 (10): 945-958. (2000);
ISSN: 0146-6380
Descriptors: Biogeochemistry/ Organic Matter/ Organic Carbon/ Molecular Structure/ Reviews/ Research Priorities/ Molecules/ Particulate organic matter/ Water analysis/ Sediment chemistry/ Chemical processes/ Water Quality/ Organic compounds
Abstract: Molecularly-uncharacterized organic matter comprises most reduced carbon in soils, sediments and natural waters. The origins, reactions and fates of these ubiquitous materials are relatively obscure, in large part because the rich vein of geochemical information that typically derives from detailed structural and stereochemical analysis is yet to be tapped. This discussion highlights current knowledge about the origins and characteristics of molecularly uncharacterized organic matter in the environment and outlines possible means by which this structurally uncharted frontier might best be explored.
© Cambridge Scientific Abstracts (CSA)

943. **Monitoring environmental quality at the landscape scale.**
O'Neill, Robert V; Hunsaker, Carolyn T; Jones, K Bruce; Riitters, Kurt H; Wickham, James D; Schwartz, Paul M; Goodman, Iris A; Jackson, Barbara L; and Baillargeon, William S
Bioscience 47 (8): 513-519. (1997)
NAL Call #: 500 Am322A;
ISSN: 0006-3568
Descriptors: biodiversity/ biotic integrity/ conservation/ environmental quality/ geographic information systems/ landscape ecology/ landscape stability/ watershed integrity
© Thomson

944. **Monitoring for ecological assessment.**
Wiersma, G. B. and Bruns, D. A.
In: North American Workshop on Monitoring for Ecological Assessment of Terrestrial and Aquatic Ecosystems = Taller Norteamericano Sobre Monitoreo para la Evaluacion Ecologica de Ecosistemas Terrestres y Acuaticos. (Held 18 Sep 1995-22 Sep 1995 at Mexico City, Mexico.)

Fort Collins, CO: USDA Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 31-38; 1996.
NAL Call #: aSD11.A42-no.284
Descriptors: environmental assessment/ monitoring/ ecosystems/ ecological balance/ models/ biological indicators/ environmental protection/ databases/ information systems/ literature reviews
This citation is from AGRICOLA.

945. **Monitoring soil quality of arable land: Microbiological indicators.**
Stenberg, B.
Acta Agriculturae Scandinavica: Section B, Soil and Plant Science 49 (1): 1-24. (1999)
NAL Call #: S3.A272;
ISSN: 0906-4710
This citation is provided courtesy of CAB International/CABI Publishing.

946. **Monitoring the vegetation resources in riparian areas.**
Winward, Alma H. and Rocky Mountain Research Station, USDA
Ogden, UT: U.S. Dept. of Agriculture, Forest Service, Rocky Mountain Research Station; 49 p.: ill. (some col.); Series: General technical report RMRS GTR-47. (2000)
Notes: Cover title. Shipping list no.: 2000-0226-P. "April 2000." Includes bibliographical references (p. 33). SUDOCS: A 13.88:RMRS-GTR-47.
NAL Call #: aSD144.A14-G46-no.-47
Descriptors: Riparian plants---Monitoring---United States/ Riparian ecology---United States---Management
This citation is from AGRICOLA.

947. **Movement and persistence of fecal bacteria in agricultural soils and subsurface drainage water: A review.**
Jamieson, R. C.; Gordon, R. J.; Sharples, K. E.; Stratton, G. W.; and Madani, A.
Canadian Biosystems Engineering 44: 1.1-1.9. (2002);
ISSN: 1492-9058
This citation is provided courtesy of CAB International/CABI Publishing.

948. **Movement of nonionic organic chemicals in agricultural soils.**
Beck, Angus J; Johnston, A E Johnny; and Jones, Kevin C
Critical Reviews in Environmental Science and Technology 23 (3): 219-248. (1993)
NAL Call #: QH545.A1C7;
ISSN: 1064-3389
Descriptors: human (Hominidae)/ livestock (Mammalia Unspecified)/ Bovidae (Bovidae)/ Plantae (Plantae Unspecified)/ animals/ artiodactyls/ chordates/ humans/ mammals/ nonhuman mammals/ nonhuman vertebrates/ plants/ primates/ vertebrates/ crop residues/ groundwater/ leaching/ pesticides/ pollution/ sludge/ weather
© Thomson

949. **Multi-function agricultural biodiversity: Pest management and other benefits.**
Gurr, G. M.; Wratten, S. D.; and Luna, J. M.
Basic and Applied Ecology 4 (2): 107-116. (2003);
ISSN: 1439-1791
Descriptors: Biological diversity/ Pest control/ Natural enemies/ Agricultural practices/ Agricultural & general applied entomology/ Control
Abstract: This paper reviews two aspects of agricultural biodiversity. 1. The ways in which agricultural biodiversity may be increased to favour pest management are examined. At the simplest level, the structure within a monoculture may be altered by changing management practices to benefit natural enemies. At the other extreme, annual and perennial non-crop vegetation may be integrated with cropping, and biodiversity increased at the landscape level. 2. The existence of a hierarchy for the types of benefits of increased biodiversity is discussed. Vegetational diversity can lead to suppression of pests via 'top-down' enhancement of natural enemy populations and by resource concentration and other 'bottom-up' effects acting directly on pests. Whilst such low-input pest management mechanisms are attractive in their own right, other (non-pest management related) benefits may simultaneously apply. These range from short-term benefits in crop yield or quality, longer term benefits for sustainability of the farming system and, ultimately, broad societal benefits including aesthetics, recreation and the conservation of flora and fauna. Examples are given of such multi-function agricultural biodiversity.
© Cambridge Scientific Abstracts (CSA)

950. **A multi-scale system approach to nutrient management research in the Netherlands.**
Neeteson, J. J.; Schröder, J. J.; and Berge, H. F. M. ten
Netherlands Journal of Agricultural Science 50 (2): 141-151. (2002)
NAL Call #: 12 N3892;
ISSN: 0028-2928
This citation is provided courtesy of CAB International/CABI Publishing.

951. **Multiresidue methods using solid-phase extraction techniques for monitoring priority pesticides, including triazines and degradation products, in ground and surface waters.**
Sabik, Hassan; Jeannot, Roger; and Rondeau, Bernard
Journal of Chromatography A 885 (1-2): 217-236. (2000)
NAL Call #: QD272.C4J68;
ISSN: 0021-9673
Descriptors: pesticides: pollutant/ triazine degradation products: pollutant/ triazines: herbicide, pollutant/ ground water/ surface water
Abstract: The review describes the use of solid-phase extraction (SPE) techniques for monitoring priority pesticides in ground and surface waters. The focus is on triazine herbicides and their degradation products. Data concerning the fate, occurrence, properties and extraction of triazines and their degradation products using different SPE techniques are tabulated and discussed.
© Thomson

952. **N-fertilization of nursery crops in the field: A review, Part II.**
Alt, D
Gartenbauwissenschaft 63 (5): 237-242. (1998);
ISSN: 0016-478X
Descriptors: nitrogen: nutrient/ Viburnum plicatum (Caprifoliaceae): ornamental crop/ Angiosperms/ Dicots/ Plants/ Spermatophytes/ Vascular Plants
© Thomson

953. **N-fertilization of nursery crops in the field: A review, Part III.**
Alt D
Gartenbauwissenschaft 63 (6): 278-282. (1998)
This citation is provided courtesy of CAB International/CABI Publishing.

954. **N:P balance in wetland forests: Productivity across a biogeochemical continuum.**
Lockaby, B G and Conner, W H
Botanical Review 65 (2): 171-185. (1999)
NAL Call #: 450 B6527 DNAr;
ISSN: 0006-8101
Descriptors: nitrogen: nutrient/ phosphorus: nutrient/ net primary productivity/ nitrogen:phosphorus balance: biogeochemical continuum, productivity/ nutrient transformation/ wetland forest
Abstract: The nature of and driving forces behind variation among wetland forests in terms of biogeochemistry and vegetation production are not well understood. We suggest that insight into biogeochemical and productivity differences may be gained by examining the degree to which nitrogen and phosphorus are balanced within wetland vegetation. On the basis of examinations of data related to N:P balance and nutrient use efficiencies, vegetation productivity in both depressional and riverine forests appears to be primarily N limited. In contrast to some current theories of wetland biogeochemistry, these data suggest that when P deficiency occurs at all, it represents a secondary productivity constraint in comparison to N. Similarly, a biogeochemical continuum is suggested for wetland forests based on the relationship between N:P ratios in senesced foliage vs. annual litterfall mass. We theorize that the position of a particular wetland forest on this continuum reflects the integration of its geomorphic position and biogeochemical history. In addition, the position of a particular system on the continuum may have predictive value with regard to net primary productivity and nutrient transformation capabilities.

955. **National biosolids overview.**
Goldstein, N. and Block, D.
Biocycle 40 (12): 48-52. (Dec. 1999)
NAL Call #: 57.8-C734;
ISSN: 0276-5055
Descriptors: sewage sludge/ waste utilization/ application to land/ regulations/ surveys/ United States/ waste management
This citation is from AGRICOLA.

956. **National guidance: Water quality standards for wetlands.**
United States. Environmental Protection Agency. Office of Water Regulations and Standards and United States. Environmental Protection Agency. Office of Wetlands Protection.
Washington, D.C.: U.S. Environmental Protection Agency, Office of Water Regulations and Standards (Rev. Aug. 21, 1997). (1997)
Notes: Alternate titles: Water quality standards for wetlands guidance, Water quality standards for wetlands, Water quality standards handbook; "July 1990." "This document is designated as appendix B to chapter 2 - General program guidance of the water quality standards handbook, December 1983." Includes bibliographical references.
NAL Call #: TD223.N355-1997
http://www.epa.gov/OWOW/wetlands/regs/quality.html
Descriptors: Wetland conservation/ Water quality management---United States/ Water quality---Standards---United States
This citation is from AGRICOLA.

957. **A national look at nitrate contamination of ground water.**
Nolan, B. T.; Ruddy, Barbara C.; Hitt, Kerie J.; and Helsel, Dennis R.
U.S. Dept. of the Interior, U.S. Geological Survey [Also available as: Water Conditioning and Purification (January 1998) 39 (12): 76-79], 1998.
Notes: Contamination of ground waters: A national look at nitrate contamination of ground water; By Bernard T. Nolan, Barbara C. Ruddy, Kerie J. Hitt, and Dennis R. Helsel [This is an electronic version of an article that appeared in the January 1998 issue of Water Conditioning and Purification, v. 39, no. 12, pages 76-79. This article replaces USGS Fact Sheet FS-092-96]. (text/html)
NAL Call #: TD427.N5-N37-1998
http://water.usgs.gov/nawqa/wcp/
Descriptors: Water---Nitrogen content---United States/ Groundwater---Pollution---United States
Abstract: Title from web page.

958. **National management measures to control nonpoint source pollution from agriculture.**
Buck, S.; Townsend, G.; United States. Environmental Protection Agency. Office of Water; United States. Environmental Protection Agency. Nonpoint Source Control Branch.; Tetra Tech, Inc.; and North Carolina State University. Water Quality Group.
United States Environmental Protection Agency, 2000
http://www.epa.gov/owow/nps/agmm/index.html
Descriptors: Agriculture---Environmental aspects/ Nonpoint source pollution/ Best management practices (Pollution prevention)/ Agricultural conservation

959. **The National Park Service integrated pest management manual: Integrated pest management manual.**
United States. National Park Service.
Washington, D.C.: National Park Service. (1999)
Notes: IPM manual; Title from home page (viewed on July 2, 2003; last updated Feb. 13, 1999).
NAL Call #: SB950.2.A1-N372
http://www.nature.nps.gov/biology/ipm/manual/ipmmanual.htm
Descriptors: Pests---Integrated control---United States
Abstract: Provides descriptions of the biology and management of 21 species or categories of pests in both text and graphic versions.
This citation is from AGRICOLA.

960. **National projections of forest and rangeland condition indicators: A technical document supporting the 1999 USDA Forest Service RPA assessment.**
Hof, John G. and Pacific Northwest Research Station
Portland, OR: U.S. Dept. of Agriculture, Forest Service, Pacific Northwest Research Station; Series: General technical report PNW 442; 57 p.: col. maps. (1999)
Notes: Cover title. "April 1999"--P. [4] of cover. Includes bibliographical references (p. 53-57).
NAL Call #: aSD11-.A46-no.442
Descriptors: Natural resources surveys---United States/ Multiple use management areas---United States/ Forest management---United States/ Range management---United States
This citation is from AGRICOLA.

961. **National standards and guidelines for pesticides in water, sediment, and aquatic organisms: Application to water-quality assessments.**
Nowell, L. H. and Resek, E. A.
Reviews of Environmental Contamination and Toxicology 140 (1994)
NAL Call #: TX501.R48;
ISSN: 0179-5953 [RCTOE4].
Notes: Special issue: 164 p.; In the series analytic: Reviews of environmental contamination and toxicology / edited by G.W. Ware
Descriptors: water quality/ pesticides/ quality standards/ guidelines/ water/ sediment/ fish/ shellfish/ tissues/ aquatic organisms/ lakes/ environmental protection/ toxicity/ contamination/ concentration/ adverse effects/ regulation/ health protection/ who/ databases/ public agencies/ literature reviews/ Canada/ United States
This citation is from AGRICOLA.

962. **National water summary of wetland resources.**
Fretwell, J. D.; Williams, John S.; Redman, Phillip J.; and Geological Survey (U.S.).
Washington, D.C.: U.S. G.P.O.; viii, 431 p.: ill. (some col.), maps (some col.); Series: U.S. Geological Survey water-supply paper 2425. (1996)
NAL Call #: 407--G29W-no.2425;
ISBN: 0607856963
Descriptors: Wetlands---United States/ Water resources development---United States/ Wetland conservation---United States
This citation is from AGRICOLA.

963. **Native plant material sources for wetland establishment: Freshwater case studies.**
United States. Army. Corps of Engineers; U.S. Army Engineer Waterways Experiment Station; and Wetlands Research Program (U.S.).
Vicksburg, Miss.: U.S. Army Engineer Waterways Experiment Station; x, 76 p.: ill., maps; Series: Wetlands Research Program technical report WRP-RE-5. (1995)
Notes: "August 1995." Includes bibliographical references (p. 74-76).
NAL Call #: QK938.M3N38--1995
Descriptors: Wetland plants/ Wetland conservation/ Wetland ecology/ Freshwater ecology
This citation is from AGRICOLA.

964. **Natural and Constructed Wetlands in Canada: An Overview.**
Kennedy, G. and Mayer, T.
Water Quality Research Journal of Canada 37 (2): 295-325. (2002);
ISSN: 1201-3080
Descriptors: Reviews/ Freshwater environments/ Hydrology/ Wildlife / Climate/ Sustainable development/ Environment management/ Wastewater treatment/ artificial wetlands/ Canada/ Wetlands/ Ecosystems/ Environmental Protection/ Water Pollution Control/ Technology/ Research Priorities/ Ecology/ Pollution control (Environmental)/ Canada/ Environmental action/ Water quality control/ Water Treatment/ Water & Wastewater Treatment
Abstract: A review of freshwater wetland research in Canada was conducted to highlight the importance of these ecosystems and to identify wetland research needs. Both natural and constructed wetland systems are discussed. Natural wetlands are an important part of the Canadian landscape. They provide the habitat for a broad variety of flora and fauna and contribute significantly to the Canadian economy. It is estimated that the total value derived from consumptive and nonconsumptive activities exceeds $10 billion annually. The past decades have witnessed the continued loss and degradation of wetlands in Canada. In spite of recent protection, Canadian wetlands remain threatened by anthropogenic activities. This review shows that more research on fate and transport of pollutants from urban and agricultural sources in wetland systems is needed to better protect the health and to assure the sustainability of wetlands in Canada. Furthermore, improved knowledge of hydrology and hydrogeochemistry of wetlands will assure more effective management of these ecosystems. Lastly, better understanding of the effect of climate change on wetlands will result in better protection of these important ecosystems. Constructed wetlands are man-made wetlands used to treat non-point source pollution. The wetland treatment technology capitalizes on the intrinsic water quality amelioration function of wetlands and is emerging as a cost-effective, environmentally friendly method of treating a variety of wastewaters. The use of wetland technology in Canada is, however, less common than in the U.S.A. A number of research needs has to be addressed before the wetland treatment technology can gain widespread acceptance in Canada. This includes research pertaining to cold weather performance, including more monitoring, research on design adaptation and investigation of the effects of constructed wetlands on wildlife.

