Supporting Information

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Biodynamic modeling of PCB uptake by *Macoma balthica* and *Corbicula fluminea* from sediment amended with activated carbon

Figure S1. PCB concentrations of dominant congeners in sediment and clams exposed to treated and untreated Grasse River sediment.

Figure S2. PCB concentrations of dioxin-like congeners or coeluting groups in sediment and clams exposed to treated and untreated Grasse River sediment.

Figure S3. Predicted and observed PCB concentrations in exposed *C. fluminea* tissue.

Flux calculations to determine PCB aqueous concentration in overlying water.

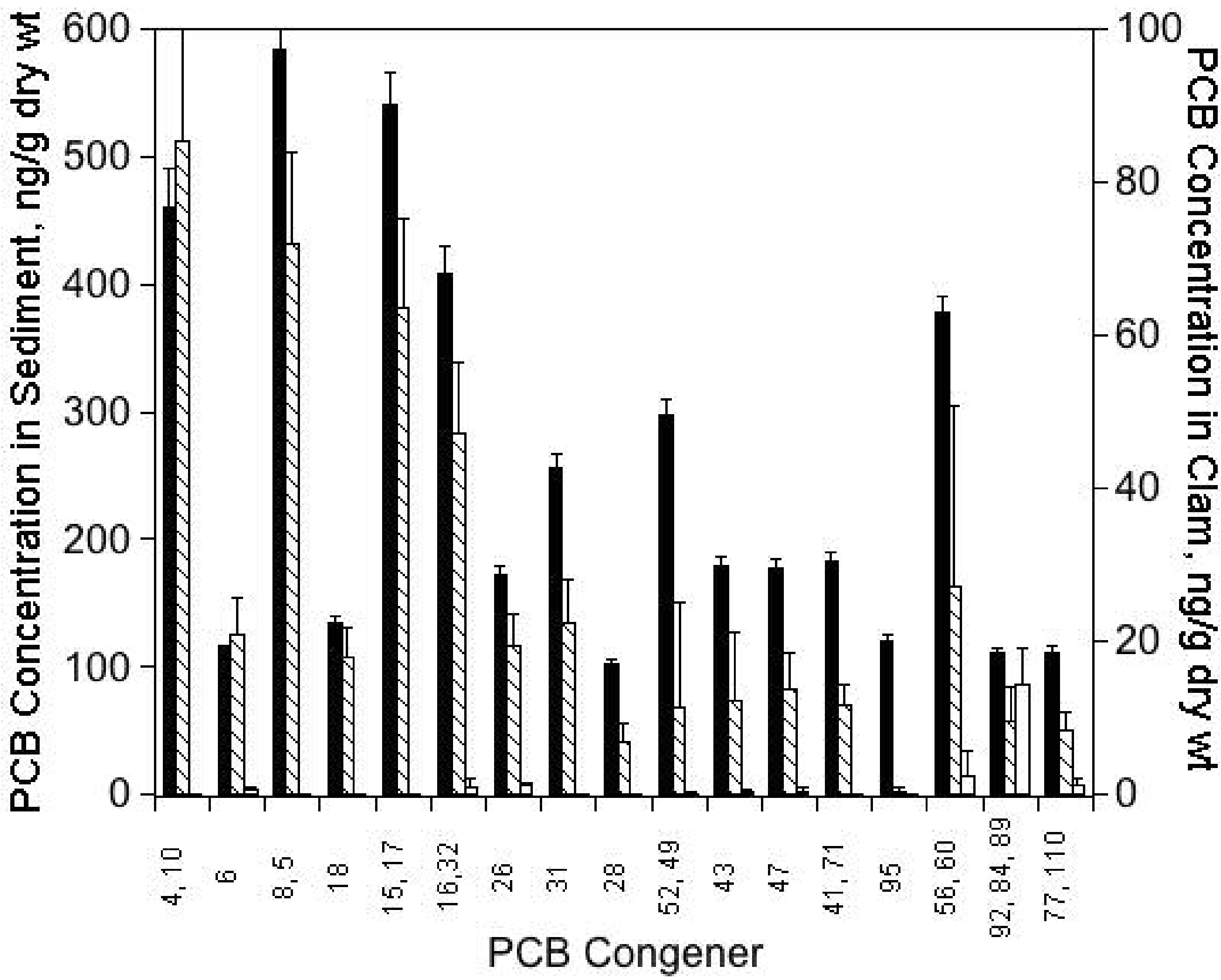

Figure SI 1. PCB concentrations of dominant congeners in sediment (black) and clams exposed to untreated (hatched) Grasse River sediment and Grasse River sediment treated with 2.5% dry wt activated carbon (white).

