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Department of Environmental Quality
Office of the Secretary
Legal Affairs Division

Extension of Comment Period and Supporting Documentation
for Wetlands Assimilation, WQ068
(LAC 33:IX.1105, 1109, and 1113) (0609Pot3)

Under the authority of the Environmental Quality Act, R.S. 30:2001 et seq., and in accordance with the provisions of the Administrative Procedure Act, R.S. 49:950 et seq., the secretary gives notice that the comment period is being extended for the proposed amendments to the Water Quality regulations, LAC 33:IX.1105, 1109, and 1113 (Log #WQ068).

Supporting documentation concerning wetlands assimilation has been made available for proposed rule WQ068 at DEQ office locations listed below and on the Internet at www.deq.louisiana.gov under Rules and Regulations, as of September 11, 2006. The Notice of Intent for WQ068 was published on pages 1473 - 1476 of the August 20, 2006, issue of the *Louisiana Register*. The proposed rule will amend the water quality standards in LAC 33:IX.Chapter 11 to protect wetland areas that may receive treated wastewater effluent. A public hearing on the proposed rule will be held on September 26, 2006, at 1:30 p.m. in the Galvez Building, Oliver Pollock Conference Room, 602 N. Fifth Street, Baton Rouge, LA 70802. The comment period for the proposed rule has been extended until October 11, 2006, to allow a 30-day review of the supporting documentation.

Written comments must be received no later than October 11, 2006, at 4:30 p.m., and should be sent to Judith A. Schuerman, Ph.D., Office of the Secretary, Legal Affairs Division, Box 4302, Baton Rouge, LA 70821-4302 or to FAX (225) 219-3582 or by e-mail to judith.schuerman@la.gov. Copies of this proposed regulation and supporting documentation can be purchased by contacting the DEQ Public Records Center at (225) 219-3168. Check or money order is required in advance for all copies.

The regulation and supporting documentation are available for inspection at the following DEQ office locations from 8 a.m. until 4:30 p.m.: 602 N. Fifth Street, Baton Rouge, LA 70802; 1823 Highway 546, West Monroe, LA 71292; State Office Building, 1525 Fairfield Avenue, Shreveport, LA 71101; 1301 Gadwall Street, Lake Charles, LA 70615; 111 New Center Drive, Lafayette, LA 70508; 110 Barataria Street, Lockport, LA 70374; 645 N. Lotus Drive, Suite C, Mandeville, LA 70471.

Herman Robinson, CPM
Executive Counsel

Additional Guidance to be Added to Volume 3 of the Louisiana Water Quality Management Plan,
Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards

For Section 8, added language is underlined and omitted language is indicated by ~~strikethrough~~. All language in Section 10 is added language.

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8. BIOLOGICAL TOXICITY TESTING

(Changes to the first sentence of paragraph 3)

Discharges into intermittent streams and wetlands that lack perennial standing water shall be required to conduct 48 hour acute toxicity tests at the critical dilution of 100% effluent ~~for the intermittent stream~~.

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10. WETLAND ASSIMILATION OF NUTRIENT RICH DISCHARGES

DEQ recognizes that many of the state's wetlands are deteriorating due to changes to hydrology and the resultant lack of nutrients, suspended solids, and a high natural subsidence rate. Therefore the department may allow the discharge of the equivalent of secondarily treated effluent into wetlands for the purposes of nourishing and enhancing those wetlands. The approval process will require:

A. A feasibility assessment that includes:

1. delineation of the available wetland(s),
2. a list of landowners and the availability of ownership and/or easement agreement(s),
3. a description and the suitability of the type (classification) of wetland(s) available,
4. the number of acres of wetlands required for assimilation,
5. uses that currently exist within the wetland (i.e., hunting, fishing, swimming, oyster propagation, etc.),
6. long-term average loading rates (and basis for calculations) to the wetland (not to exceed 15g TN/square meter/yr and 4g TP/square meter/yr),*
7. a proposed reference area for evaluation purposes, and
8. hydrology and hydrograph of the proposed assimilation area and possible distribution system layout.