965. **Natural background concentrations of nutrients in streams and rivers of the conterminous United States.**
Smith, R. A.; Alexander, R. B.; and Schwarz, G. E.
Environmental Science and Technology 37 (14): 3039-3047. (2003)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X
Descriptors: Environment/ Ecology/ Environmental Engineering & Energy/ nitrogen/ phosphorus/ watersheds/ transport/ export/ yields/ cycle/ size
Abstract: Determining natural background concentrations of nutrients in watersheds in the developed world has been hampered by a lack of pristine sampling sites covering a range of climatic conditions and basin sizes. Using data from 63 minimally impacted U.S. Geological Survey reference basins, we developed empirical models of the background yield of total nitrogen (TN) and total phosphorus (TP) from small watersheds as functions of annual runoff, basin size, atmospheric nitrogen deposition rate, and region-specific factors. We applied previously estimated in-stream loss rates to yields from the small watershed models to obtain estimates of background TN and TP yield and concentration throughout the stream/river network in 14 ecoregions of the conterminous United States. Background TN concentration varies from less than 0.02 mg L-1 in the xeric west to more than 0.5 mg L-1 along the southeastern coastal plain. Background TP concentration varies from less than 0.006 mg L-1 in the xeric west to more than 0.08 mg L-1 in the great plains. TN concentrations in U.S. streams and rivers currently exceed natural background levels by a much larger factor (6.4) than do TP concentrations (2.0). Because of local variation in runoff and other factors, the range of background nutrient

concentrations is very large within some nutrient ecoregions. It is likely that background concentrations in some streams in these regions exceed proposed nutrient criteria.

966. **Natural channel systems: An approach to management and design.**
Ontario. Ministry of Natural Resources.
Toronto, ON: Ministry of Natural Resources; 103 p. (1994)
Notes: "June 1994."
NAL Call #: TC529.N37--1994;
ISBN: 0777826690
Descriptors: Water supply---Management/ Channels---Hydraulic engineering---Canada
This citation is from AGRICOLA.

967. **Natural emissions of non-methane volatile organic compounds, carbon monoxide, and oxides of nitrogen from North America.**
Guenther, Alex; Geron, Chris; Pierce, Tom; Lamb, Brian; Harley, Peter; and Fall, Ray
Atmospheric Environment 34 (12-14): 2205-2230. (2000)
NAL Call #: TD881.A822;
ISSN: 1352-2310
Descriptors: carbon monoxide: natural emissions, pollutant/ hydrocarbons: pollutant/ isoprenes: pollutant/ monoterpenes: pollutant/ nitric oxide: natural emissions, pollutant/ nitrogen oxides: natural emissions, pollutant/ non methane volatile organic compounds: natural emissions, pollutant/ North American Research Strategy for Tropospheric Ozone [NARSTO]/ environmental pollution
Abstract: The magnitudes, distributions, controlling processes and uncertainties associated with North American natural emissions of oxidant precursors are reviewed. Natural emissions are responsible for a major portion of the compounds, including non-methane volatile organic compounds (NMVOC), carbon monoxide (CO) and nitric oxide (NO), that determine tropospheric oxidant concentrations. Natural sources include soil microbes, vegetation, biomass burning, and lightning. These sources are strongly influenced by human activities that have led to significant changes in the magnitude and distribution of natural emissions in the past two centuries. The total NMVOC flux of about 84 X 1012 g of carbon (Tg C) is comprised primarily of isoprene (35%), 19 other terpenoid compounds (25%) and 17 non-terpenoid compounds (40%). Vegetation is predicted to contribute about 98% of the total annual natural NMVOC emission. The estimated annual natural NO emission of 2.1 X 1012 g of nitrogen (Tg N) from North America is primarily due to soils and lightning, while the estimated 10 Tg C of CO arises from biomass burning and vegetation. Field measurements of ambient concentrations and above canopy fluxes have validated emission estimates for a few compounds from some important landscapes. The uncertainty associated with natural emission estimates ranges from less than 50% for midday summer isoprene emission from some locations to about a factor of 10 for some compounds and landscapes.

968. **Natural product chemistry and its part in the defence against insects and fungi in agriculture.**
Crombie, Leslie
Pesticide Science 55 (8): 761-774. (1999)
NAL Call #: SB951.P47;
ISSN: 0031-613X
Descriptors: avenacins: fungicides/ cordifines: antifeedant, natural product/ mammeins: antifeedant, natural product/ nicandra steroids: antifeedant, natural product/ pyrethrins: insecticide, natural product/ rotenoids: insecticide, natural product/ unsaturated amides: insecticide, natural product/ fungi (Fungi): plant pathogen/ insects (Insecta): pest/ Alternaria (Fungi Imperfecti or Deuteromycetes): H S toxins/ Animals/ Arthropods/ Fungi/ Insects/ Invertebrates/ Microorganisms/ Nonvascular Plants/ Plants
Abstract: This paper surveys our work on natural products as potential models for defensive substances against insect and fungal predators. Insecticides and repellents included are pyrethrins, rotenoids, lipid amides, phorbol esters, cordifolia germacranolides, nicandrenoids, mammeins, dihydroagarofuran esters, and cembrene diols. The fungal H-S toxins from Alternaria, and avenacins from oat roots are briefly considered. The avenacins provide an in-situ defence of oat roots against the destructive 'Take-all' fungus disease.

969. **Natural protection of spring and well drinking water against surface microbial contamination: Indicators and monitoring parameters for parasites.**
Edberg, S. C.; LeClerc, H.; and Robertson, J.
Critical Reviews in Microbiology 23 (2): 179-206. (1997)
NAL Call #: QR1.C7;
ISSN: 1040-841X.
Notes: Subtitle: [Part] II.

970. **Natural systems agriculture: A truly radical alternative.**
Jackson, W.
Agriculture, Ecosystems and Environment 88 (2): 111-117. (Feb. 2002)
NAL Call #: S601-.A34;
ISSN: 0167-8809 [AEENDO].
Notes: Special issue: Soil health as an indicator of sustainable management / edited by J.W. Doran and S.I. Stamatiadis. Paper presented at a workshop held June 24-25, 1999, Athens/Kifissia, Greece.
Includes references.
Descriptors: agriculture/ sustainability/ alternative farming/ erosion/ soil pollution/ agricultural chemicals/ petroleum/ ecology/ ecosystems/ evolution/ insect pests/ plant pathogens/ weeds/ pest management/ disease control/ weed control/ domestication/ perennials/ seed output/ literature reviews
Abstract: The natural systems agriculture (NSA) idea was developed at The Land Institute in 1977 and was published in 1978. Less than 20 years later, research efforts at The Land Institute and by other researchers familiar with research questions had satisfactorily answered the difficult biological questions launching the possibility of a new agricultural paradigm toward fruition. This new paradigm features an ecologically sound perennial food-grain-producing system where soil erosion goes to near zero, chemical contamination from agrochemicals plummets, along with agriculture's dependence on fossil fuels. NSA is predicated on an evolutionary-ecological view of the world in which the essentials for sustainable living have been sorted

out and tested in nature's ecosystems over millions of years. From numerous studies, evolutionary biologists and ecologists have learned much about how ecological bills are paid by ecosystems which hold and build soil, manage insects, pathogens and weeds. A primary feature of NSA is to sufficiently mimic the natural structure to be granted the function of its components. Domesticating wild perennials and increasing seed yield and at the same time perennializing the major crops to be planted as domestic prairies is a major goal. For the first time in 10,000 years, humans can now build an agriculture based on nature's ecosystems. As a prototype this means we explore in-depth how the never-plowed native prairie works and then develop a diverse, perennial vegetative structure capable of producing desirable edible grains in abundance including perennializing the major grain crops. A paradigm shift of relatively easily manageable proportions is. available to solve the problem of agriculture and is antithetical to solving problems in agriculture.
This citation is from AGRICOLA.

971. **Natural systems as models for the design of sustainable systems of land use.**
Ewel, J. J.
Agroforestry Systems 45 (1/3): 1-21. (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: land use/ ecosystems/ agriculture/ soil fertility/ climatic factors/ plant succession/ stress/ natural selection/ evapotranspiration/ environmental temperature/ water availability/ livestock/ species diversity/ land management/ animal husbandry/ erosion/ literature reviews
This citation is from AGRICOLA.

972. **Natural Treatment and on-Site Processes.**
Kruzic, A. P. and White, K. D.
Water Environment Research 68 (4): 498-503. (1996)
NAL Call #: TD419.R47;
ISSN: 1061-4303.
Notes: 1996 literature review
Descriptors: wastewater treatment/ septic tanks/ infiltration/ wetlands/ overland flow/ literature review/ Wastewater treatment processes
Abstract: Natural treatment systems for wastewater can be divided into two broad categories: soil-based systems, which include subsurface infiltration, rapid infiltration/soil aquifer treatment, overland flow, and slow rate systems; and aquatic systems, which include pond, floating aquatic plant, and constructed wetland systems. Many, but not all, on-site wastewater treatment systems are natural systems using septic tanks as a pretreatment.
© Cambridge Scientific Abstracts (CSA)

973. **Natural Treatment Processes and on-Site Processes.**
Kruzic, A. P.
Water Environment Research 67 (4): 470-475. (1995)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: literature review/ wastewater treatment/ infiltration/ soil disposal fields/ overland flow/ ponds/ aquatic plants/ artificial wetlands/ Wastewater treatment processes/ sewage & wastewater treatment
Abstract: Natural treatment systems for wastewater can be divided into two broad categories: soil-based systems, which include subsurface infiltration, rapid infiltration/soil aquifer treatment, overland flow, and slow rate systems; and aquatic systems, which include pond, floating aquatic plant, and constructed wetland systems. Many, but not all, on-site wastewater treatment systems are natural systems using septic tanks as a pretreatment.
© Cambridge Scientific Abstracts (CSA)

974. **A naturalist's guide to wetland plants: An ecology for eastern North America.**
Cox, Donald D.
Syracuse, N.Y.: Syracuse University Press; xvii, 194 p.: ill. (2002)
Notes: 1st ed.; Includes bibliographical references (p. 181-187) and index.
NAL Call #: QK115-.C72-2002;
ISBN: 0815607407 (pbk.)
Descriptors: Wetland plants---East---United States---Identification/ Wetland plants---North America---Identification/ Wetland plants---Ecology---East---United States/ Wetland plants---Ecology---North America
This citation is from AGRICOLA.

975. **Nematode and insect management in transitional agricultural systems.**
McSorley, R.
HortTechnology 12 (4): 597-600. (Oct. 2002-Dec. 2002)
NAL Call #: SB317.5.H68;
ISSN: 1063-0198
Descriptors: ecosystems/ plant parasitic nematodes/ insect pests/ organic farming/ cropping systems/ integrated pest management/ sustainability/ efficacy/ crops/ crop yield/ literature reviews
Abstract: As an agroecosystem makes the transition from conventional to organic practices, changes in the pest management tactics used are often apparent. Despite varying degrees of efficacy among tactics, the issue of whether or not numbers of insect and nematode pests and their damage will become more severe in an organic system depends on the specifics of the pests and crops involved. Although many conventional systems rely on reactive strategies to deal with pest problems, an alternative approach is to redesign systems so that plant health is maximized, regardless of pest numbers, although this approach takes planning and time. An abrupt transition from conventional to organic may be risky if pest numbers are high and alternative practices are not yet in place. Hybrid systems, involving decreasing levels of conventional tactics and increasing levels of organic tactics, may be needed before the transitional period begins, in order to bridge the gap and lessen the impact of crop losses during the transitional period. The design of cropping systems with minimal pest impact requires a much more extensive and specific knowledge base than needed for reactive strategies.
This citation is from AGRICOLA.

976. **Neuroptera in agricultural ecosystems.**
Stelzl, M. and Devetak, D.
Agriculture, Ecosystems and Environment 74 (1/3): 305-321. (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: neuroptera/ agricultural land/ ecosystems/ integrated pest management/ biological control/ agriculture/ habitats/ beneficial insects/ predation/ communities/ endangered species/ field crops/ orchards/ literature reviews/ indicator species/ predators of insect pests
Abstract: Due to their well known environmental needs, Neuroptera serve as valuable indicator species for assessing the ecology of natural and semi-natural habitats. In agricultural ecosystems some species of the families Chrysopidae, Hemerobiidae, and Coniopterygidae are known as beneficial predators of plant-sucking insect pests. Mass rearing and mass release of Chrysopids therefore, have become standard methods of biological pest control. The present paper summarizes information on biology and ecology of these three most important Neuropteran families, followed by a description of Neuropteran communities found in different natural and semi-natural ecosystems, with special reference to agroecosystems. Two separate sections deal with red lists of endangered species and integrated control programs. Literature lists are provided for those who want to study Neuroptera in more detail.
This citation is from AGRICOLA.

977. **New and versatile optical-immunoassay instrumentation for water monitoring.**
Willard, D.; Proll, G.; Reder, S.; and Gauglitz, G.
Environmental Science and Pollution Research 10 (3): 188-191. (2003);
ISSN: 0944-1344
This citation is provided courtesy of CAB International/CABI Publishing.

978. **New strategies for America's watersheds.**
National Research Council. Committee on Watershed Management
Washington DC: National Academies Press; 328 p. (1999);
ISBN: 0-309-08373-7
http://www.nap.edu/books/0309064171/html/
Descriptors: watersheds/ water quality/ watershed management

979. **Nitrate and selected pesticides in ground water of the Mid-Atlantic region.**
Ator, Scott W.; Ferrari, Matthew J.; Geological Survey (U.S.); and United States. Environmental Protection Agency.
Baltimore, Md.: U.S. Geological Survey; 8 p.: col. ill., col. maps; Series: Water-resources investigations report 97-4139. (1997)
Notes: Caption title. Includes bibliographical references (p. [8]).
NAL Call #: GB701.W375—no.97-4139
Descriptors: Groundwater---Pollution---Middle Atlantic States/ Nitrates---Environmental aspects---Middle Atlantic States/ Pesticides---Environmental aspects---Middle Atlantic States
This citation is from AGRICOLA.

980. **Nitrate in the ground waters of the United States: Assessing the risk.**
Nolan, B. T.; Ruddy, B. C.; and National Water Quality Assessment Program (U.S.).
Reston, Va.: U.S. Geological Survey, 1997.
Notes: USGS NAWQA fact sheet 092-96; At head of title: National Water-Quality Assessment Program.
NAL Call #: TD427.N5N65-1997
http://water.usgs.gov/nawqa/FS-092-96.html
Descriptors: Water---Nitrogen content---United States/ Groundwater---Pollution---United States/ Water quality---United States
This citation is from AGRICOLA.

981. **Nitrate removal in stream riparian zones.**
Hill, A. R.
Journal of Environmental Quality 25 (4): 743-755. (July 1996-Aug. 1996)
NAL Call #: QH540.J6;
ISSN: 0047-2425 [JEVQAA]
Abstract: This review considers the role of stream riparian zones in regulating the transport of nitrate (NO3(-)) in groundwater flow from uplands to streams. The current consensus is that most riparian zones effectively remove NO3(-) from subsurface water. However, research has not focused on the relationship between hydrology and chemistry within the context of the riparian zone hydrogeologic setting. Most riparian zones that remove NO3(-) occur in landscapes with impermeable layers near the ground surface. In this setting, small amounts of groundwater follow shallow horizontal flow paths that increase water residence time and contact with vegetation roots and organic-rich riparian soils. Limited research suggests that riparian zones have less effect on NO3(-) transport in hydrogeologic settings where groundwater has little interaction with vegetation and sediments because flow occurs mainly across the surface, or at depth beneath the riparian zone before discharging to the stream. Considerable uncertainty surrounds the relative importance of vegetation uptake and microbial denitrification in NO3(-) removal from subsurface water in riparian zones. Plant NO3(-) uptake requires the presence of the root zone below the water table. Information is lacking on the vertical distribution and seasonal dynamics of fine root biomass in relation to water table fluctuations. High denitrification rates have been reported in 0 to 10 cm surface soils of riparian zones in the USA, France, and New Zealand. However, rapid NO3(-) removal from groundwater also occurs in riparian locations where the water table is always > 0.5 m below the surface. Denitrification at depth within the saturated zone has been studied to a limited extent and has been found not to occur at some sites. An interdisciplinary approach in which patterns of NO3(-) depletion and the role of NO3(-) removal processes are related to groundwater flow paths is needed to provide a better understanding of NO3(-) regulation in riparian zones.
This citation is from AGRICOLA.

