Effects of Sediment Diversions on Water Quality in Deltaic Louisiana Estuaries

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Justic et al. (2008) – CLEAR Vol. IV, Chapter 7, Appendix 12
Allison et al. (2012)

Justic et al. (2005)
Allison et al. (2012)
Das et al. (2011, 2012), Wang and Justic (2009), Justic et al. (in preparation)
Wang and Justic (2009)

%MR Discharge

33%

17%

39%

11%
* - about the same as the increase in NRC predicted under the 2012 Master Plan for Sustainable Coast (Rivera et al., 2013)
NF Effects = f(Freshwater Res. Time)

FRT = \( \frac{S_0 - S}{S_0} \times \frac{V}{Q} \)

Lower Barataria Bay (Das et al., 2010):

\( V = 1.7 \times 10^9 \text{ m}^3 \)
\( S = 12.5 \)
\( S_0 = 25 \)

\( \text{FRT@300 m}^3 \text{ s}^{-1} = 33 \text{ days} \)
\( \text{FRT@3,000 m}^3 \text{ s}^{-1} = 3.3 \text{ days} \)
Dettmann (2001), Gardner and White (2010), Perez et al. (2001), Lane et al. (2004)
LBB Residence times:
< 1 to 14 days

Das (2010)
Justic et al. (in preparation)
Figure 10. Modeled temperature effects on potential biogeochemical rates.

Branoff (2009)
Chl a @ Causeway (µg L⁻¹)

1997 diversion

2008 diversion

2011 diversion

Source: RETurner; LSU Department of Oceanography and Coastal Sciences
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http://saveourlake.org/bonnet-carre.php
Source: S. Howden (personal communication)
Discussion points

Near field:
- Salinity, temperature and residence times
- Nutrient concentrations and ratios
- Phytoplankton biomass
- HAB potential

Far field:
- Nutrient concentrations and ratios
- Spatial patterns in productivity and hypoxia
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