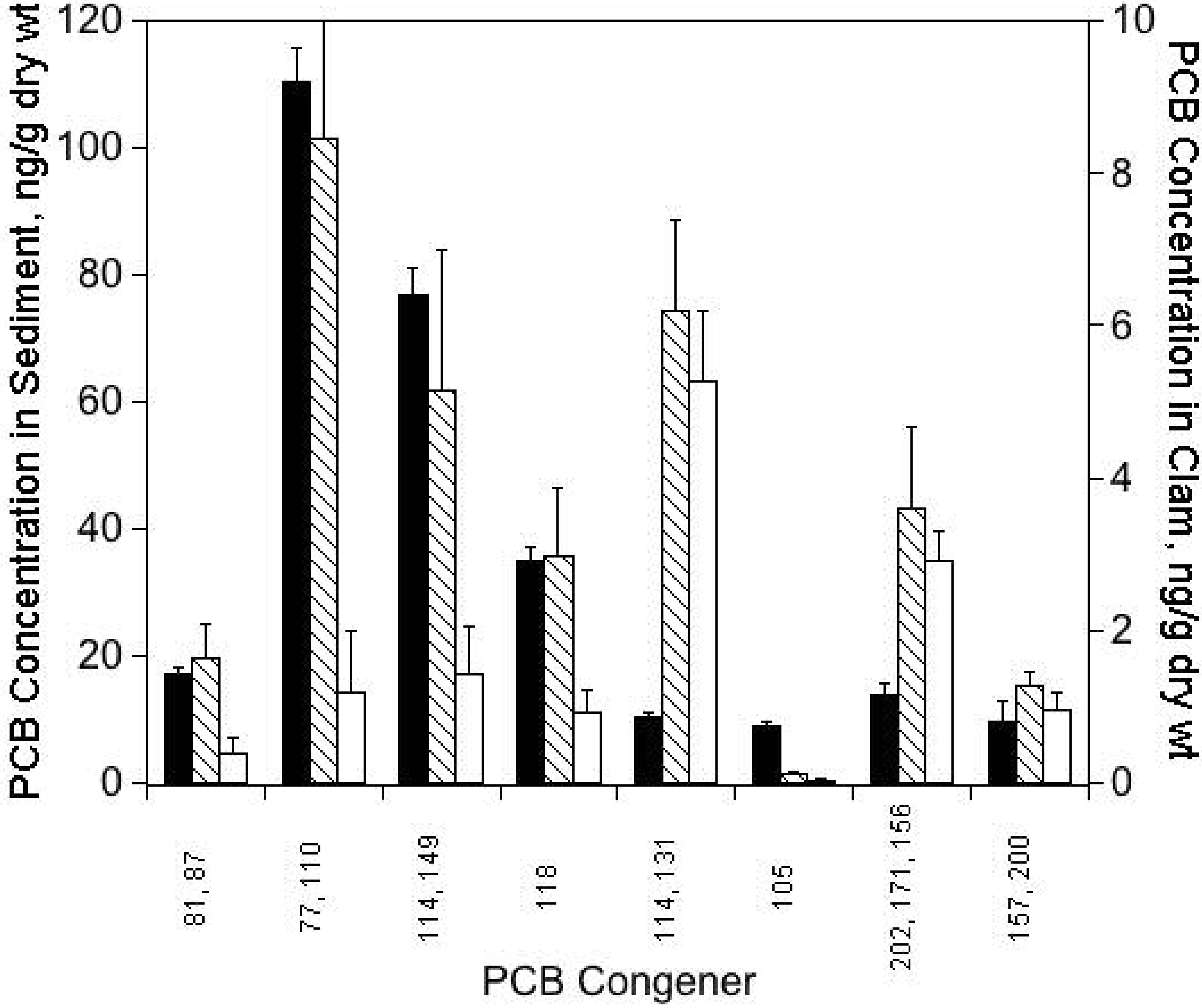

Figure SI 2. PCB concentrations of dioxin-like congeners or coeluting groups in sediment (black) and clams exposed to untreated (hatched) Grasse River sediment and Grasse River sediment treated with 2.5% dry wt activated carbon (white).