982. **Nitrates in groundwater in the southeastern USA.**
Hubbard, R. K. and Sheridan, J. M.
In: Contamination of groundwaters/ Adriano, D. C.; Iskandar, A. K.; and Murarka, I. P.
Northwood, UK: Science Reviews, 1994; pp. 303-345.
ISBN: 0-905927-44-3
This citation is provided courtesy of CAB International/CABI Publishing.

983. **Nitrogen and phosphorus consumption, utilisation and losses in pig production: Denmark.**
Fernandez, J A; Poulsen, H D; Boisen, S; and Rom, H B
Livestock Production Science 58 (3): 225-242. (1999)
NAL Call #: SF1.L5;
ISSN: 0301-6226

Descriptors: ammonia: emission/ nitrogen: consumption, loss, utilization/ phosphorus: consumption, utilization, loss/ pig (Suidae)/ Animals/ Artiodactyls/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ legislation/ manure environmental pollution/ pig production
Abstract: Swine production in Denmark has increased by more than 50% in the past 20 years and in this time the structure of production has changed markedly towards larger units. This has resulted in a serious threat to the local environment. Consequently, legislative measures with a progressive degree of restriction have been introduced. The annual production of slurry from pigs amounted to about 12.5 million tons in 1995, containing about 104 000 tons of N and 25 000 tons of P. Ammonia emission from pig buildings in 1996 was about 16 000 tons. Production of one standard pig (about 100-kg live weight) generated a total excretion of about 5 kg N and 1.2 kg P in 1997. Sows, weaners and growing pigs contributed 22, 13 and 63% to N excretion and 26, 15 and 59% to P excretion, respectively. Nitrogen and phosphorus losses from pig production in Denmark are discussed in relation to legislative and nutritional measures.
© Thomson

984. **Nitrogen and phosphorus consumption, utilisation and losses in pig production: France.**
Dourmad, J Y; Guingand, N; Latimier, P; and Seve, B
Livestock Production Science 58 (3): 199-211. (1999)
NAL Call #: SF1.L5;
ISSN: 0301-6226
Descriptors: ammonia/ nitrogen: consumption, feces, urine/ phosphorus: consumption, urine, feces/ pig (Suidae)/ Animals/ Artiodactyls/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ manure pollution/ pig production
Abstract: Although pig density in France (80 pigs produced/year/km2) is lower than on average in the European Union (140 pigs/year/km2), some regions with intensive animal production (720 pigs/year/km2) have to face environmental problems related to a surplus of animal manure. According to the legislation, the amount of nitrogen from animal manure should not exceed 170 kg/ha. The actual situation for nitrogen and phosphorus consumption, utilisation and losses in pig production in France is described in this paper. It was calculated that on average 67% of the N and 66% of the P consumed by the pigs is excreted in faeces and urine. Improvements in feeding techniques could reduce by 15 to 30% N and P excretion by the animals, and ammonia losses in the atmosphere. The nutritional basis for these improvements is described.
© Thomson

985. **Nitrogen and the industry processing of pig manure.**
Have PJ.
In: Nitrogen flow in pig production and environmental consequences: Proceedings of the First International Symposium. (Held 8 Jun 1993-11 Jun 1993 at Wageningen, The Netherlands.) Verstegen, MW; Hartog, LA; Kempen, GJ; and Metz, JH (eds.); pp. 386-397; 1993.
This citation is provided courtesy of CAB International/CABI Publishing.

986. **Nitrogen biomarkers and their fate in soil.**
Amelung, W.
Journal of Plant Nutrition and Soil Science / Zeitschrift fur Pflanzenernahrung und Bodenkunde 166 (6): 677-686. (2003)
NAL Call #: 384 Z343A;
ISSN: 1436-8730.
Notes: Number of References: 83; Publisher: Wiley-V C H Verlag Gmbh
Descriptors: Agriculture/ Agronomy/ soil organic nitrogen/ amino sugars/ amino acid enantiomers/ microbial residues/ cell aging/ racemization/ amino acid racemization/ Conservation Reserve Program/ dissolved organic matter/ South African highveld/ microbial residues/ aspartic acid/ murchison meteorite/ marine sediments/ North America/ sandy soils
Abstract: More than 90 % of the nitrogen (N) in soils can be organically bound, but the mechanisms and rates by which it is cycled have eluded researchers. The objective of this research was to contribute to a better understanding of the origin and transformation of soil organic N (SON) by using amino sugars and the enantiomers of amino acids as markers for microbial residues and/or aging processes. Studied samples presented here comprised (1) soil transects across different climates, (2) arable soils with different duration of cropping, and (3) radiocarbon-dated soil profiles. The results suggested that increased microbial alteration of SON temporarily results in a sequestration of N in microbial residues, which are mineralized at later stages of SON decomposition. Microorganisms increasingly sequestered N within intact cell wall residues as frost periods shortened. At a mean annual temperature above 12-15 degreesC, these residues were mineralized, probably due to limitations in additional substrates. Breaking the grassland for cropping caused rapid SON losses. Microbial residues were decomposed in preference to total N, this effect being enhanced at higher temperatures. Hence, climate and cultivation interactively affected SON dynamics. Nevertheless, not all SON was available to soil microorganisms. In soil profiles, L-aspartic acid and L-lysine slowly converted into their D-form, for lysine even at a similar rate in soils of different microbial activity. Formation of D-aspartate with time was, therefore, induced by microorganisms while that of D-lysine was not. The racemization of the two amino acids indicates that SON not available to microorganisms ages biotically and abiotically. In native soils, the latter is conserved for centuries, despite N deficiency frequently occurring in living terrestrial environments. Climate was not found to affect the fate of old protein constituents in surface soil. When native grassland was broken for cropping, however, old SON constituents had become available to microorganisms and were degraded.
© Thomson ISI

987. **Nitrogen cycling under different soil management systems.**
Martens, D. A.
Advances in Agronomy 70: 143-192. (2001)
NAL Call #: 30-Ad9;
ISSN: 0065-2113
This citation is provided courtesy of CAB International/CABI Publishing.

988. **Nitrogen Dynamics and Buffer Zones.**
Gilliam, J. W.
In: Buffer Zones: Their Processes and Potential in Water Protection Conference Handbook. (Held 30 Aug 1996-2 Sep 1996 at Oxfordshire, UK.) Cardigan, UK: Samara Publishing Limited; pp. 17; 1996.
Notes: Conference: Int. Conf. Buffer Zones: Their Processes and Potential in Water Protection, Woodstock, Oxfordshire (UK), 30 Aug-2 Sep 1996
Descriptors: riparian land/ nitrogen removal/ dynamics/ groundwater movement/ nitrates/ denitrification/ literature review/ water quality control/ organic carbon/ buffer zones/ Water quality control
Abstract: Riparian buffer areas are very effective in removal of nitrate from groundwater moving through them as shown by research in several countries. Reductions of greater than 90% have frequently been measured. However, removals are greatly affected by hydrologic conditions present in the riparian areas and complete hydrologic information is usually missing in riparian studies. Most authors attribute the changes in nitrate concentration to denitrification although many measurements of concentration changes along apparent ground-water flow paths have occurred in soil layers with low levels of organic carbon. This has lead some to question whether the concentration changes are a result of denitrification or simply dilution by water from other sources. The current ideas on this topic, information on nitrous oxide loss in riparian areas and opinions of the author will be presented.

989. **Nitrogen excess in North American ecosystems: Predisposing factors, ecosystem responses, and management strategies.**
Fenn, Mark E; Poth, Mark A; Aber, John D; Baron, Jill S; Bormann, Bernard T; Johnson, Dale W; Lemly, A Dennis; McNulty, Steven G; Ryan, Douglas F; and Stottlemyer, Robert
Ecological Applications 8 (3): 706-733. (1998)
NAL Call #: QH540.E23;
ISSN: 1051-0761
Descriptors: nitrate: leaching, pollutant/ nitrogen: atmospheric deposition, cycling, limitation/ soil organic matter/ ecosystem responses/ eutrophication/ fertilization/ forest ecosystem/ management strategies/ soil acidification/ vegetation uptake
Abstract: Most forests in North America remain nitrogen limited, although recent studies have identified forested areas that exhibit symptoms of N excess, analogous to overfertilization of arable land. Nitrogen excess in watersheds is detrimental because of disruptions in plant/soil nutrient relations, increased soil acidification and aluminum mobility, increased emissions of nitrogenous greenhouse gases from soil, reduced methane consumption in soil, decreased water quality, toxic effects on freshwater biota, and eutrophication of coastal marine waters. Elevated nitrate (NO3-) loss to groundwater or surface waters is the primary symptom of N excess. Additional symptoms include increasing N concentrations and higher N:nutrient ratios in foliage (i.e., N:Mg, N:P), foliar accumulation of amino acids or NO3-, and low soil C:N ratios. Recent nitrogen-fertilization studies in New England and Europe provide preliminary evidence that some forests receiving chronic N inputs may decline in productivity and experience greater mortality. Long-term fertilization at Mount Ascutney, Vermont, suggests that declining and slow N-cycling coniferous stands may be replaced by fast-growing and fast N-cycling deciduous forests. Symptoms of N saturation are particularly severe in high-evaluation, nonaggrading spruce-fir ecosystems in the Appalachian Mountains and in eastern hardwood watersheds at the Fernow Experimental Forest near Parsons, West Virginia. In the Los Angeles Air Basin, mixed conifer forests and chaparral watersheds with high smog exposure are N saturated and exhibit the highest streamwater NO3- concentrations for wildlands in North America. High-elevation alpine watersheds in the Colorado Front Range and a deciduous forest in Ontario, Canada, are N saturated, although N deposition is moderate (apprx 8 kgcntdotha-1cntdotyr-1). In contrast, the Harvard Forest hardwood stand in Massachusetts has absorbed > 900 kg N/ha during 8 yr of N amendment studies without significant NO3- leaching, illustrating that ecosystems vary widely in the capacity to retain N inputs. Overly mature forests with high N deposition, high soil N stores, and low soil C:N ratios are prone to N saturation and NO3- leaching. Additional characteristics favoring low N retention capacity include a short growing season (reduced plant N demand) and reduced contact time between drainage water and soil (i.e., porous coarse-textured soils, exposed bedrock or talus). Temporal patterns of hydrologic fluxes interact with biotic uptake and internal cycling patterns in determining ecosystem N retention. Soils are the largest storage pool for N inputs, although vegetation uptake is also important. Recent studies indicate that nitrification may be widespread in undisturbed ecosystems, and that microbial assimilation of NO3- may be a significant N retention mechanism, contrary to previous assumptions. Further studies are needed to elucidate the sites, forms, and mechanisms of N retention and incorporation into soil organic matter, and to test potential management options for mitigating N losses from forests. Implementation of intensive management practices in N-saturated ecosystems may only be feasible in high-priority areas and on a limited scale. Reduction of N emissions would be a preferable solution, although major reductions in the near future are unlikely in many areas due to economic, energy-use, policy, and demographic considerations.

990. **Nitrogen fate and transport in agricultural systems.**
Follett, R. F. and Delgado, J. A.
Journal of Soil and Water Conservation 6 (57): 402-408. (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/ nitrous oxide/ nitric oxide/ emission/ ammonia/ volatilization/ denitrification/ agricultural land/ agricultural soils/ water erosion/ soil flora/ soil biology
This citation is from AGRICOLA.

991. **Nitrogen fertilization management for no-till cereal production in the Canadian Great Plains: A review.**
Malhi, S. S.; Grant, C. A.; Johnston, A. M.; and Gill, K. S.
Soil and Tillage Research 60 (3/4): 101-122. (2001)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

992. **Nitrogen in the environment: Sources, problems, and management.**
Follett, R. F. and Hatfield, Jerry L.
Amsterdam; New York: Elsevier; xviii, 520 p.: ill. (2001)
Notes: 1st ed.; Includes bibliographical references and index.
NAL Call #: S651-.N59-2001;
ISBN: 0444504869 (alk. paper)
Descriptors: Nitrogen fertilizers/ Nitrogen fertilizers---Environmental aspects
This citation is from AGRICOLA.

993. **Nitrogen losses and fertilizer N use efficiency in irrigated porous soils.**
Aulakh, M. S. and Bijay Singh.
Nutrient Cycling in Agroecosystems 47 (3): 197-212. (1996)
NAL Call #: S631.F422;
ISSN: 1385-1314 [NCAGFC]
Descriptors: sandy soils/ sandy loam soils/ coarse textured soils/ irrigated conditions/ flooding/ nitrogen/ losses from soil/ ammonia/ volatilization/ nitrification/ identification/ leaching/ nitrogen fertilizers/ use efficiency/ groundwater pollution/ literature reviews/ loamy sand soils
Abstract: Porous soils are characterized by high infiltration, low moisture retention and poor fertility due to limitation of organic matter and nitrogen (N). However, wherever irrigated and properly managed, these are among the most productive soils in the world. For sustained productivity and prevention of N related pollution problems, fertilizer N management in porous soils needs to be improved by reducing losses of N via different mechanisms. Losses of N through ammonia volatilization are not favoured in porous soils provided fertilizer N is applied before an irrigation or rainfall event. Ammonium N transported to depth along with percolating water cannot move back to soil surface where it is prone to be lost as NH3. Under upland conditions nitrification proceeds rapidly in porous soils. Due to high water percolation rates in porous soils, continuous flooding for rice production usually cannot be maintained and alternate flood and drained conditions are created. Nitrification proceeds rapidly during drained conditions and nitrates thus produced are subsequently reduced to N2 and N2O through denitrification upon reflooding. Indirect N-budget estimates show that up to 50% of the applied N may be lost via nitrification-denitrification in irrigated porous soils under wetland rice. High soil nitrate N levels and sufficient downward movement of rain water to move nitrate N below the rooting depth are often encountered in soils of humid and subhumid zones, to a lesser extent in soils of semiarid zone and quite infrequently, if at all in arid zone soils. The few investigations carried out with irrigated porous soils do not show substantial leaching losses of N beyond potential rooting zone even under wetland rice. However, inefficient management of irrigation water and fertilizer N particularly with shallow rooted crops may lead to pollution of groundwater due to nitrate leaching. At a number of locations, groundwater beneath irrigated porous soils is showing increased nitrate N concentrations. Efficient management of N for any cropping system in irrigated porous soils can be achieved by plugging losses of N via different mechanisms leading to both high crop production and minimal pollution of the environment.
This citation is from AGRICOLA.

994. **Nitrogen management and sustainability.**
Jarvis, S. C.
In: Grass for diary cattle/ Cherney, J. H. and Cherney, D. J., 1998; pp. 161-192
This citation is provided courtesy of CAB International/CABI Publishing.

