State Forest (Shepparton, Victoria) were analysed for both Carbon and Nitrogen isotope ratios over eighteen months, to provide both temporal and spatial data of the food web. Terrestrial and aquatic macrophytes showed overlapping 13C signatures between -27 and -35. Aquatic organisms showed 13C signatures spread between -20 and -35. For this wetland, therefore, it was not possible to distinguish amongst the various macrophyte Carbon sources entering the food web on the basis of Carbon signatures. Nitrogen 15 ratios of animals were, however, useful in determining trophic structure. This study demonstrates that stable isotope analysis of food web structure and processes is highly dependent on adequate separation of carbon isotope ratios. If separation of ratios does not occur, then conclusions on the nature and origin of carbon sources based on the stable isotope method will not be possible.

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Nitrogen transformations in wetland soil cores measured by ^{15}N isotope pairing and dilution at four infiltration rates

The effect of water infiltration rate (IR) on nitrogen cycling in a saturated wetland soil was investigated by applying an ^{15}N isotope dilution and pairing method. Water containing ^{15}Nnitrate was infiltrated through 10 cm long cores of sieved and homogenised soil at rates of 72, 168, 267 and 638 mm day^{-1}. Then the frequencies of $^{30}N_2$, $^{29}N_2$, $^{15}NO_3^-$, and $^{15}NH_4^+$ were measured in the outflow water. This method allowed simultaneous determination of nitrification, coupled and uncoupled denitrification, and nitrate assimilation rates. From 3% (at the fastest IR) to 95% (at the slowest IR) of nitrate was removed from the water, mainly by denitrification. The nitrate-N removal was compensated for by the net release of ammonium and dissolved organic nitrogen. Lower oxygen concentrations in the soil at slower IRs led to a sharper decrease in the nitrification rate than in the ammonification rate, and, consequently, more ammonium leaked from the soil. The decreasing organic carbon to nitrogen ratio (from 12.8 to 5.1) and the increasing ratio of light absorbance at 250/365 mm (from 4.5 to 5.2) indicated an increasing bioavailability of the outflowing dissolved organic matter with increasing IR. The efflux of nitrous oxide was also very sensitive to IR and increased several fold when a zone of low oxygen concentration was close to the outlet of the soil cores. N_2O then comprised 8% of the total gaseous N losses from the soil.

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Denitrification in River Marginal Wetlands in north west Devon, UK.

River Marginal Wetlands (RMWs) can be efficient at removing nutrients from surface and shallow ground water, particularly with regard to nitrate. Denitrification is often one of the main processes of nitrate removal in RMWs, the spatial and temporal variability of which is often very high. Studies at sites in north-west Devon, UK, have identified meso-scale features in the landscape termed Zones of Enhanced Denitrification (ZEDens), in which denitrification rates have been found to be significantly higher than in the majority of the wetland site. The reasons for the occurrence of these ZEDens and their significance have been examined at a number of sites in south-west England, resulting in the development of a set of identification criteria that can be used to assist in wetland functional assessments. The identification criteria are based on hydrogeomorphological features observable in the field, combined with easily measureable soil parameters and vegetation assemblages.

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Nutrient dynamics in the Swan River Estuary as reflected by phytoplankton assemblages

The phytoplankton community composition productivity and biomass characteristics of the Swan River Estuary were assessed from March to December 1995. Additionally, the first ever intensive study on phytoplankton conducted in 1980-81 by John was compared to that of 1994-95. Summer and autumn were characterised by mild blooms of diatoms and dinoflagellates, characteristic of marine waters. The physical and chemical water quality variables were greatly influenced by the onset of winter rainfall which in turn influenced the phytoplankton dynamics. Salinity was of critical importance in the seasonal succession of phytoplankton. The spatial and temporal salinity concentration was influenced by seasonal rainfall which determined the movement of the salt water "wedge" from the lower estuary to the upper estuary. The phytoplankton assemblage in autumn were predominantly dinoflagellates which could be directly associated with the high salinity and availal nutrients. The phytoplankton biomass was limited by the c ncentration of nitrite+nitrate throughout autumn, which in turn effectively lowered the N:P ratio during this period. With abundant phosphorus in the system, nitrogen is considered to be the limiting nutrient to phytoplankton biomass. Dinoflagellate and diatom blooms coincided with an increase in the ammonium concentration. The most likely source of ammonium available to phytoplankton during this period was from the sediments. The comparison of data from 1980-81 and 1994-95 displayed an increase in the phytoplankton biomass of the upper estuary during summer. It is also likely that there was an increase in the frequency of small blooms of dinoflagellates in the middle and upper estuary in autumn. It was evident that water quality in the upper Swan River Estuary has continued to decline since the 1980-81 study and eutrophication has prevailed.