B. A baseline study of the wetland that includes the discharge area and the reference area:

1. classification of the flora present,
2. vegetative productivity,
3. sediment analysis for metals and nutrients,
4. water level measurements/analyses, including salinity, dissolved oxygen conductivity, nitrogen series and total phosphorus,
5. water quality measurements, and
6. accretion measurement(s).

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C. Upon permit issuance** the permittee will be required to conduct ongoing biological measurements to ensure the biological integrity of the wetland. The quantity and frequency of the measurements will be dependant upon the flow of the discharge and the loading rate to the wetland, but may include, but is not limited to sampling in the discharge area and the reference site for variations in:

1. floral species diversity (*Terrestrial Plant Ecology*. Chapter 9. Method of Sampling the Plant Community Barbour, et al 1987),
2. above-ground productivity (*Methods for Estimating the Primary Production of Forest*. P. J. Newbould 1967; *Effect of forest management practices on southern wetland productivity*, W. H. Conner, 1994; *The use of wetlands in the Mississippi River Delta for wastewater assimilation: a review*, Day, J. W. et al 2004),
3. water stages,
4. metals and nutrient analysis from plant tissue samples,
5. metals and nutrient analysis from sediment samples,
6. water quality analysis of metals, nutrient, and other components, and
7. accretion measurement(s).

Statistical analysis will be included in the permit requirements as follows: "One-way analysis of variance will be carried out to compare treatment and control area parameters using statistical software. An alpha probability level of <0.05 will be used to define a significant difference. Comparison of means with significant ANOVA tests will be made using Tukey-Kramer Honestly Significant Difference (HSD) test (Sall and Lehman 1996)." Other statistical tests may be used as appropriate and would be described in the facility reporting.

D. As found in LAC 33:IX.1113.B.12, the following biological criteria shall apply to a wetland receiving a discharge:

"Due to effluent addition, the discharge area shall have no more than a 20% reduction in the rate of total above-ground wetland productivity over a 5-year period as compared to a reference area…"

The following language provides permit implementation guidance for the biological criteria.

Area Definitions
The Discharge Area is defined as the area of wetlands directly affected by effluent addition, and is inclusive of the delineated assimilation area.

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* Site-specific loading rates may be applied, if scientifically justified and adopted by LDEQ.
** To avoid confusion and to provide a better understanding of permitting requirements, an example permit application is included in Appendix G of this volume and an example permit is included in Appendix H.

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The Reference Area is defined as wetland area that is nearby and similar to the Discharge Area, but that is not affected by effluent addition. The Reference Area and Discharge Area will be determined through the required feasibility and baseline studies described in Sections 10.A and 10.B above.

Background and Basis for Criteria Implementation and Assessment

Above ground primary productivity is a key measurement of overall ecosystem health in the wetlands of south Louisiana (Conner 1994; Day et al. 2004). Primary productivity is dependent on a number of factors, including hydrology, nutrient availability and past management practices (Conner 1994; Conner and Day 1976, 1988a and b; Ewel & Odum 1984). The underlying ecological model is that the addition of secondarily-treated nutrient rich municipal wastewater to south Louisiana wetlands will promote vertical accretion through increased organic matter production and deposition, counteracting the effects of hydrological isolation and subsidence. This is supported by Rybczyk et al. (2002) who reported increased soil accretion rates at the Thibodaux wastewater discharge area, and by Hesse et al. (1998) that showed higher growth rates of cypress trees at the Breaux Bridge wastewater discharge area, an area that has received wastewater effluent for over 50 years.

Methods for Measuring Above-ground Productivity in Forested Wetlands

At forested wetland sites, 10 x 100 m quadrates should be established to measure forest productivity. Productivity of a forested wetland is defined as the sum of stem growth (perennial productivity) and leaf and fruit fall (ephemeral productivity). Aboveground net primary productivity (NPP) should be calculated as the sum of ephemeral and perennial productivity, and presented as live dry weight per square meter per year basis (g dry wt m^{-2} yr^{-1}).