995. **Nitrogen management in dryland cropping systems.**
Westfall, D. G.; Havlin, J. L.; Hergert, G. W.; and Raun, W. R.
Journal of Production Agriculture 9 (2): 192-199. (Apr. 1996-June 1996)
NAL Call #: S539.5.J68;
ISSN: 0890-8524 [JPRAEN].
Notes: Paper presented at the symposium "Cropping Systems of the Great Plains" held during the ASA-CSSA-SSSA annual meetings 1994, Seattle. Includes references.
Descriptors: dry farming/ intensive cropping/ sustainability/ fertilizer requirement determination/ nitrogen fertilizers/ application rates/ crop management/ minimum tillage/ no-tillage/ crop yield/ triticum/ zea mays/ helianthus/ placement/ soil testing/ sampling/ nitrogen/ mineralization/ nutrient sources/ environmental impact/ nitrate/ leaching/ surface water/ water quality/ nitrogen cycle/ literature reviews/ great plains states of USA/ nitrogen fertilizer management/ nutrient management
Abstract: Management of fertilizer N in dryland cropping systems in the semi-arid Great Plains is important to the economic and environmental sustainability of these systems. As producers shift from the traditional tilled winter wheat (Triticum aestivum L.)-fallow (WF) cropping systems to those that include summer crops in the rotation, N management becomes more important because yield losses as a result of underfertilization become greater. Fertilizer N rate is more important in obtaining optimum yields of dryland crops than N placement in drier environments, while placement becomes more important as rainfall increases. Soil testing is an accurate method of quantifying the residual soil nitrate-N level in the root zone. However, a combination of soil testing, fertilizer N experiences of the producer, and projected N requirement (expected yield) are the best factors producers can use in determining fertilizer N rates. If soil testing occurs early in the spring/summer fallow period preceding planting, a correction to the fertilizer N recommendation should be made to account for N mineralization that occurs between soil sampling and planting. This can prevent overfertilization. Dryland systems appear to have a soil-plant N buffer capacity that prevents inorganic N accumulation at fertilizer N rates that exceed optimal N requirements to meet crop needs. Recent research has reported N buffering in the range of 21 to 76 lb N/acre per yr for annually cropped dryland wheat production systems. This means that the application of from 21 to 76 lb N/acre per yr did not result in an accumulation of inorganic N in the soil. This concept should be evaluated on additional datasets, and, if found to

be applicable to a range of conditions it could have an effect on establishing environmentally safe fertilizer N rates for dryland cropping systems.
This citation is from AGRICOLA.

996. **Nitrogen management in irrigated agriculture.**
Rauschkolb, Roy S. and Hornsby, Arthur G.
New York: Oxford University Press; xi, 251 p.: ill. (1994)
Notes: Includes bibliographical references (p. 230-245) and index.
NAL Call #: S619.N57R38--1994;
ISBN: 0195078357 (acid-free paper)
Descriptors: Irrigation farming/ Nitrogen in agriculture---Management/ Crops and nitrogen
This citation is from AGRICOLA.

997. **Nitrogen management strategies to reduce nitrate leaching in tile-drained Midwestern soils.**
Dinnes, D. L.; Karlen, D. L.; Jaynes, D. B.; Kaspar, T. C.; Hatfield, J. L.; Colvin, T. S.; and Cambardella, C. A.
Agronomy Journal 94 (1): 153-171. (Jan. 2002-Feb. 2002)
NAL Call #: 4-AM34P;
ISSN: 0002-1962 [AGJOAT]
Descriptors: soil fertility/ nitrogen/ soil management/ leaching/ tile drainage/ application rates/ groundwater/ groundwater pollution/ water pollution/ surface water/ use efficiency/ water quality/ tillage/ crops/ soil organic matter/ hydrology/ air temperature/ precipitation/ monitoring/ rotations/ cover crops/ conservation tillage/ placement/ nitrification inhibitors/ wetlands/ biological filtration/ literature reviews/ United States
Abstract: Balancing the amount of N needed for optimum plant growth while minimizing the NO3 that is transported to ground and surface waters remains a major challenge for everyone attempting to understand and improve agricultural nutrient use efficiency. Our objectives for this review are to examine how changes in agricultural management practices during the past century have affected N in Midwestern soils and to identify the types of research and management practices needed to reduce the potential for nonpoint NO3 leakage into water resources. Inherent soil characteristics and management practices contributing to nonpoint NO3 loss from Midwestern soils, the impact of NO3 loading on surface water quality, improved N management strategies, and research needs are discussed. Artificial drainage systems can have a significant impact on water quality because they behave like shallow, direct conduits to surface waters. Nonpoint loss of NO3 from fields to water resources, however, is not caused by any single factor. Rather, it is caused by a combination of factors, including tillage, drainage, crop selection, soil organic matter levels, hydrology, and temperature and precipitation patterns. Strategies for reducing NO3 loss through drainage include improved timing of N application at appropriate rates, using soil tests and plant monitoring, diversifying crop rotations, using cover crops, reducing tillage, optimizing N application techniques, and using nitrification inhibitors. Nitrate can also be removed from water by establishing wetlands or biofilters. Research that is focused on understanding methods to minimize NO3 contamination of water resources should also be used to educate the public about the complexity of the problem and the need for multiple management strategies to solve the problem across agricultural landscapes.
This citation is from AGRICOLA.

998. **Nitrogen modeling for soil management.**
Shaffer, M. J.
Journal of Soil and Water Conservation 57 (6): 417-425. (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 cycle/ nitrate nitrogen/ leaching/ soil fertility/ nitrogen fertilizers/ fertilizer requirement determination/ soil organic matter/ organic nitrogen compounds/ nitrous oxide/ nitrogen/ emission/ soil biology/ soil flora/ geographical information systems/ simulation models/ computer simulation/ literature reviews
This citation is from AGRICOLA.

999. **Nitrogen pollution in the northeastern United States: Sources, effects, and management options.**
Driscoll, C. T.; Whitall, D.; Aber, J.; Boyer, E.; Castro, M.; Cronan, C.; Goodale, C. L.; Groffman, P.; Hopkinson, C.; and Lambert, K.
Bioscience 53 (4): 357-374. (Apr. 2003)
NAL Call #: 500 Am322A;
ISSN: 0006-3568 [BISNAS]
Descriptors: air pollution/ water pollution/ ozone/ forests/ estuaries/ pollution control/ simulation models/ northeastern states of USA
This citation is from AGRICOLA.

1000. **Nitrogen pools and processes in agricultural systems of Coastal British Columbia: A review of published research.**
Kowalenko, C. G.
Canadian Journal of Plant Science 80 (1): 1-10. (2000)
NAL Call #: 450-C16.
Notes: Number of References: 45; From: Nutrient cycling in crop cultural systems: 78th Annual Conference of the Agricultural Institute of Canada / Vancouver, British Colombia, 8 July 1998
This citation is provided courtesy of CAB International/CABI Publishing.

1001. **Nitrogen turnover in soil after application of animal manure and slurry as studied by the stable isotope 15N: A review.**
Dittert K; Goerges T; and Sattelmacher B
Journal of plant nutrition and soil science = Zeitschrift für Pflanzenernährung und Bodenkunde 161 (4): 453-463; 3 ref. (1998)
This citation is provided courtesy of CAB International/CABI Publishing.

1002. **Nitrogen use in vegetable crops in temperate climates.**
Schenk, M. K.
Horticultural Reviews 22: 185-223. (1998)
NAL Call #: SB317.5.H6;
ISSN: 0163-7851 [HORED5]
Descriptors: crops/ vegetables/ nitrogen fertilizers/ application rates/ temperate climate/ nitrate/ ammonium/ nutrient uptake/ fertilizer requirement determination/ nutrient requirements/ growth rate/ nutrient transport/ root systems/ soil fertility/ mineralization/ growth period/ nitrogen content/ sap/ application methods/ split dressings/ placement/

nitrification/ inhibition/ slow release fertilizers/ crop management/ organic matter/ irrigation/ chloride/ literature reviews
This citation is from AGRICOLA.

1003. **Nitrous oxide emission from agricultural soils.**
Beauchamp, E. G.
Canadian Journal of Soil Science 77 (2): 113-123. (1997)
NAL Call #: 56.8 C162 .
Notes: Number of References: 82; From: Proceedings of Quebec City Symposium on Greenhouse Gas Emissions from Soil Ecosystems, Quebec, Canada, 1995
This citation is provided courtesy of CAB International/CABI Publishing.

1004. **Nitrous Oxide Emissions and the Anthropogenic Nitrogen in Wastewater and Solid Waste.**
Barton, P. K. and Atwater, J. W.
Journal of Environmental Engineering 128 (2): 137-150. (2002);
ISSN: 0733-9372.
Notes: DOI: 10.1061/(ASCE)0733-9372(2002)128:2(137)
Descriptors: Solid wastes/ Nitrous oxide/ Wastewater/ Emissions/ Greenhouse gases/ Nitrogen cycle/ Air Pollution / Path of Pollutants/ Fate of Pollutants/ Cycling Nutrients/ Nitrogen Compounds/ Atmospheric Chemistry/ Reviews/ Research Priorities/ Waste Management/ Wastewater Treatment/ Waste Disposal/ Pollution (Air)/ Climatic changes/ Air pollution/ Sources and fate of pollution/ Sewage/ Air Pollution: Monitoring, Control & Remediation
Abstract: In the 20th century, human interference in the nitrogen cycle has caused a doubling of the global nitrogen fixation rate (an element critical in the proteins of all organisms), thereby intensifying global nitrous oxide (N sub(2)O) production during microbial nitrification and denitrification. Nitrous oxide is a powerful greenhouse gas, important in climate change, and as well, is a stratospheric ozone-depleting substance. It is likely that much of the Earth's population now relies on anthropogenic nitrogen in its food supplies, resulting in anthropogenic nitrogen contained in wastes requiring management. Food production is considered as a source of global nitrous oxide emissions; however, the nitrogen in wastewater and solid wastes may be a significant fate of much anthropogenic nitrogen. This factor has largely escaped in-depth, critical analysis from the perspective of nitrous oxide emissions. This paper introduces nitrogen cycling and nitrous oxide production and reviews the research currently available on N sub(2)O emissions from wastewater treatment operations, landfilling, composting, and incineration; demonstrating that each process can emit large amounts of this important gas. This is followed by a discussion of the limited research. The relative importance of N sub(2)O in waste management is also estimated, indicating that wastewater treatment may be the most important operation for managing anthropogenic nitrogen in wastes.
© Cambridge Scientific Abstracts (CSA)

1005. **Nitrous oxide emissions derived from N leaching.**
Groffman, P. M.; Gold, A. J.; Kellogg, D. Q.; and Addy, K.
DIAS Report, Plant Production (81): 143-155. (2002)
NAL Call #: SB187.D4 D54 nr. 81;
ISSN: 1397-9884
This citation is provided courtesy of CAB International/CABI Publishing.

1006. **Nitrous oxide emissions from grazed grassland.**
Oenema, O; Velthof, G L; Yamulki, S; and Jarvis, S C
Soil Use and Management 13 (4 [supplement]): 288-295. (1997)
NAL Call #: S590.S68;
ISSN: 0266-0032
Descriptors: nitrous oxide: emission, greenhouse gas/ livestock (Mammalia): grazer/ Animals/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ agriculture/ climate change/ grazed grassland
Abstract: Grazing animals on managed pastures and rangelands have been identified recently as significant contributors to the global N2O budget. This paper summarizes relevant literature data on N2O emissions from dung, urine and grazed grassland, and provides an estimate of the contribution of grazing animals to the global N2O budget. The effects of grazing animals on N2O emission are brought about by the concentration of herbage N in urine and dung patches, and by the compaction of the soil due to treading and trampling. The limited amount of experimental data indicates that 0.1 to 0.7% of the N in dung and 0.1 to 3.8% of the N in urine is emitted to the atmosphere as N2O. There are no pertinent data about the effects of compaction by treading cattle on N2O emission yet. Integral effects of grazing animals have been obtained by comparing grazed pastures with mown-only grassland. Grazing derived emissions, expressed as per cent of the amount of N excreted by grazing animals in dung and urine, range from 0.2 to 9.9%, with an overall mean of 2%. Using this emission factor and data statistics from FAO for numbers of animals, the global contribution of grazing animals was estimated at 1.55 Tg N2O-N per year. This is slightly more than 10% of the global budget.
© Thomson

1007. **No-till vegetable production: Its time is now.**
Morse, R. D.
HortTechnology 9 (3): 373-379. (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: vegetables/ crops/ no-tillage/ direct sowing/ transplanting/ transplanters/ farm machinery/ weed control/ cover crops/ green manures/ crop residues/ crop management/ literature reviews
Abstract: Advantages of no-till (NT) production systems are acknowledged throughout the world. During the 1990s, production of NT vegetable crops has increased for both direct seeded and transplanted crops. Increased interest in reduced-tillage systems among research workers and vegetable growers is attributed to: 1) development and commercialization of NT transplanters and seeders, 2) advancements in the technology and practice of producing and managing high-residue cover crop mulches, and 3) improvements and acceptance of integrated weed management techniques. Results from research experiments and grower's fields over the years has shown that success with NT transplanted crops is highly dependent on achieving key

production objectives, including: 1) production of dense, uniformly distributed cover crops; 2) skillful management of cover crops before transplanting, leaving a heavy, uniformly distributed killed mulch cover over the soil surface; 3) establishment of transplants into cover crops with minimum disturbance of surface residues and surface soil; and 4) adoption of year-round weed control strategies.
This citation is from AGRICOLA.

1008. **No-tillage visions: Protection of soil, water and climate and influence on management and farm income.**
Tebrügge, F.
In: Conservation agriculture: Environment, farmers experiences, innovations, socio-economy, policy/ García-Torres, L.; Benites, J.; Martínez-Vilela, A.; and Holgado-Cabrera, A.
Dordrecht, The Netherlands: Kluwer Academic, 2003; pp. 327-340
ISBN: 1-4020-1106-7
NAL Call #: S604.5 .C64 2003
This citation is provided courtesy of CAB International/CABI Publishing.

1009. **Non-chemical weed management in organic farming systems.**
Bond, W. and Grundy, A. C.
Weed Research 41 (5): 383-405. (Oct. 2001)
NAL Call #: 79.8-W412;
ISSN: 0043-1737 [WEREAT]
Descriptors: organic farming/ farming systems/ weed control/ heat/ cultivation/ rotations/ cultivars/ mulching/ ground cover/ competitive ability/ detection/ steam/ literature reviews/ mechanical weed control/ thermal weed control
This citation is from AGRICOLA.

1010. **Nonpoint and point sources of nitrogen in major watersheds of the United States.**
Puckett, L. J. and Geological Survey (U.S.). Reston, Va.:
U.S. Geological Survey, 1994. 9 p.
Notes: Includes bibliographical references (p. 9).
NAL Call #: GB701.W375--no.94-4001
http://water.usgs.gov/nawqa/wri94-4001/wri94-4001main.html
Descriptors: Nonpoint source pollution---United States/ Water---Nitrogen content---United States/ Water---Pollution---United States/ Point source identification
This citation is from AGRICOLA.

1011. **Nonpoint pollution of surface waters with phosphorus and nitrogen.**
Carpenter SR; Caraco NF; Correll DL; Howarth RW; Sharpley AN; and Smith VH
Ecological Applications 8 (3): 559-568; 3 ref. (1998)
NAL Call #: QH540.E23
This citation is provided courtesy of CAB International/CABI Publishing.

1012. **Nonpoint Sources.**
Line, D. E.; Arnold, J. A.; Osmond, D. L.; Coffey, S. W.; and Gale, J. A.
Water Environment Research 65 (6): 558-571. (1993)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Literature review/ Model studies/ Nonpoint pollution sources/ Path of pollutants/ Reviews/ Water pollution control/ Water pollution sources/ Agricultural runoff/ Economic aspects/ Hydrologic models/ Monitoring/ Nutrients/ Pesticides/ Sediment transport/ Solute transport/ Sources and fate of pollution/ Water quality control
Abstract: Nonpoint source pollution (NSP) originates from generally diffuse land areas that intermittently contribute pollutants to surface and groundwater. The literature is reviewed on several aspects of NSP including policy, economics, and management issues; effects of NSP on surface and groundwater; best management practices (BMPs) for NSP control; and modeling and monitoring NSP. The option of effluent trading, the allocation of pollutant loading reductions for NSP using least cost as the criterion has been evaluated as an economical supplement to traditional regulatory programs addressing water quality problems. NSP control program discussions focus on the effectiveness of federal and state efforts to control NSP and restore or protect water quality. Examples of NSP include agricultural runoff (pesticides and fertilizers), soil erosion, toxic organic chemicals, and nutrients. BMPs studied for control of NSP include erosion control measures (tillage and crop planting practices), terracing, vegetative filter strips, constructed wetlands, and urban runoff and stormwater control. Mathematical modeling of water quality is a useful tool in decision making and evaluating management practices for NSP controls. New erosion and sediment transport models are continuously being developed while the components of established models are constantly being modified. Several studies have been conducted to assess the predictive capabilities of some well-known NSP models. Models may predict the fate of pollutants in surface waters, groundwater, and at the watershed level. The use of sophisticated database management and data acquisition tools has improved and expanded the utility of NSP models. The monitoring of NSP is studied in several papers. Risk-assessment articles which deal with the economic risk to the farmer and environmental risk from NSP are also reviewed. (Geiger-PTT) 35 013011055

1013. **Nonpoint Sources.**
Line, D. E.; Osmond, D. L.; Coffey, S. W.; Arnold, J. A.; Gale, J. A.; Spooner, J.; and Jennings, G. D.
Water Environment Research 66 (4): 585-594. (1994)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: water pollution/ nonpoint pollution sources/ literature review/ surface water/ groundwater pollution/ economic aspects/ water pollution control/ model studies/ monitoring/ water management/ groundwater pollution/ pollution control/ pollution monitoring/ non point pollution sources/ Sources and fate of pollution/ Prevention and control
Abstract: Nonpoint source (NPS) pollution originates from diffuse land areas that intermittently contribute pollutants to surface and ground water. This article is a review of 1993 literature on several aspects of NPS pollution, including policy, economics, and management issues; effects and extent of NPS pollutants in surface and ground water; NPS pollution controls; and modeling an of NPS pollution.