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An ecological model of the Swan River estuary: An integrating tool for diverse ecological and physico-chemical studies

The Swan River is a highly seasonal, productive estuary in the south-west of Western Australia. In response to concerns about Swan River eutrophication, an ecological model is being applied to the upper 30km of the estuary. The model consists of a two-dimensional hydrodynamic model coupled with algorithms for biological and physical processes. The

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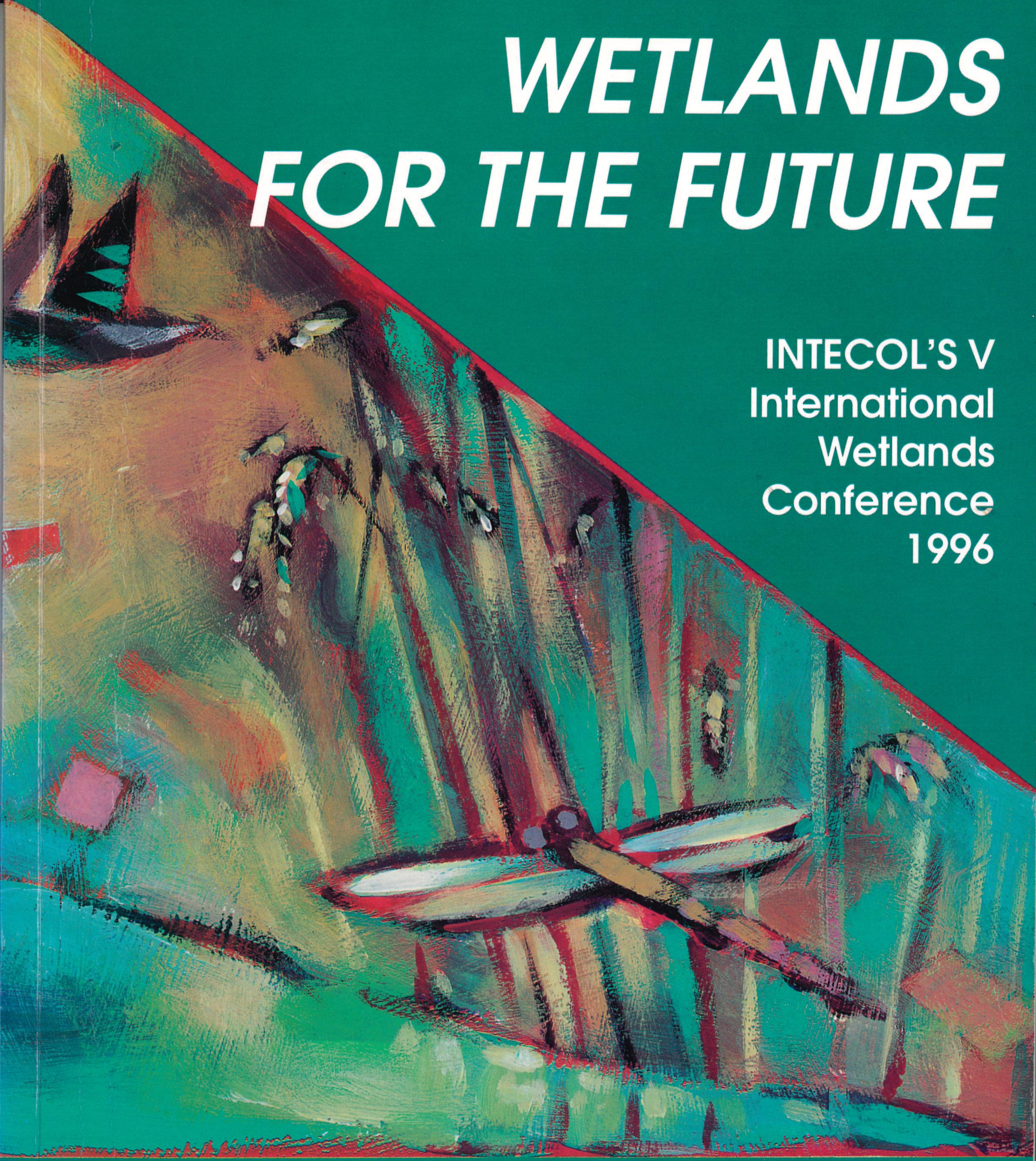

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