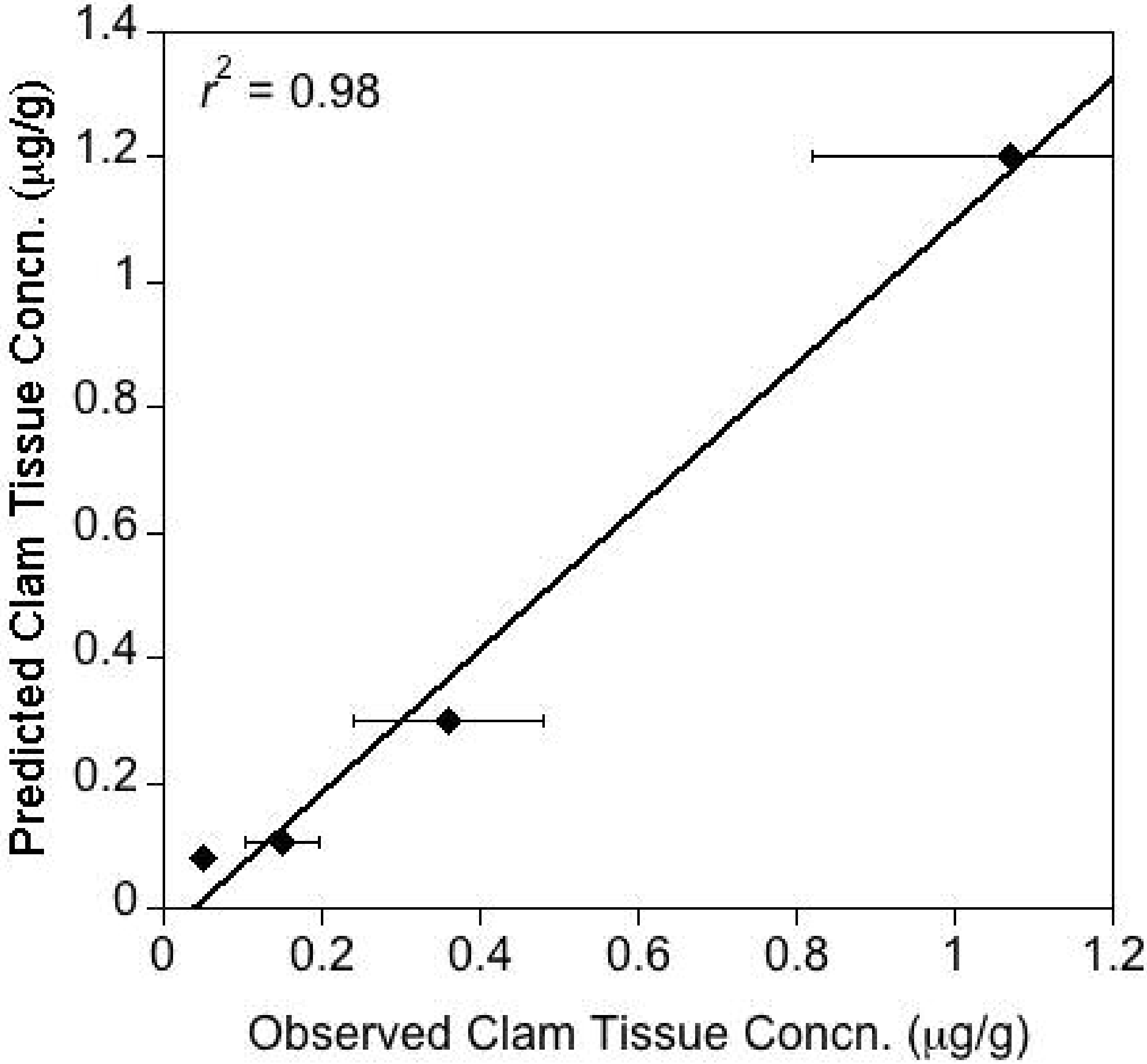

Figure SI 3. Predicted and observed total PCB concentrations in *C. fluminea* tissue.

Flux calculations to determine aqueous PCB concentrations in overlying water.

The following equation was used to describe overlying surface water PCB concentrations:

$$\frac{\mathrm{d}C_{\mathrm{aq,\,surface}}}{\mathrm{d}t} = \frac{k \cdot \left(C_{\mathrm{aq,\,eq}} - C_{\mathrm{aq,\,surface}}\right) \cdot \mathrm{A} - \mathrm{FR} \cdot \mathrm{W} \cdot \mathrm{AE}_{\mathrm{aq}} \cdot C_{\mathrm{aq,\,surface}} + k_{\mathrm{e}} \cdot C_{\mathrm{clam}} \cdot \mathrm{W}}{\mathrm{V}} \qquad (3)$$

where k is the mass transfer coefficient for PCBs from sediment to water (m/d), $C_{\mathrm{aq,eq}}$ is the aqueous equilibrium PCB concentration (μg/m^3), $C_{\mathrm{aq,surface}}$ is the overlying surface water PCB concentration (μg/m^3 in the sediment flux term; μg/L in the clam aqueous uptake term), A is the plan surface area of the sediment (m^2), W is the total weight of clams in the aquarium (g dry wt), and V is the volume of overlying surface water in the system (L). All other parameters are as defined for Equation 1. The mass transfer coefficient (k) was estimated as 0.003 m/d from a study