1014. **Nonpoint sources.**
Line, D. E.; Osmond, D. L.; Arnold, J. A.; Coffey, S. W.; Spooner, J.; and Jennings, G. D.
Water Environment Research 67 (4): 685-700. (1995)
NAL Call #: TD419.R47;
ISSN: 1047-7624
This citation is provided courtesy of CAB International/CABI Publishing.

1015. **Nonpoint Sources.**
Line, D. E.; Osmond, D. L.; Gannon, R. W.; Coffey, S. W.; Jennings, G. D.; Gale, J. A.; and Spooner, J.
Water Environment Research 68 (4): 720-732. (1996)
NAL Call #: TD419.R47;
ISSN: 1061-4303.
Notes: 1996 literature review
Descriptors: Sources and fate of pollution/ Secondary publication and distribution/ Freshwater pollution/ Behavior and fate characteristics/ Marine/ Brackish water
Abstract: Nonpoint source (NPS) pollution originates from diffuse land areas that intermittently contribute pollutants to surface and ground water. This article is a review of 1995 literature on several aspects of NPS pollution, including policy, economics, and management issues; effects and extent of pollutants in surface and ground water; pollution controls; and modeling and monitoring. Several publications addressed the broad topic of nonpoint sources. Novotny and Olem (1994) discussed prevention, identification, and management issues related to the control of NPS pollution, including laws, regulations, and policies; hydrologic considerations; atmospheric deposition; erosion and sedimentation; urban pollution; toxic pollution; modeling and monitoring; agricultural issues; wetlands; management and restoration; and integrated planning and control of NPS pollution on a watershed basis. A book examining nitrogen fertilization, fixation, and loss and the environmental implications of alternative nitrogen sources on ecosystems was published (Bacon, 1995). Herricks and Jenkins (1995) edited a book on assessing, controlling, and improving the quality of stormwater runoff from industrial and municipal areas. Proceedings of a conference on surface water quality and ecology (Water Environment Federation, 1995) focused on a wide range of topics, including the Everglades, sediment impacts on water quality, marine and estuarine systems, watershed management, water quality criteria and standards, environmental modeling and monitoring, natural systems, stormwater impacts, and risk assessment. Proceedings of a conference on animal waste management provided an interdisciplinary discussion of animal waste and its interactions with soil and water within a watershed framework (Steele, 1995). The National Agricultural Library published bibliographies on dairy farm manure management (Makuch, 1995a) and NPS pollution issues (Makuch, 1995b).

1016. **Nonpoint sources.**
Line, D. E.; Osmond, D. L.; Coffey, S. W.; McLaughlin, R. A.; Jennings, G. D.; Gale, J. A.; and Spooner, J.
Water Environment Research 69 (4): 844-860. (1997)
NAL Call #: TD419.R47;
ISSN: 1047-7624
This citation is provided courtesy of CAB International/CABI Publishing.

1017. **Nonpoint Sources.**
Line, D. E.; Mclaughlin, R. A.; Osmond, D. L.; Jennings, G. D.; Harman, W. A.; Lombardo, L. A.; and Spooner, J.
Water Environment Research 70 (4): 895-912. (1998)
NAL Call #: TD419.R47;
ISSN: 1061-4303
Descriptors: Literature Review/ Nonpoint Pollution Sources/ Surface Water/ Groundwater Pollution/ Monitoring/ Environmental Policy/ Water Pollution Control/ Sources and fate of pollution
Abstract: Nonpoint source (NPS) pollution originates from diffuse land areas that intermittently contribute pollutants to surface and ground water. This article is a review of 1997 literature on several aspects of NPS pollution, including policy, economics, and management issues; effects and extent of pollutants in surface and ground water; pollution controls; and modeling and monitoring. Several publications addressed the broad topic of NPS pollution. Osmond, Line, et al. (1997) provided an overview of the Section 319 National Monitoring Program of the Clean Water Act. Under this program, selected watersheds around the country are monitored during a 6- to 10-year period to evaluate how implementation of best management practices (BMPs) leads to improved water quality. Proceedings from a national conference on NPS Pollution Information/Education Programs included papers on various education and outreach efforts aimed at adults and children for protecting water resources.

1018. **Nonpoint sources.**
Line, D. E.; Jennings, G. D.; McLaughlin, R. A.; Osmond, D. L.; Harman, W. A.; Lombardo, L. A.; Tweedy, K. L.; and Spooner, J.
Water Environment Research 71 (5): 1054-1069. (Aug. 1999)
NAL Call #: TD419.R47;
ISSN: 1061-4303 [WAERED].
Notes: Includes references.
Descriptors: water pollution/ groundwater pollution/ groundwater/ surface water/ water quality/ pollutants/ runoff/ leaching/ agricultural land/ agricultural chemicals/ pollution control/ literature reviews/ nonpoint source pollution/ best management practices
Abstract: Annual literature review covers multiple aspects of nonpoint source pollution and includes references to articles on pollution trading.
This citation is from AGRICOLA.

1019. **North American agroforestry: An intergrated science and practice.**
Garrett, H. E.; Rietveld, W. J.; and Fisher, Richard F.
Madison, Wis. American Society of Agronomy, Inc.; 402 p. (2000)
NAL Call #: S494.5.A45-.N68-2000;
ISBN: 0891181423
Descriptors: Agroforestry---United States/ Forest management---United States
This citation is from AGRICOLA.

1020. **The North-South divide! Organic wastes, or resources for nutrient management.**
Giller, K. E.; Cadisch, G.; and Palm, C.
Agronomie 22 (7/8): 703-709. (Nov. 2002-Dec. 2002)
NAL Call #: SB7.A3;
ISSN: 0249-5627 [AGRNDZ].

Notes: Paper presented at the 11th Nitrogen Workshop held September 9-12, 2001, Reims, France. Includes references.
Descriptors: cattle manure/ crop residues/ nitrogen/ mineralization/ tropics/ green manures/ literature reviews/ waste utilization/ nutrient availability/ soil fertility/ soil flora/ soil biology/ biological activity in soil/ crop management/ nitrogen fixation/ legumes
This citation is from AGRICOLA.

1021. **Northeast cover crop handbook.**
Sarrantonio, Marianne
Emmaus, PA: Rodale Institute; xiii, 118 p.: ill.; Series: Soil health series. (1994)
Notes: Includes bibliographical references (p. [105]-107) and index.
NAL Call #: SB284.3.U6S27--1994;
ISBN: 0913107174 (pbk.)
Descriptors: Cover crops---Northeastern States---Handbooks, manuals, etc
This citation is from AGRICOLA.

1022. **Northern forested wetlands: Ecology and management.**
Trettin, Carl C.
Boca Raton, Fla.: CRC Lewis; 486 p.: ill., maps. (1997)
NAL Call #: SD410.9.N67--1997;
ISBN: 1566701775
Descriptors: Wetland forestry/ Forested wetlands---Management/ Wetlands---Management/ Wetland ecology/ Forest ecology
This citation is from AGRICOLA.

1023. **Notes on sediment management in reservoirs: National and international perspectives.**
Fan, Shou shan.; Morris, Gregory.; and United States. Federal Energy Regulatory Commission.
Washington, D.C.: Printed by Federal Energy Regulatory Commission; iii, 248 p.: ill., maps. (1994)
Notes: Cover title. Distributed to depository libraries in microfiche. Shipping list no.: 96-0337-M. "December 31, 1993." Includes bibliographical references. SUDOCS: E 2.2:SE 2/3.
NAL Call #: Fiche--S-133-E-2.2: SE-2/3-
Descriptors: Sediments---Geology/ Reservoir sedimentation/ Desilting basins
This citation is from AGRICOLA.

1024. **Nuisance concerns and odor control.**
Miner JR
Journal of Dairy Science 80 (10): 2667-2672; 11 ref. (1997)
NAL Call #: 44.8 J822
This citation is provided courtesy of CAB International/CABI Publishing.

1025. **Nursery soil management: Organic amendments.**
Davey, C B
In: U.S. Forest Service General Technical Report: PNW (Series: U.S. Forest Service General Technical Report: PNW 389), 1997. pp. 6-18
Notes:
ISSN: 0363-6224
Descriptors: trees (Spermatophyta)/ plants/ spermatophytes/ vascular plants/ bulk density/ composts/ forestry/ manures/ nursery soil management/ root penetration/ soil amendments/ soil compaction/ soil organic matter/ soil science/ water holding capacity/ wood wastes
Abstract: In von Carlowitz' book of 1713 on economic silviculture, he devotes a full chapter to nurseries. He discusses the best soil for a nursery, how the soil is treated and prepared for sowing, and the favorability of using lots of organic matter. Thus, our present topic is hardly new. However, there is considerable new information that will help us to a better understanding of the dynamics of organic matter in soil. Recently it has been shown that some of the most active and important organic matter is soluble. It breaks down very rapidly, however, so it must be continuously replaced. Organic matter maintenance is a bother but it is essential to the production of high quality grade one seedlings. It even makes economic sense. The roles of organic matter in the physical, chemical, and biological aspects of nursery soil management are discussed in this review. The impact of soil organic matter on air and water movement into and out of the soil, the water-holding capacity, soil compaction and bulk density, and ease of root penetration are all physical aspects. The dynamics of nutrients in the soil, both immobilization and mineralization, the components of acidity (both the pH value and exchangeable aluminum), and the cation exchange capacity are the important chemical aspects. The enhancement of mycorrhiza formation and function and the suppression of soil-borne pests, including disease organisms, nematodes, insects, and some weeds are parts of the biological factors. These are all discussed in terms of improved seedling quality.

1026. **Nutrient concentrations and yields in undeveloped stream basins of the United States.**
Clark, G. M.; Mueller, D. K.; and Mast, M. A.
Journal of the American Water Resources Association 36 (4): 849-860. (2000)
NAL Call #: GB651.W315;
ISSN: 1093-474X [JWRAF5]
Abstract: Data from 85 sites across the United States were used to estimate concentrations and yields of selected nutrients in streams draining relatively undeveloped basins. Flow-weighted concentrations during 1990-1995 were generally low with median basin concentrations of 0.020, 0.087, 0.26, 0.010, and 0.022 milligrams per liter (mg/L) for ammonia as N, nitrate as N, total nitrogen, orthophosphate as P, and total phosphorus, respectively. The flow-weighted concentration of nitrate exceeded 0.6 mg/L in only three basins. Total nitrogen exceeded 1 mg/L in only four basins, and total phosphorus exceeded 0.1 mg/L in only four basins. The median annual basin yield of ammonia as N, nitrate as N, total nitrogen, orthophosphate as P, and total phosphorus was 8.1, 26, 86, 2.8, and 8.5 kilograms per square kilometer, respectively. Concentrations and yields of nitrate tended to be highest in northeastern and mid-Atlantic coastal states and correlated well with areas of high atmospheric nitrogen deposition. Concentrations and yields of total nitrogen were highest in the southeastern part of the nation and in parts of the upper Midwest. In the northeast, nitrate was generally the predominant form of nitrogen, and in the southeast and parts of the upper Midwest, organic nitrogen was the dominant form. Concentrations of total phosphorus were generally highest in the Rocky Mountain and Central Plain states.
This citation is from AGRICOLA.

1027. **Nutrient cycling and fertility management in temperate short rotation forest systems.**
Heilman, Paul and Norby, Richard J
Biomass and Bioenergy 14 (4): 361-370. (1998);
ISSN: 0961-9534
Descriptors: nitrate: leaching/ nitrogen: nutrient/ cropping strategies/ denitrification/ fertility management/ fertilizer requirements/ nutrient cycling/ nutrient losses/ short rotation forest systems/ soil pH/ waste disposal
Abstract: Under most conditions, fertilizers will be required to maintain production of short rotation forestry (SRF) plantations. Information from fertilizer trials together with knowledge of general soil fertility in an area permits approximation of fertilizer requirements. Refining those approximations for specific plantations is important for the following three reasons: the need to assure high production; the need to minimize production costs; and the desire to limit off-site effects of fertilizer application. To meet those goals, requires understanding the behavior of fertilizer in soils including leaching, immobilization and, in the case of nitrogen, denitrification. Knowledge of nutrient cycling in SRF including nutrient removal at harvest, other nutrient losses, and natural inputs of nutrients, helps in achieving good fertilizer practices. Cropping strategies that minimize fertilizer use can lower costs and reduce off-site effects of fertilizing. This review summarizes current knowledge of nutrient cycling, cropping strategies and fertility management in temperate SRF plantations.

1028. **Nutrient cycling in integrated plant-animal systems: Implications for animal management strategies in smallholder farming systems.**
Ndlovu LR and Mugabe PH
In: Natural resources management in African agriculture: Understanding and improving current practices/ Barrett, Christopher B.; Place, Frank; and Aboud, Abdillahi A.
Wallingford, UK: CABI Publ., 2002; pp. 251-260.
Notes: "Published in association with the International Centre for Research in Agroforestry."

1029. **Nutrient cycling on organic farms.**
Goulding K; Stockdale E; Fortune S; and Watson C
Journal of the Royal Agricultural Society of England 161: 65-75. (2000)
NAL Call #: 10 R81

1030. **Nutrient Enrichment and Decomposition in Wetland Ecosystems: Models, Analyses and Effects.**
Rybczyk, J. M.; Garson, G.; and Day, J. W.
Current Topics in Wetland Biogeochemistry 2: 52-72. (1996);
ISSN: 1076-4674
Descriptors: litter/ wetlands/ ecosystems/ mineralization/ decomposition/ nutrients/ cycling nutrients/ model studies/ enrichment/ literature review/ nutrient cycles/ nutrients (mineral)/ degradation / biodegradation/ literature reviews/ decomposers/ leaves/ biogeochemistry/ nutrient enrichment/ Chemical processes/ Habitat community studies/ Protective measures and control/ Freshwater pollution
Abstract: Decomposition refers to the breakdown of organic matter to carbon dioxide, water and inorganic mineral components (mineralization) (Dickinson and Pugh 1974). Inorganic components can also be re-incorporated into the litter matrix during decomposition (immobilization). Generally, nutrient availability limits the rate of biological decomposition of plant organic matter because of the disparity between the high demand for nitrogen and phosphorus by decomposer organisms that use plant litter carbon as an energy source and the relatively low concentrations of nutrients found in the leaf litter (Swift et al. 1979, Neely and Davis 1985, Enriquez et al. 1993). Nutrient amendments to wetland ecosystems can potentially increase the rates of decomposition by either improving initial litter nutrient quality, via fertilization of the growing plant (Coulson and Butterfield 1978, Valiela et al. 1985, Lukumbuzya et al. 1994), or by increasing externally, the nutrients available to decomposer communities (Howarth and Fisher 1976, Haines and Hanson 1979, Fairchild et al. 1984). Nutrient amendments can also affect the mineralization and immobilization of nutrients within the decomposing litter matrix by altering the distribution and amounts of nutrients associated with the labile and refractory litter components, and by increasing the external pool of nutrients that can be re-incorporated into the decomposing litter matrix (Kaushik and Hynes 1971, Howarth and Fisher 1976, Andersen 1978, Coulson and Butterfield 1978, Elwood et al. 1981, Marinucci et al. 1983, DeBusk and Dierberg 1984, Fairchild et al. 1984, Neely and Davis 1985, Valiela et al. 1985, Hohmann and Neely 1993). We reviewed 24 studies that examined the effects of nutrient amendments, most commonly nitrogen and phosphorus, on the rates of wetland plant litter decomposition in either, wetland ecosystems, laboratory wetland mesocosms, streams or vegetated littoral zones of lakes.