Perennial productivity should be calculated using diameter at breast height (dbh) measurements of all trees with dbh greater than 3.2 cm. Measurements of dbh should be taken during two consecutive winters when trees are dormant, and biomass calculated using allometric equations (Megonigal et al. 1997; Scott et al. 1985). The following steps should be used to calculate perennial productivity:

- Estimate biomass (in kg) from dbh using allometric equations
- Sum biomass per study site and divide by area (in m^2) of study site. This calculates the biomass per unit area (kg m^{-2}) for each year and study site.
- Subtract Yr_1 biomass (kg m^{-2}) from Yr_2 biomass, and multiply by 1000. This calculates Net Primary Productivity (NPP) as g m^{-2} yr^{-1}.

Ephemeral productivity should be measured using 0.25 m^2 leaf litter boxes, with screened bottoms and approximately 10 cm wide sides. Six boxes should be placed randomly in each 10 x 100 m quadrates. Leaves and other materials that collect in the boxes should be gathered bimonthly, separated into leaves and woody material, dried to a constant weight, and weighed. Ephemeral productivity should be calculated by summing the dried weight of leaves from each box over one year and extrapolating to grams per m^2.

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Methods for Measuring Above-ground Productivity in Emergent Wetlands
At each non-forested marsh study site, end of season live biomass should be measured using five randomly placed 0.06 m^2 quadrats 10-20 m from the bayou edge in areas of relatively homogenous herbaceous vegetation. Samples should be collected from the quadrats during the last two weeks of September or the first two weeks of October. Vegetation within the quadrat should be cut as close to the marsh surface as possible, stored in labeled paper bags, brought back to the laboratory, and refrigerated until processing. Live material should be separated from dead, and dried at 60°C to a constant weight. Aboveground net primary productivity should be calculated by extrapolating the live dried weight of each sample to grams per m^2.

Calculating Daily Maximum and Monthly Average Permit Limitations for Total Phosphorus and Nitrogen Based on Long-Term Loading Rates
The following language provides guidance on the implementation of the long-term average nutrient loading rates.

Based on the Yearly long-term Average Loading Rates specified above and the acreage of wetland into which the effluent is discharged, an effluent loading rate will be calculated and included in the permit. First the yearly loading rates are converted from grams/square meter to pounds/acre. The product is divided by 365 days/year to calculate the daily long-term average loading rate. The dividend is inserted into the calculation of permit limits using the statistical approach by using the same multipliers to determine the daily maximum (3.11) and monthly average (1.31) loading rate limits.

4g $TPm^{-2}yr^{-1}$ = 35.6 lbs. TP $acre^{-1}yr^{-1}$

15g $TPm^{-2}yr^{-1}$ = 133.8 lbs. TP $acre^{-1}yr^{-1}$

As an example, if the discharge was to 234 acres, then

the yearly loading rate is:

(35.6 lbs. TP $acre^{-1}yr^{-1}$) * 234 acres = 8330 lbs. TP/year

the long term average daily loading rate is:

(8330 lbs. TP/year)/365 days/year = 22.8 lbs. TP/day

Using the multipliers found on page 12 of this volume,

the daily maximum discharge loading rate is:

(22.8 lbs. TP/day) * 3.11 = 70.9 lbs. TP/day

the monthly average discharge

(22.8 lbs. TP/day) * 1.31 = 29.9 lbs. TP/day

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References

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Hesse, I.D, J. Day, and T. Doyle. 1998. *Long-term growth enhancement of Baldcypress (Taxodium Distichum) from municipal wastewater application. Environmental Management.* 22:119-127.

Megonigal, J. P., W. H. Conner, S. Kroeger, and R. R. Sharitz. 1997. *Aboveground production in southeastern floodplain forests: a test of the subsidy-stress hypothesis.* Ecology 78:370-384.

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