

ORD CLEARANCE FORM

Initiator Information		Product Category (Select if applicable)	
First Name:	Jake	<input type="checkbox"/> HISA (Highly Influential Scientific Assessment) <input type="checkbox"/> ISI (Influential Scientific Information) <input type="checkbox"/> High Profile and/or Policy Relevant (not HISA or ISI)	
Last Name:	Beaulieu		
E-mail Address:	Beaulieu.Jake@epa.gov		
Organization:	ord, nrmrl, wswrd, uwmb		
Principal Investigator / Project Officer Information		Product Information	
First Name:	Jake	Clearance Tracking Number	ORD-020010
Middle Initial:		EPA Publication Number	
Last Name:	Beaulieu	Product Type	Journal Article
Email:	Beaulieu.Jake@epa.gov	Product Subtype	Peer Reviewed
Phone #:		Records Schedule Selection	Permanent
Product Title			
Carbon limitation of heterotrophic respiration is linked to dissolved organic matter quality in urban streams - journal article			
Author(s), Affiliation, and Address			
External Author		EPA Author	
First Name: Clay		First Name: Jake	
Last Name: Arango		Last Name: Beaulieu	
Organization: CentraWashington Universityl		Organization: ord, nrmrl, wswrd, uwmb	
Address:		Address:	
Telephone:		Telephone:	
Email:		Email: Beaulieu.Jake@epa.gov	
Percentage Contribution %:		Percentage Contribution %:	
Impact / Purpose Statement			
Note: The Impact / Purpose Statement information for this work product will be displayed on the additional pages.			
Product Description / Abstract			
Note: All Product Description / Abstract information for this work product will be displayed on the additional pages.			
Tracking and Planning			
Note: All Tracking and Planning Field data for this work product will be displayed on the additional pages.			
Bibliographic Citation Components			
Publisher: Springer		Meeting Name:	
Publisher City: New York		Meeting Start Date:	
Publisher State: NY		Meeting End Date:	
Publisher Country: USA		Meeting City:	
Editors:		Meeting State:	
Edition:		Meeting Country:	
Book Title:		Journal: BIOGEOCHEMISTRY	
Chapter:		Publication Title:	
Volume:		Year:	
Issue:		URL:	
Pages:			

[illegible]

Additional Authors

Author #3 - EPA Author

First Name: Ken
Last Name: Fritz
Organization: ord, nerl, sed, eib
Address:
Phone:
Email: Fritz.Ken@epa.gov
Percentage Contribution:

Author #4 - EPA Author

First Name: Brian
Last Name: Hill
Organization: ord, nheerl, med
Address:
Phone:
Email: Hill.Brian@epa.gov
Percentage Contribution:

Author #5 - EPA Author

First Name: Colleen
Last Name: Elonen
Organization: ord, nheerl, med
Address:
Phone:
Email: Elonen.Colleen@epa.gov
Percentage Contribution:

Author #6 - External Author

First Name: Michael
Last Name: Pennino
Organization: University of Maryland
Address:
Phone:
Email:
Percentage Contribution:

Author #7 - EPA Author

First Name: Paul
Last Name: Mayer
Organization: ord, nheerl, wed, eeb
Address:
Phone:
Email: Mayer.Paul@epa.gov
Percentage Contribution:

Author #8 - External Author

First Name: Sujay
Last Name: Kaushal
Organization: University of Maryland
Address:
Phone:
Email:
Percentage Contribution:

Author #9 - External Author

First Name: David
Last Name: Balz
Organization: Pegasus Technical Services
Address:
Phone:
Email:
Percentage Contribution:

Tracking and Planning

Task ID: 4.2B

Task: Case studies focused on GI role in maintaining aq life use, habitat endpoints at watershed scale

Product Title: N/A - Not Applicable

Product Description: N/A - Not Applicable

Project: GI BMPs, metrics

Topic: Maintaining and Improving Natural and Engineered Water System

Research Program Area: Safe and Sustainable Water Resources

Impact / Purpose Statement

To inform the public

Product Description / Abstract

Urban streams are degraded by a suite of factors, including burial beneath urban infrastructure (i.e., roads, parking lots) that eliminates light and reduces direct organic matter inputs to streams, with likely consequences for organic matter metabolism by microbes and carbon limitation in streams. We studied seasonal changes in organic matter metabolism by microbial communities in open and buried reaches of three urban streams in Cincinnati, Ohio. We characterized organic matter quality using fluorescence spectroscopy, extracellular enzyme profiles, and carbon limitation patterns. We hypothesized: 1) that algal production would lead to higher quality dissolved organic matter (DOM) in spring compared to other seasons and in open compared to buried reaches, 2) lower reliance of microbial respiration on recalcitrant carbon sources in spring and in open reaches, and 3) that microbial respiration would be more carbon limited in the autumn and in buried reaches. DOM quality was generally higher in spring than autumn, but the only DOM quality metric that varied by reach was an indicator of recalcitrant humic compounds, which showed more humic DOM in open compared to buried reaches. This likely reflected open reaches as an avenue for direct terrestrial inputs from the riparian zone. Extracellular enzyme assays showed that microbes in buried reaches consistently allocated more effort to degrade recalcitrant carbon sources, consistent with a lack of labile carbon compounds due to limited photosynthesis. Finally, buried and open reaches were both more carbon-limited in autumn when terrestrial leaf inputs dominated compared to the spring when vernal algal blooms were pronounced. Altogether, our data show that stream burial affects the quality of DOM pool with consequences for how microbes use those carbon sources, and that buried and open stream reaches were limited by labile carbon in all seasons. Different carbon quality and use patterns coupled with widespread carbon limitation suggests that these urban streams likely export recalcitrant carbon to downstream water bodies, and that the cycling of nitrogen and/or phosphorus could decrease if heterotrophic metabolism is limited by labile carbon availability.

CCs

Beaulieu.Jake@epa.gov
Elonen.Colleen@epa.gov
Fritz.Ken@epa.gov
Greene.Rick@epa.gov
Hill.Brian@epa.gov
Impellitteri.Christopher@epa.gov
Latham.Michelle@epa.gov
Massey.Kati@epa.gov
Matney.Rachel@epa.gov
Mayer.Paul@epa.gov
Rea.Anne@epa.gov
Speth.Thomas@epa.gov
Thurston.Hale@epa.gov
Williams.Joe@epa.gov
mattas-curry.lahne@epa.gov
vanDrunick.Suzanne@epa.gov

Does this journal article have EPA-generated data associated with it?

No

If no EPA-generated data is associated with the journal article please explain:

Data were generated by Lead Author from Central Washington University.

Comments

Author: Jake Beaulieu Date: 01/20/2017 7:19 AM

Peer reviewed manuscript