1031. **Nutrient losses in surface irrigation runoff.**
Bjorneberg, D. L.; Westermann, D. T.; and Aase, J. K.
Journal of Soil and Water Conservation 57 (6): 524-529. (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: nutrients/ nitrogen/ phosphorus/ losses from soil/ surface irrigation/ return flow/ water reuse/ water erosion/ sediment yield/ polyacrylamide / furrows/ grass strips/ erosion control/ ponds/ sediment/ pollution control/ sediment trapping ponds

1032. **Nutrient management: Crop production and water quality.**
Klausner, Stu.
Ithaca, N.Y.: Northeast Regional Agricultural Engineering Service. vi, 40 p.: ill. (some col.); Series: NRAES 101. (1997)
Notes: Cover title. Includes bibliographical references p. 38-39.
NAL Call #: S675-.N72-no.-101

1033. **Nutrient management, cultivar development and selection strategies to optimize water use efficiency.**
Davis, J. G. and Quick, J. S.
Journal of Crop Production 1 (2): 221-240. (1998)
NAL Call #: SB1.J683;
ISSN: 1092-678X [JCPRF8].
Notes: Special issue: Nutrient Use in Crop Production / edited by Z. Rengel. Includes references.
Descriptors: crops/ cultivars/ artificial selection/ selection program/ genetic improvement/ fertilizers/ water use efficiency/ nutrient sources/ photosynthesis/ crop yield/ rooting/ soil water content/ economic analysis/ evapotranspiration/ literature reviews
This citation is from AGRICOLA.

1034. **Nutrient Management for Water Quality Protection: Integrating Research Into Environmental Policy.**
Sims, J. T.; Goggin, N.; and Mcdermott, J.
Water Science and Technology 39 (12): 291-298. (1999)
NAL Call #: TD420.A1P7;
ISSN: 0273-1223.
Notes: Conference: IAWQ 3. International Conference on Diffuse Pollution, Edinburgh (UK), 21 Aug-4 Sep 1998; Source: Diffuse Pollution '98; Editors: Novotny, V. //D'Arcy, B.; DOI: 10.1016/S0273-1223(99)00346-7; *ISBN:* 0080434096
Descriptors: United States, Delaware/ Cycling Nutrients/ Environmental Policy/ Reviews/ Water Quality Management/ Agricultural Practices/ Degradation/ Nutrients (mineral)/ Water pollution / Policies/ Water quality control/ Agricultural pollution/ Nutrients/ Environment management/ Legislation/ Agriculture/ Government policies/ Nutrient cycles/ Pollution monitoring/ Ecosystem management/ United States, Delaware/ Water quality control/ Environmental action/ Prevention and control/ Freshwater pollution
Abstract: Agriculture's impacts on water quality have been the focus of basic and applied research in Delaware for more than 25 years. Research has examined nutrient cycling in soils, nutrient transport from soils to water, and the environmental consequences of ground water contamination and surface water eutrophication by nutrients. Much of the research has specifically been oriented towards the development of agricultural management practices to prevent the degradation of water quality by nutrients. Other research has focused on increasing our understanding of the chemical, physical, and biological processes that control nutrient cycling and transport and improving the monitoring techniques needed to document how changing management practices affects water quality. Agencies responsible for water quality protection have sought to integrate this research into environmental policy, but have often been frustrated by the fragmented and sometimes contradictory nature of the information provided to them. This paper reviews key advances in research on nutrient management and water quality in Delaware and discusses the obstacles faced in translating research into widely accepted management practices and environmental policies.

1035. **Nutrient management of food animals to enhance and protect the environment.**
Kornegay, E. T.
Boca Raton, Fla.: CRC/Lewis Publishers; xix, 344 p.: ill. (1996)
Notes: " ... based on the proceedings of the John Lee Pratt International Symposium on Nutrient Management of Food Animals to Enhance and Protect the Environment held on June 4-7 at Virginia Polytechnic Institute and State University"--Pref. Includes bibliographical references and index.
NAL Call #: SF94.6.N87--1996;
ISBN: 1566701996 (alk. paper)
Descriptors: Animal nutrition---Congresses/ Food animals---Nutrition---Congresses/ Feeds---Congresses
This citation is from AGRICOLA.

1036. **Nutrient management strategies on Dutch dairy farms: An empirical analysis.**
Oondersteijn, C. J. M.
Wageningen: s.n.; 200 p.: ill., maps. (2002)
Notes: "Stellingen" inserted. Thesis (doctoral)--Wageningen Universiteit, 2002. Includes bibliographical references (p. 162-175).
NAL Call #: DISS-F2002088;
ISBN: 9058087166
This citation is from AGRICOLA.

1037. **Nutrient recycling: The European experience: Review.**
Hall JE
Asian Australasian Journal of Animal Sciences 12 (4): 667-674; 7 ref. (1999)
NAL Call #: SF55.A78A7
This citation is provided courtesy of CAB International/CABI Publishing.

1038. **Nutrient recycling: The North American experience: Review.**
Fontenot, J. P.
Asian Australasian Journal of Animal Sciences 12 (4): 642-650. (1999)
NAL Call #: SF55.A78A7;
ISSN: 1011-2367
This citation is provided courtesy of CAB International/CABI Publishing.

1039. **Nutrient retention in riparian ecotones.**
Vought, L. B. M.; Dahl, J.; Pedersen, C. L.; and Lacoursiere, J. O.
Ambio 23 (6): 342-348. (1994)
NAL Call #: QH540.A52;
ISSN: 0044-7447
This citation is provided courtesy of CAB International/CABI Publishing.

1040. **Nutrients in ground water and surface water of the United States: An analysis of data through 1992.**
Mueller, D. K. and Geological Survey (U.S.). Denver, Colo.: U.S. Dept. of the Interior, U.S. Geological Survey, 1995. 74 p.
Notes: "National Water-Quality Assessment Program"--Cover.
NAL Call #: GB701.W375-no.95-4031
http://pubs.er.usgs.gov/pubs/wri/wri954031
Descriptors: Water---Nitrogen content---United States/ Water---United States---Phosphorus content
This citation is from AGRICOLA.

1041. **Nutrients in groundwaters of the conterminous United States, 1992-1995.**
Nolan, B. T. and Stoner, J. D.
Environmental Science and Technology 34 (7): 1156-1165. (2000)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X [ESTHAG]
Descriptors: groundwater/ water quality/ contaminants/ groundwater pollution/ federal programs/ United States/ US geological survey's national water quality assessment program nawqa
This citation is from AGRICOLA.

1042. **Nutrients in shallow ground waters beneath relatively undeveloped areas in the conterminous United States.**
Nolan, B. T.; Hitt, K. J.; and National Water Quality Assessment Program (U.S.). Denver, Colorado: U.S. Dept. of the Interior, U.S. Geological Survey, 2003. 17 p.
Notes: "National Water-Quality Assessment Program."
NAL Call #: GB701-.W375-no.-2002-4289
http://water.usgs.gov/nawqa/nutrients/pubs/wri02-4289/wri02-4289.pdf
Descriptors: Nutrient pollution of water---United States/ Groundwater---Pollution---United States
This citation is from AGRICOLA.

1043. **Nutrients in the nation's waters: Too much of a good thing?**
Mueller, David K.; Helsel, Dennis R.; and Kidd, Mary A.
Washington, D.C. U.S. G.P.O., 1996. 24 p.
Notes: Includes bibliographical references (p. 22).
NAL Call #: TD427.N87M84--1996
http://water.usgs.gov/nawqa/circ-1136/circ-1136main.html
Descriptors: Nutrient pollution of water---United States
This citation is from AGRICOLA.

1044. **Nutritional management for environment friendly animal production.**
Paik IK
Asian Australasian Journal of Animal Sciences 13: 302-314. (2000)
NAL Call #: SF55.A78A7.
Notes: Special Issue; Number of References: 37; From: Proceedings of 2000 International Symposium Recent Advances in Animal Nutrition, Seoul, Korea, 20-22 April 2000; Special issue editors: Aumaitre A, Lee BD, Ha JK
This citation is provided courtesy of CAB International/CABI Publishing.

1045. **Oak regeneration using the shelterwood-burn technique: Management options and implications for songbird conservation in the southeastern United States.**
Lanham, J. D.; Keyser, P. D.; Brose, P. H.; and Van Lear, D. H.
Forest Ecology and Management 155 (1/3): 143-152. (Jan. 2002)
NAL Call #: SD1.F73;
ISSN: 0378-1127 [FECMDW].
Notes: Special issue: Forest ecology in the next millennium: Putting the long view into practice / edited by A.C. Dibble. Paper presented at a workshop held June 27-30, 1999, Orono, Maine. Includes references.
Descriptors: quercus/ liriodendron tulipifera/ wild birds/ shelterwood/ natural regeneration/ prescribed burning/ forest management/ nature conservation/ plant competition/ stand structure/ botanical composition/ woodlands/ plant succession/ habitats/ literature reviews/ southeastern states of USA
This citation is from AGRICOLA.

1046. **Occurrence and fate of hormone steroids in the environment.**
Ying GuangGuo; Kookana, R. S.; and Ru YingJun
Environment International 28 (6): 545-551. (2002)
NAL Call #: TD169.E54;
ISSN: 0160-4120
This citation is provided courtesy of CAB International/CABI Publishing.

1047. **Occurrence, degradation and fate of pesticides during composting: Part I: Composting, pesticides, and pesticide degradation.**
Buyuksonmez, Fatih; Rynk, Robert; Hess, Thomas F; and Bechinski, Edward
Compost Science and Utilization 7 (4): 66-82. (1999)
NAL Call #: TD796.5.C58;
ISSN: 1065-657X
Descriptors: fungicide: compost chemistry, degradation, pesticide/ herbicide: compost chemistry, degradation, pesticide/ insecticide: compost chemistry, degradation, pesticide
Abstract: This paper reviews the findings of research reported in the currently available literature regarding the occurrence and transformations of pesticides through the composting process and the use of compost. Part I summarizes the composting process, pesticides and mechanisms of pesticide degradation. Part II reviews research studies concerning the occurrence and fate of pesticides during composting. Investigations of pesticide residues in composting feedstocks and finished compost detected few of the target pesticides. The compounds that were found occurred at low concentrations. The majority of the compounds detected were insecticides in the organochlorine category, including chemicals that have been banned from use in the U.S. for many years. Generally, organophosphate and carbamate insecticides and most herbicides were rarely detected. Comparisons of pesticide concentrations before and after composting also showed organochlorine compounds to be most resistant to biodegradation during composting. With some exceptions, pesticides in other categories decomposed moderately well to very well. Studies that followed the mechanisms of degradation indicate that mineralization accounts for only a small portion of pesticide disappearance. Other prominent fates include partial degradation to secondary compounds, adsorption, humification, and volatilization. In general the research results suggest that the pattern of pesticide degradation during composting is similar to the degradatiion observed in soils. With a few important distinctions, composting can be considered a biologically active soil environment in which degradation is accelerated. However, as some studies noted, composting does not always speed the degradation of all pesticides. The nature of the pesticide, specific composting conditions and procedures, the microbial communities present, and the duration of composting affect the extent and the mechanisms of degradation.

1048. **Occurrence, degradation and fate of pesticides during composting: Part II, Occurrence and fate of pesticides in compost and composting systems.**
Buyuksonmez, Fatih; Rynk, Robert; Hess, Thomas F; and Bechinski, Edward
Compost Science and Utilization 8 (1): 61-81. (2000)
NAL Call #: TD796.5.C58;
ISSN: 1065-657X
Descriptors: pesticides: degradation, fate/ microbes (Microorganisms)/ Microorganisms/ compost
Abstract: This paper reviews the findings of research reported in the currently available literature regarding the occurrence and transformations of pesticides through the composting process and the use of compost. Part I summarizes the composting process, pesticides and mechanisms

of pesticide degradation. Part II reviews research studies concerning the occurrence and fate of pesticides during composting. Investigations of pesticide residues in composting feedstocks and finished compost detected few of the target pesticides. The compounds that were found occurred at low concentrations. The majority of the compounds detected were insecticides in the organochlorine category, including chemicals that have been banned from use in the U.S. for many years. Generally, organophosphate and carbamate insecticides and most herbicides were rarely detected. Comparisons of pesticide concentrations before and after composting also showed organochlorine compounds to be most resistant to biodegradation during composting. With some exceptions, pesticides in other categories decomposed moderately well to very well. Studies that followed the mechanisms of degradation indicate that mineralization accounts for only a small portion of pesticide disappearance. Other prominent fates include partial degradation to secondary compounds, adsorption, humification, and volatilization. In general the research results suggest that the pattern of pesticide degradation during composting is similar to the degradation observed in soils. With a few important distinctions, composting can be considered a biologically active soil environment in which degradation is accelerated. However, as some studies noted, composting does not always speed the degradation of all pesticides. The nature of the pesticide, specific composting conditions and procedures, the microbial communities present, and the duration of composting affect the extent and the mechanisms of degradation.
© Thomson

1049. **Occurrence of Nitrate in Groundwater: A Review.**
Spalding, R. F. and Exner, M. E.
Journal of Environmental Quality 22 (3): 392-402. (1993)
NAL Call #: QH540.J6 [JEVQAA]
Descriptors: Groundwater pollution/ Irrigation effects/ Nitrates/ Nonpoint pollution sources/ United States/ Water pollution sources/ Agricultural runoff/ Aquifers/ Cropland/ Drainage effects/ Soil types/ Tile drainage/ Sources and fate of pollution
Abstract: The results of federal, state, and local surveys, which included more than 200,000 NO3-N data points, are summarized in this review of NO3 in groundwater in the USA. The levels of NO3-N are associated with source availability and regional environmental factors. In regions where well-drained soils are dominated by irrigated cropland, there is a strong propensity toward the development of large areas with groundwater that exceeds the maximum contaminant level of 10 mg/L NO3-N. Most of these areas are west of the Missouri River where irrigation is a necessity. Aquifers in highly agricultural areas in the southeastern USA reportedly are not contaminated. Vegetative uptake and denitrification in this warm, wet, C-rich environment are responsible for the natural remediation of NO3 in shallow aquifers. In the Middle Atlantic states and the Delmarva Peninsula, localized contamination occurs beneath cropped, well-drained soils that receive excessive applications of manure and commercial fertilizer. Extensive tile drainage has for the most part prevented a NO3 problem in the groundwater of the Corn Belt states. Throughout the USA there are recurring themes. They include a decrease in NO3-N levels with depth; lower NO3-N levels in shallow wells (<8 m); and a significant increase in NO3-N in older wells and in wells with poor construction. The factors affecting the distribution of NO3 in aquifers are complex and poorly understood. Interdisciplinary studies using discrete depth sampling, geohydrological indicators, isotopic tracers, and microbiological techniques are necessary to unravel the complex dynamics. (Author's abstract) 35 012605040
© Cambridge Scientific Abstracts (CSA)

1050. **Occurrence of pesticides in shallow groundwater of the United States: Initial results from the National Water-Quality Assessment Program.**
Kolpin, D. W.; Barbash, J. E.; and Gilliom, R. J.
Environmental Science and Technology 32 (5): 558-566. (1998)
NAL Call #: TD420.A1E5;
ISSN: 0013-936X [ESTHAG]
This citation is from AGRICOLA.