by Ortiz et al. (*18*) involving Grasse River sediment at low-flow conditions. Since, as confirmed by measurement, the overlying surface water PCB concentration is always much lower than the aqueous equilibrium concentration, $C_{\mathrm{aq,surface}}$ effectively can be neglected in the sediment flux term.

Solving Equation 3 for the steady state overlying surface water concentration yields

$$C_{\mathrm{aq,surface}} = \frac{k \cdot C_{\mathrm{aq,eq}} \cdot \mathrm{A} + k_{\mathrm{e}} \cdot C_{\mathrm{clam}} \cdot \mathrm{W}}{\mathrm{FR} \cdot \mathrm{AE}_{\mathrm{aq}} \cdot \mathrm{W}} \qquad (4)$$

If a median value is assumed for the clam tissue concentration, the steady state overlying surface water concentration is estimated to be 0.0035 μg/L. This value is two to three orders of magnitude lower than the equilibrium pore-water concentration for Grasse River sediment, 1.03 ± 0.08 μg/L. An initial surface water PCB concentration of 0.0044

± 0.00054 μg/L was measured in simulated test systems at a time immediately before clam introduction. Given this initial condition, the steady state concentration of 0.0035 μg/L should be reached in approximately 2 d in our tests with Grasse River sediment and *C. fluminea*.