1051. **Occurrence of pesticides in the atmosphere in France.**
Bedos, Carole; Cellier, Pierre; Calvet, Raoul; and Barriuso, Enrique
Agronomie 22 (1): 35-49. (2002)
NAL Call #: SB7.A3;
ISSN: 0249-5627
Descriptors: pesticides: physico chemical characteristics, pollutant/ aerosol particles/ atmosphere/ fog/ gaseous phase/ rainwater/ seasonality/ spatial variability
Abstract: The transfer of pesticides to the atmosphere leads to a contamination of all atmospheric phases: gaseous, aerosol particles, fog droplets or rainwater. This paper makes a review of observations of pesticides in the atmosphere in France, which started at the end of the 80s. Measured concentrations in rainwater were very high, with maximum values reaching 60 mugcntdotl-1. Concentrations in fog were much higher than in rainwater. Regarding the gaseous and particulate phases, the measured concentrations range from not detected to 185 ngcntdotm-3. Very high values (2.6 mugcntdotm-3) have been measured locally. This contamination is observed throughout the year, sometimes displaying a seasonal pattern and spatial variability. Compounds which have been banned are still present in the atmosphere. It is also striking that pesticides which could be expected to be not very volatile based on their physico-chemical characteristics are found in the atmosphere.
© Thomson

1052. **Odor control for livestock systems.**
Powers, W J
Journal of Animal Science 77 (2 [supplement]): 169-176. (1999)
NAL Call #: 49 J82;
ISSN: 0021-8812
Descriptors: livestock (Mammalia)/ Animals/ Chordates/ Mammals/ Nonhuman Mammals/ Nonhuman Vertebrates/ Vertebrates/ anaerobic digesters/ biofilters/ dietary restriction/ lagoons/ management practices/ manure storage systems/ odor control strategies
Abstract: Odors are generated primarily as the result of manure storage but also result from animal housing and manure application. Effective odor control is dependent upon implementation of strategies that are complementary to management

practices. Some systems use a deep pit or a holding tank for manure storage. In such systems, little or no biological processing occurs, and they are therefore considered high-load systems. In systems where biological processing occurs to a great extent, such as in anaerobic digesters or lagoons, the system would be termed a low-load system. Odor control strategies for manure storage areas, such as solids separation and additives, are best suited for low-load systems, whereas covers and biofilters provide the best results for high-load systems. Strategies that reduce nutrient production, such as dietary restriction of nutrients, are well-suited for all types of manure storage systems. To comply with current or pending odor control regulations, it is imperative that producers be provided with sound recommendations of odor control strategies.
© Thomson

1053. **Odor mitigation for concentrated animal feeding operations: White paper and recommendations.**
Sweeten, J. M.; Jacobson, L. D.; Heber, A. J.; Schmidt, D. R.; Lorimor, J. C.; Westerman, P. W.; Miner, J. R.; Zhang, R. H.; Williams, C. M.; and Auvermann, B. W.
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

1054. **Odor sensor for manure management.**
Kizil, U.; Panigrahi, S.; and Lindley, J. A.
In: 2000 ASAE Annual International Meeting. (Held 9 Jul 2000-12 Jul 2000 at Milwaukee, Wisconsin.)
St. Joseph, Mich.: American Society of Agricultural Engineers; pp. 1-14; 2000.
Notes: ASAE Paper No. 004046
This citation is provided courtesy of CAB International/CABI Publishing.

1055. **Off-stream water sources for grazing cattle as a stream bank stabilization and water quality BMP.**
Sheffield, Ronald Erle
Blacksburg, Va.: Virginia Polytechnic Institute and State University, 1996.
Notes: Thesis (M.S.); Bibliography: leaves 147-153.
NAL Call #: ViBlbV LD5655.V855-1996.S544
This citation is from AGRICOLA.

1056. **On-line sample handling strategies for the trace-level determination of pesticides and their degradation products in environmental waters.**
Barcelo, Damia and Hennion, Marie Claire
Analytica Chimica Acta 318 (1): 1-41. (1995)
NAL Call #: 381 An1;
ISSN: 0003-2670
Descriptors: analytical method/ gas chromatography/ liquid chromatography/ mass spectrometry/ N Methylcarbonate/ pollution
Abstract: An overview of the use of on-line techniques is presented. First, it includes the on-line coupling of solid-phase extraction and liquid chromatography, which is certainly the most commonly used automated technique really well adapted to the multiresidue analysis of pesticides in aqueous samples. The different parameters which govern the method (dimension of the pre-columns, type of sorbents, pre-columns in series, quantitative analysis) are discussed and applications to various waters are presented. Emphasis is given to the limits of detection obtained using UV diode array, fluorescence or electrochemical detection modes. The on-line post-column reaction detection coupled to liquid chromatography are also reviewed with emphasis on the determination of N-methylcarbamates. The performances of the on-line mass spectrometric detection coupled to solid-phase extraction and liquid chromatography are presented using thermospray, particle beam or electrospray. The main characteristics of the on-line coupling of solid-phase extraction and gas chromatography are also given, with various applications and corresponding detection limits. The recent results obtained with the on-line coupling of gas chromatography with solid-phase micro-extraction are outlined. Supercritical fluid extraction is also mentioned as a new sample handling technique which can be easily on-line coupled to the chromatographic separation.
© Thomson

1057. **On the Choice of Structural Parameters and Endpoints to Indicate Responses of Freshwater Ecosystems to Pesticide Stress.**
Brock, T. C. M. and Budde, B. J.
In: Freshwater Field Tests for Hazard Assessment of Chemicals/ Hill, I. R.; Heimbach, F.; Leeuwangh, P.; and Mattiessen, P.
Boca Raton, FL: Lewis Publishers, 1994; pp. 19-56.
Notes: Conference: European Workshop on Freshwater Field Tests, Potsdam (Germany), 25-26 Jun 1992;
ISBN: 0-87371-940-9
Descriptors: pesticides/ ecosystem disturbance/ pollution effects/ freshwater ecology/ population dynamics/ literature review/ water pollution/ ecosystems/ Effects on organisms/ Effects of pollution/ Freshwater pollution
Abstract: A review is presented of the recent literature (published after 1980) on the choice of structural parameters in studying the biological effects of pesticides in freshwater ecosystems. A short overview is given of the types of pesticide applied. Three types of test system are distinguished, viz., macrophyte-dominated lentic systems, open water lentic systems, and lotic systems. The biological populations frequently studied in these systems, and the set of parameters used, are outlined. Gaps in the knowledge of community structure responses in pesticide-stressed freshwaters are discussed. Furthermore, the predictability and causality of structural community responses is commented on, with reference to primary and secondary effects of pesticides and the recovery of affected populations.
© Cambridge Scientific Abstracts (CSA)

1058. **One phytopathologist's growth through IPM to holistic plant health: The key to approaching genetic yield potential.**
Browning, J. A.
Annual Review of Phytopathology 36: 1-24. (1998)
NAL Call #: 464.8-An72;
ISSN: 0066-4286 [APPYAG]

Descriptors: plant pathology/ integrated pest management/ plants/ crop yield/ maximum yield/ biographies/ history/ plant diseases/ plant disease control/ crop management/ genetic diversity/ literature reviews
This citation is from AGRICOLA.

1059. **Opportunities and constraints to improving irrigation water management: Foci for research.**
Burton, M A; Kivumbi, D; and El Askari, K
Agricultural Water Management 40 (1): 37-44. (1999)
NAL Call #: S494.5.W3A3;
ISSN: 0378-3774
Descriptors: water management: research foci/ water use efficiency
Abstract: Potential areas for research to improve irrigation water management and irrigation water utilization are identified, and their likelihood of adoption discussed within the context of existing constraints.
© Thomson

1060. **Opportunities for increased nitrogen-use efficiency from improved resource management in irrigated rice systems.**
Cassman, K. G.; Peng, S.; Olk, D. C.; Ladha, J. K.; Reichardt, W.; Dobermann, A.; and Singh, U.
Field Crops Research 56 (1/2): 7-39. (1998)
NAL Call #: SB183.F5;
ISSN: 0378-4290 [FCREDZ].
Notes: Special issue: Nutrient use efficiency in rice cropping systems / edited by K.G. Cassman and H.R. Lafitte. Includes references.
Descriptors: oryza sativa/ nitrogen/ use efficiency/ crop management/ irrigation/ crop yield/ nitrogen fertilizers/ application rates/ application date/ soil fertility/ nutrient uptake/ nutritional state/ losses/ soil organic matter/ decomposition/ nitrogen cycle/ soil biology/ soil depth/ intensive cropping/ heat sums/ nitrogen content/ literature reviews
This citation is from AGRICOLA.

1061. **Optimization procedure for cost effective BMP placement at a watershed scale.**
Veith, T. L.; Wolfe, M. L.; and Heatwole, C. D.
Journal of the American Water Resources Association 39 (6): 1331-1343. (2003)
NAL Call #: GB651.W315;
ISSN: 1093-474X.
Notes: Number of References: 26
Descriptors: Environment/ Ecology/ watershed management/ genetic algorithm/ spatial optimization/ modeling/ geographic information systems/ nonpoint source pollution/ sediment delivery
Abstract: A combinatorial optimization procedure for best management practice (BMP) placement at the watershed level facilitates selection of cost effective BMP scenarios to control nonpoint source (NPS) pollution. A genetic algorithm (GA) was selected from among several optimization heuristics. The GA combines an optimization component written in the C++ language with spatially variable NPS pollution prediction and economic analysis components written within the ArcView geographic information system. The procedure is modular in design, allowing for component modifications while maintaining the basic conceptual framework. An objective function was developed to lexicographically optimize pollution reduction followed by cost increase. Scenario cost effectiveness is then calculated for scenario comparisons. The NPS pollutant fitness score allows for evaluation of multiple pollutants, based on prioritization of each pollutant. The economic component considers farm level public and private costs, cost distribution, and land area requirements. Development of a sediment transport function, used with the Universal Soil Loss Equation, allows the optimization procedure to run within a reasonable timeframe. The procedure identifies multiple near optimal solutions, providing an indication of which fields have a more critical impact on overall cost effectiveness and flexibility in the final solution selected for implementation. The procedure was demonstrated for a 1,014-ha watershed in the Ridge and Valley physiographic region of Virginia.
© Thomson ISI

1062. **Options for managing odor: A report from the Swine Odor Task Force.**
Swine Odor Task Force.
North Carolina Agricultural Research Service, North Carolina State University, 1995.
Notes: 78 pp.: ill. (text/html)
http://www.ces.ncsu.edu/whpaper/SwineOdor.html
Descriptors: swine/ pig manure/ swine housing/ odor emissions/ odor control/ odor control technology/ North Carolina

1063. **Options for using low-quality water for vegetable crops.**
Shannon, M. C. and Grieve, C. M.
HortScience 35 (6): 1058-1062. (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: vegetables/ horticultural crops/ irrigation water/ water quality/ salinity/ drainage water/ saline water/ water reuse/ salt tolerance/ susceptibility/ yield losses/ economic analysis/ germplasm/ crop management/ rotations/ lycopersicon esculentum/ cucumis melo/ soil salinity/ literature reviews
This citation is from AGRICOLA.

1064. **Organic amendments and phosphorus sorption by soils.**
Iyamuremye, F. and Dick, R. P.
Advances in Agronomy 56: 139-185. (1996)
NAL Call #: 30-Ad9;
ISSN: 0065-2113
Descriptors: phosphorus/ animal manure/ organic soil amendment/ plant residues/ soil aeration/ soil phosphorus sorption/ soil science
© Thomson

1065. **Organic farming and water pollution.**
Brown, S.
Journal of the Institution of Water and Environment Management 7 (6): 586-591. (Dec. 1993)
NAL Call #: TD420.W374;
ISSN: 0951-7359
Descriptors: organic farming/ water pollution/ groundwater pollution/ nitrate/ leaching/ pesticides/ runoff/ fertilizers/ low input agriculture/ animal manures/ soil conservation
Abstract: Farming activities are often a source of water pollution in rural areas. Nitrate leaching, eutrophication, pesticide accumulation and other forms of contamination are causing increasing concern. This paper briefly reviews the problems and discusses the possible solutions

offered by organic farming systems, along with any new problems that may be created.
This citation is from AGRICOLA.

1066. **Organic nitrogen deposition on land and coastal environments: A review of methods and data.**
Cornell, S. E.; Jickells, T. D.; Cape, J. N.; Rowland, A. P.; and Duce, R. A.
Atmospheric Environment 37 (16): 2173-2191. (2003)
NAL Call #: TD881.A822;
ISSN: 1352-2310
This citation is provided courtesy of CAB International/CABI Publishing.

1067. **Organic pollutant migration in soils as affected by soil organic matter. Molecular and mechanistic aspects.**
Senesi, N.
NATO ASI Series: Series G, Ecological Sciences 32: 47-74. (1993)
NAL Call #: QH540.N3;
ISSN: 0258-1256.
Notes: In the series analytic: Migration and fate of pollutants in soils and subsoils / edited by D. Petruzzelli and F.G. Helfferich. Proceedings of the NATO Advanced Study Institute, May 24-June 5, 1992, Maratea, Italy. Literature review. Includes references.
Descriptors: soil pollution/ pollutants/ pesticides/ organic compounds/ transport processes/ soil organic matter/ humic acids/ fulvic acids/ literature reviews
This citation is from AGRICOLA.

1068. **Organizing paradigms for the study of inland aquatic ecosystems.**
Brezonik, Patrick L.
Washington, D.C.: National Academy Press, 1996; pp. 203-217
http://www.nap.edu/books/0309054435/html/
Descriptors: flowing waters/ freshwater ecology/ inland aquatic ecosystems study/ lakes/ methodology/ organizing paradigms/ river continuum concept/ terrestrial aquatic interactions/ wetlands
© Thomson

1069. **Organochlorine pesticides and PCBs in stream sediment and aquatic biota: Initial results from the National Water-Quality Assessment Program, 1992-1995.**
Wong, C. S.; Capel, P. D.; Nowell, L. H.; and National Water Quality Assessment Program (U.S.).
Sacramento, Calif. U.S. Dept. of the Interior, 2000. 88 p.
Notes: Shipping list no.: 2000-0353-P.
NAL Call #: GB701 .W375 no. 00-4053
Descriptors: National Water Quality Assessment Program---United States/ Organochlorine compounds---Environmental aspects---United States/ Water quality biological assessment---United States/ River sediments---United States---Analysis
This citation is from AGRICOLA.

1070. **Our changing perspectives on benefits and risks of pesticides: A historical overview.**
Ecobichon, Donald J
Neurotoxicology 21 (1-2): 211-218. (2000);
ISSN: 0161-813X
Descriptors: DDT: pesticide/ pesticide: environmental contamination, misuse, pesticide, use/ global use
Abstract: The introduction of chemical pesticides following WW II ushered in the era of the "quick fix" for any agricultural, forestry and human health problems. Scenarios of use, misuse, abuse and environmental contamination can be presented for any class of pesticide, culminating in dependence on these chemicals for increased production of food and fibre and improved health. With time, sophisticated agents having unique, target-specific mechanisms of action evolved but at increased cost(s) to crop production. Equatorical countries, rapidly becoming "breadbaskets" of the world, are particularly dependent on pesticides as they strive to increase production of nontraditional export products (NTEPS), valuable cash crops in demand in countries having more temperate climates. Developing nations have neither the legislation and regulations necessary to control pesticides nor trained personnel to inspect and monitor use, to analyze residues in produce or to initiate training programs. Their transition from agrarian to industrialized societies has meant that smaller, less well educated populations must shoulder the responsibility of increased traditional food production for consumption by urban populations as well as that of NTEPS. Unfortunately, to attain these goals, many older, more toxic, environmentally persistent and cheap pesticides, long banned in developed countries, are used extensively, creating serious local and global contamination and health problems.
© Thomson

1071. **Outdoor Air Quality.**
Auverman, B.; Bicudo, J.; Lorimor, J.; Jacobson, L.; and Schmidt, D.
Ames, Iowa: Midwest Plan Service, Iowa State University MWPS-18; 96 p. (2002); *ISBN:* 0-89373-096-3
Descriptors: livestock/ animal manure management/ odor control/ odor emissions/ air quality/ dust emissions/ land application
Abstract: With the trend towards larger and more concentrated production sites, odors, gases, and dust are rapidly becoming issues that are even more important for animal producers and others involved with the agricultural community. The public's increasing intolerance for odors coupled with the economic importance of animal agriculture has resulted in an urgent need for all stakeholders to find adequate solutions. Outdoor Air Quality, MWPS-18 Section 3, uses a science-based approach to measuring air quality and emphasizes the basic principles involved in controlling dust and odor. This book covers five major topics: basics of outdoor air quality, managing odors from buildings, managing dust and odor from open lots, managing odors from manure storages, and managing odors during manure application.
© Midwest Plan Service (MWPS)

1072. **Overland flow transport of pathogens from agricultural land receiving faecal wastes.**
Tyrrel, S. F. and Quinton, J. N.
Journal of Applied Microbiology 94, Suppl. S: 87S-93S. (2003)
NAL Call #: QR1.J687;
ISSN: 1364-5072.
Notes: Number of References: 43
Descriptors: Biology/ Microbiology/ coastal waters/ thermophilic campylobacters/ bacteriological quality/ indicator organisms/ runoff water/ pollution/ salmonella/ prevalence/ delivery/ cattle
Abstract: Considerable investment has been made in recent years in improvements to the microbiological quality of urban wastewater discharges to surface waters, particularly in coastal towns, with the aim of reducing the exposure of bathers and surfers to gastrointestinal pathogens. As this source of pollution

has come under greater control, attention has started to focus on diffuse catchment sources of faecal contamination which have been shown to be dominant during high river flows associated with storm events. This association with storm events suggests that rapidly responding hydrological pathways such as overland flow are likely to be important. The aim of this paper is to establish the current state of knowledge of pathogen transport processes in overland flow. In addition, the paper will attempt to convey the way that soil erosion science may aid our understanding of this environmental problem. The scale and nature of faecal waste applications to land in the UK is briefly reviewed, with data presented on both livestock slurry and manure, and human sewage sludge. Particular emphasis is placed on factors influencing the likelihood of pathogens making their way from infected livestock and humans to the soil surface, and therefore the chances of them being available for transport by overland flow. The literature relating to pathogen transport in overland flow is reviewed. Existing pathogen transport models treat pathogens as particles and link pathogen transport models to pathogen die-off kinetics. Such models do not attempt to describe the interactions that may occur between pathogens and soil and waste particles. Although conceptual models describing the possible states in which pathogen transport may occur have been proposed, an understanding of the factors controlling the partitioning of the microorganisms between the different states is only just beginning to emerge. The apparent poor performance of overland flow mitigation measures such as grass buffer strips in controlling the movement of faecal indicators highlights the need for a better understanding the dynamics of microbial transport so that better management approaches may be developed. Examples of on-going research into overland flow transport processes are briefly described and gaps in knowledge identified.

1073. **Overview and Future Direction of Biological Control Technology.**
Cofrancesco, A. F.
Journal of Aquatic Plant Management 36: 49-53. (1998)
NAL Call #: SB614.H9;
ISSN: 0146-6623.
Notes: Special section: Proceedings of the U.S. Army Corps of Engineers Aquatic Plant Control Research Program Review, July 15, 1997
Descriptors: Exotic Species/ Biotechnology/ Pathogens/ Aquatic Plants/ Submerged Plants/ Research Priorities/ Evaluation/ Aquatic Weed Control / Interagency Cooperation/ Insects/ Biological control/ Herbivores/ Introduced species/ Environmental impact/ Ecosystem management/ Environment management/ Reviews/ Freshwater environments/ Research programs/ Hydrilla verticillata/ Melaleuca quinquenervia/ Alternanthera philoxeroides/ Myriophyllum spicatum/ Pistia stratiotes/ Eichhornia crassipes/ United States/ Bottle brush tree/ Cajeput tree/ Control of water on the surface/ Species interactions: pests and control/ Control
Abstract: The Corps of Engineers (CE) biological control technology area had its beginnings in 1959 when the CE and the U.S. Department of Agriculture began a cooperative research effort. Since then, numerous insects and pathogens have been studied as potential agents for the management of target plant populations. Researchers have traveled to the countries of origin of six target plants (Eichhornia crassipes Mart. (Solms), Alternanthera philoxeroides (Mart.) Griseb., Myriophyllum spicatum L., Pistia stratiotes L., Hydrilla verticillata (L. F.) Royle, and Melaleuca quinquenervia (Cav.) S. T. Blake) to search for host specific agents. As a result, 13 insect biocontrol agents have been released as management tools lot five of these targets. On average these projects have developed one agent every 2.9 years. The CE also has conducted pathogen biological control research using endemic pathogens. More recently the CE has begun classical biocontrol studies using exotic pathogens as potential agents of aquatic plants. Research in the near future will be directed at the management of submersed aquatic vegetation. The past successes will be used to assist in directing the program, however, new emphasis will be placed on the development of more effective evaluation procedures to document impact of the biological control agents.

1074. **Overview of Areawide Management of Insects.**
Chandler, L. D. and Faust, R. M.
Journal of Agricultural Entomology 15 (4): 319-325. (1998)
NAL Call #: SB599.J69;
ISSN: 0735-939X
Descriptors: Integrated control/ United States/ Insecta/ Agricultural & general applied entomology
Abstract: In 1995 the United States Department of Agriculture (USDA), Agricultural Research Service (ARS) implemented a new areawide pest management initiative. This program, targeted at key pests across the United States, has resulted in renewed discussion of the pros and cons of this integrated-pest-management-related control tactic. This introduction to an areawide pest management symposium presented at the 1997 Entomological Society of America Annual Meeting provides information on the development of areawide pest management as we know it today. Additionally, a comparison of areawide management to conventional pest control strategies, as well as examples of historic and current programs are presented.

1075. **Overview of areawide programs and the program for suppression of codling moth in the western USA directed by the United States Department of Agriculture, Agricultural Research Service.**
Calkins, C. O. and Faust, R. J.
Pest Management Science 59 (6-7): 601-604. (2003)
NAL Call #: SB951 .P47;
ISSN: 1526-498X.
Notes: Number of References: 7; Publisher: John Wiley & Sons Ltd
Descriptors: Entomology/ Pest Control/ Cydia pomonella/ mating disruption/ integrated pest management/ pheromone
Abstract: An areawide suppression program for codling moth (Cydia pomonella L) populations was initiated in 1995 in Washington, Oregon and California under the direction of the US Department of Agriculture,

Agricultural Research Service in cooperation with Washington State University, Oregon State University and University of California, Berkeley. Mating disruption was used to reduce the pest population while reducing and eliminating the use of organophosphate insecticides. During the 5-year program, the original 1064 hectares were expanded to 8400 hectares and from 66 grower participants to more than 400 participants. The acreage under mating disruption in the three states increased from 6000 hectares in 1994 to 54 000 hectares in the year 2000.

1076. **Overview of Canadian Watershed Monitoring Programs for Improved Water Quality.**
Perrone, J.; Madramootoo, C. A.; Enright, P.; and Papineau, F.
Canadian Water Resources Journal 23 (2): 121-134. (1998);
ISSN: 0701-1784.
Notes: Alternative title: Revue Canadienne Des Ressources Hydriques
Descriptors: Canada/ Watersheds/ Water Pollution Control/ Monitoring/ Water Quality Control/ Water Resources Management/ Agriculture/ Hydroelectric Plants/ Agricultural runoff/ Pollution monitoring/ Pollution control/ Water quality/ Government policy/ Sociological aspects/ Economics/ Resource management/ Government programs/ Environmental monitoring/ Ontario/ North America/ Great Lakes/ Network design/ Behavior and fate characteristics/ Environmental action
Abstract: Pollution from intensive agricultural production is a major contributor to water quality degradation in Canada. Activities such as forestry and hydroelectric development in rural areas also endanger water quality. The need to develop good management practices to reduce such contamination has led to the initiation of numerous watershed water quality and modeling studies. Great Lakes basin water quality studies in the 1970s formed a technical and methodological basis for future watershed studies in Canada. More recently, implementation of various governmental programs such as the Canada Green Plan has promoted an integrated ecosystems approach that achieves water quality improvement by focusing on socio-economic aspects of basin water resources management. Some of the significant watershed studies initiated in recent years in Canada are discussed in the present paper.

1077. **Overview of conservation tillage on cotton production in the mid- south.**
Bradley, J. F.
In: 1995 Proceedings Beltwide Cotton Conferences. (Held 4 Jan 1995-7 Jan 1995 at San Antonio, Texas.); Vol. 1. Memphis, Tenn.: National Cotton Council; pp. 200-203; 1995.

1078. **An Overview of Constructed Wetlands as Alternatives to Conventional Waste Treatment Systems.**
Hamilton, H.; Nix, P. G.; and Sobolewski, A.
Water Pollution Research Journal of Canada 28 (3): 529-548. (1993)
NAL Call #: TD420.A1W34;
ISSN: 0197-9140.
Notes: Conference: BIOQUAL '92 Meet., Vancouver, BC (Canada), 9-11 Jun 1992; Editors: Hall, E. R.
Descriptors: wetlands / construction/ wastewater treatment/ hydrocarbons/ organic compounds/ biodegradation/ bacteria/ biofilms/ Non patents/ Microbial degradation/ Environmental Applications/ Impact/ Sewage & wastewater treatment/ Wastewater treatment processes
Abstract: Constructed wetlands are an attractive alternative to conventional wastewater treatment under certain conditions. This review presents background information on wetland treatment and wetland design, and outlines the potential for wetlands to treat water contaminated with organic compounds including hydrocarbons. The major mechanisms that reduce contaminant concentrations in wetlands are sedimentation, filtration, chemical precipitation, microbial interaction and plant uptake. The presence of bacteria in "Biofilms" on the enormous plant and detrital surface area in wetlands is fundamental to their ability to degrade complex organic contaminants. There are few examples in the literature of wetlands being used to control organic chemical pollution. However, the very high level of biochemical activity in the water column and upper sediment layer in wetlands, combined with a high degree of ecological resilience, suggests that wetlands can be an attractive low cost, low energy, low maintenance alternative to conventional treatment methods.

1079. **Overview of cover crops and green manures.**
Sullivan, Preston G.; Diver, Steve.; and Appropriate Technology Transfer for Rural Areas (Organization).
Fayetteville, AR: ATTRA; 17 p.: ill.; Series: Fundamentals of sustainable agriculture (Appropriate Technology Transfer for Rural Areas (Organization)). (2001)
Notes: Caption title. "ATTRA, Appropriate Technology Transfer for Rural Areas." "January 2001." "ATTRA is the national sustainable agriculture information center funded by the USDA's Rural Business--Cooperative Service." Includes bibliographical references (p. 12-13).
NAL Call #: SB284.3.U6-S85-2001
http://www.attra.org/attra-pub/covercrop.html
Descriptors: Cover crops---United States/ Green manure crops---United States

1080. **An overview of EPA's watershed model BASINS and related federal spatial data products.**
Whittemore, Raymond C. and National Council of the Paper Industry for Air and Stream Improvement (U.S.).
Research Triangle Park, NC: National Council of the Paper Industry for Air and Stream Improvement; 15, 11 p.: ill. (some col.), col. maps; Series: Technical bulletin (National Council of the Paper Industry for Air and Stream Improvement (U.S.): 1981) no. 744. (1997)
Notes: "September 1997." Includes bibliographical references (p. 15).
NAL Call #: TD899.P3N34--no.744
Descriptors: United States Environmental Protection Agency---Computer programs/ BASINS---Computer program/ Watersheds---Research---United States---Computer programs/ Water quality management---United States---Computer programs/ Watershed management---United States---Computer programs/ Water---Pollution---United States/ Point source

identification---Computer programs/ Nonpoint source pollution---United States---Computer programs
This citation is from AGRICOLA.

1081. **An overview of forest canopy ecosystem functions with reference to urban and riparian systems.**
Shaw, D. C. and Bible, K.
Northwest Science 70 (special issue): 1-6. (1996)
NAL Call #: 470-N81;
ISSN: 0029-344X [NOSCAX]
Descriptors: forests/ canopy/ ecosystems/ riparian forests/ urban areas/ forest ecology/ literature reviews
This citation is from AGRICOLA.

1082. **Overview of green manures/cover crops.**
Power, J. F.
In: Proceedings Northeastern and Intermountain Forest and Conservation Nursery Associations. (Held 2 Aug 1993-5 Aug 1993 at St. Louis, Missouri.)
Fort Collins, Colo.: United States Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; pp. 47-50; 1994.
Notes: Series: General technical report RM 243
NAL Call #: aSD11.A42-no.243
Descriptors: green manures/ cover crops/ erosion/ ground cover/ soil organic matter/ nitrogen/ soil fertility/ glycine max/ adaptability/ vicia villosa/ growth period/ seasonal variation/ fabaceae/ soil temperature/ dry matter/ Nebraska/ North Dakota
This citation is from AGRICOLA.

1083. **Overview of pesticide fate in the environment: Principles, processes, and offsite transport.**
Neary, D. G.
Proceedings - Forest Vegetation Management Conference (22nd): 19-24. (2001)
NAL Call #: QH541.5.F6F67;
ISSN: 1057-2147.
Notes: Meeting held January 16-18, 2001, Redding, California. Includes references.
Descriptors: herbicides/ transport processes/ environmental impact/ soil water movement/ forest ecology/ herbicide residues/ application methods/ degradation
This citation is from AGRICOLA.

1084. **An overview of phosphorus behavior in wetlands with implications for agriculture.**
Gale, P. M. and Reddy, K. R.
In: Animal waste and the land-water interface.
Boca Raton, Fla.: Lewis Publishers, 1995; pp. 205-213.
ISBN: 1566701899
NAL Call #: TD930.A55-1995
Descriptors: wetland soils/ soil chemistry/ phosphorus/ pollutants/ retention/ water pollution/ agricultural wastes
This citation is from AGRICOLA.

1085. **An overview of present knowledge on methane emission from biomass burning.**
Delmas, R.
Fertilizer Research 37 (3): 181-190. (1994)
NAL Call #: S631.F422;
ISSN: 0167-1731 [FRESDF].
Notes: Special section: Methane and nitrous oxide: the other greenhouse gases / edited by A.R. van Amstel and A.R. Mosier. Papers presented at a workshop February 3-5, Amersfoort, Netherlands. Includes references.
Descriptors: methane/ emission/ biomass/ burning/ agricultural wastes/ bioenergy/ prescribed burning/ world/ global methane emission
This citation is from AGRICOLA.

1086. **Overview of recycling nutrients from animal waste through forages.**
Evers, G. W.
Proceedings of the Southern Pasture and Forage Crop Improvement Conference 52: 59-64. (1996)
NAL Call #: 60.19-So83;
ISSN: 0193-6425.
Notes: Meeting held March 30-April 2, 1996, Oklahoma City, Oklahoma. Includes references.
This citation is from AGRICOLA.

1087. **Overview of soil erosion from irrigation.**
Koluvek, P. K.; Tanji, K. K.; and Trout, T. J.
Journal of Irrigation and Drainage Engineering 119 (6): 929-946. (1993)
NAL Call #: 290.9 AM3Ps (IR);
ISSN: 0733-9437
This citation is provided courtesy of CAB International/CABI Publishing.

1088. **An overview of some tillage impacts on earthworm population abundance and diversity: Implications for functioning in soils.**
Chan, K. Y.
Soil and Tillage Research 57 (4): 179-191. (2001)
NAL Call #: S590.S48;
ISSN: 0167-1987
This citation is provided courtesy of CAB International/CABI Publishing.

1089. **Overview of studies on riparian vegetation: Past, present and future perspectives.**
Sakio, H.; Nakamura, F.; and Oshima, Y.
Japanese Journal of Ecology 45 (3): 291-294. (1995);
ISSN: 0021-5007
This citation is provided courtesy of CAB International/CABI Publishing.

1090. **An Overview of Substances Present in Canadian Aquatic Environments Associated With Endocrine Disruption.**
Hewitt, M. and Servos, M.
Water Quality Research Journal of Canada 36 (3): 191-213. (2001);
ISSN: 1201-3080.
Notes: Theme Issue: Endocrine Disrupting Substances in the Canadian Environment
Descriptors: Reviews/ Aquatic environment/ Endocrine system/ Canada / endocrine disruptors/ Contaminants/ Chemical pollution/ Biota/ Water pollution/ Pollution effects/ Water quality (Natural waters)/ Pollutants/ Endocrine glands/ Metals/ Pesticides/ Industrial wastes/ Chemicals/ Water Pollution Effects/ Pesticides/ Toxicity/ Canada/ endocrine disruptors/ Environmental action/ Effects of Pollution/ Effects of pollution
Abstract: Numerous environmental contaminants have been associated with the ability to affect the endocrine status of animals and with the potential to elicit effects on individuals or populations in Canadian aquatic environments. Potential endocrine disrupting substances (EDS) consist of almost every class of environmental contaminants reported to date, including industrial chemicals, historical and current use pesticides, metals, and different classes of natural products. It has been difficult to establish cause-and-effect relationships with potential EDS for several reasons: i) the diversity of

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.

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.**
Reutergaardh, 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. //Reutergardh, 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)

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