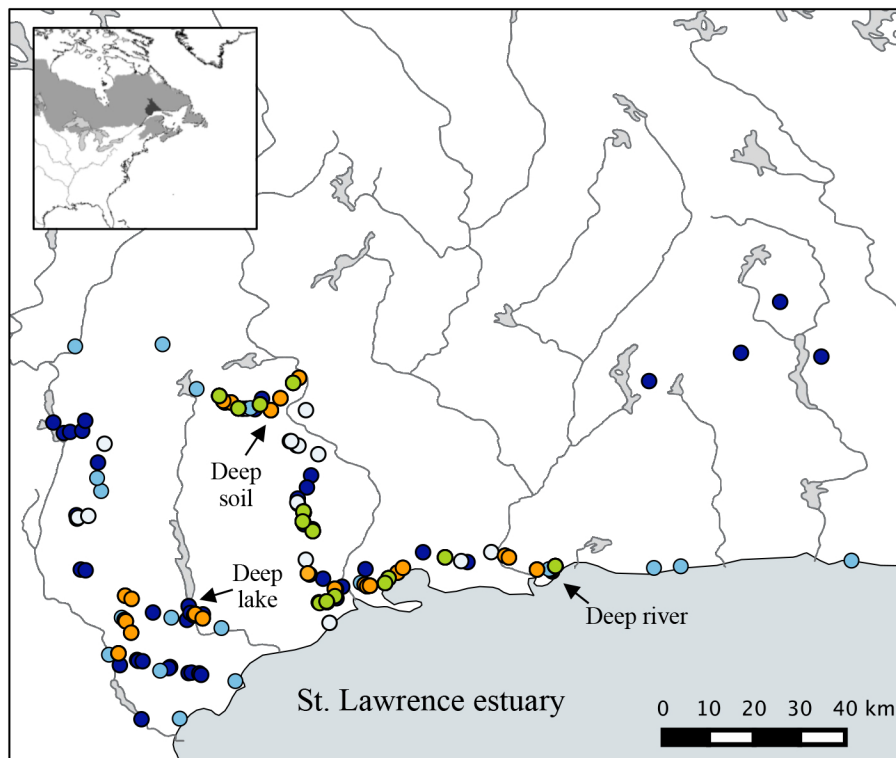
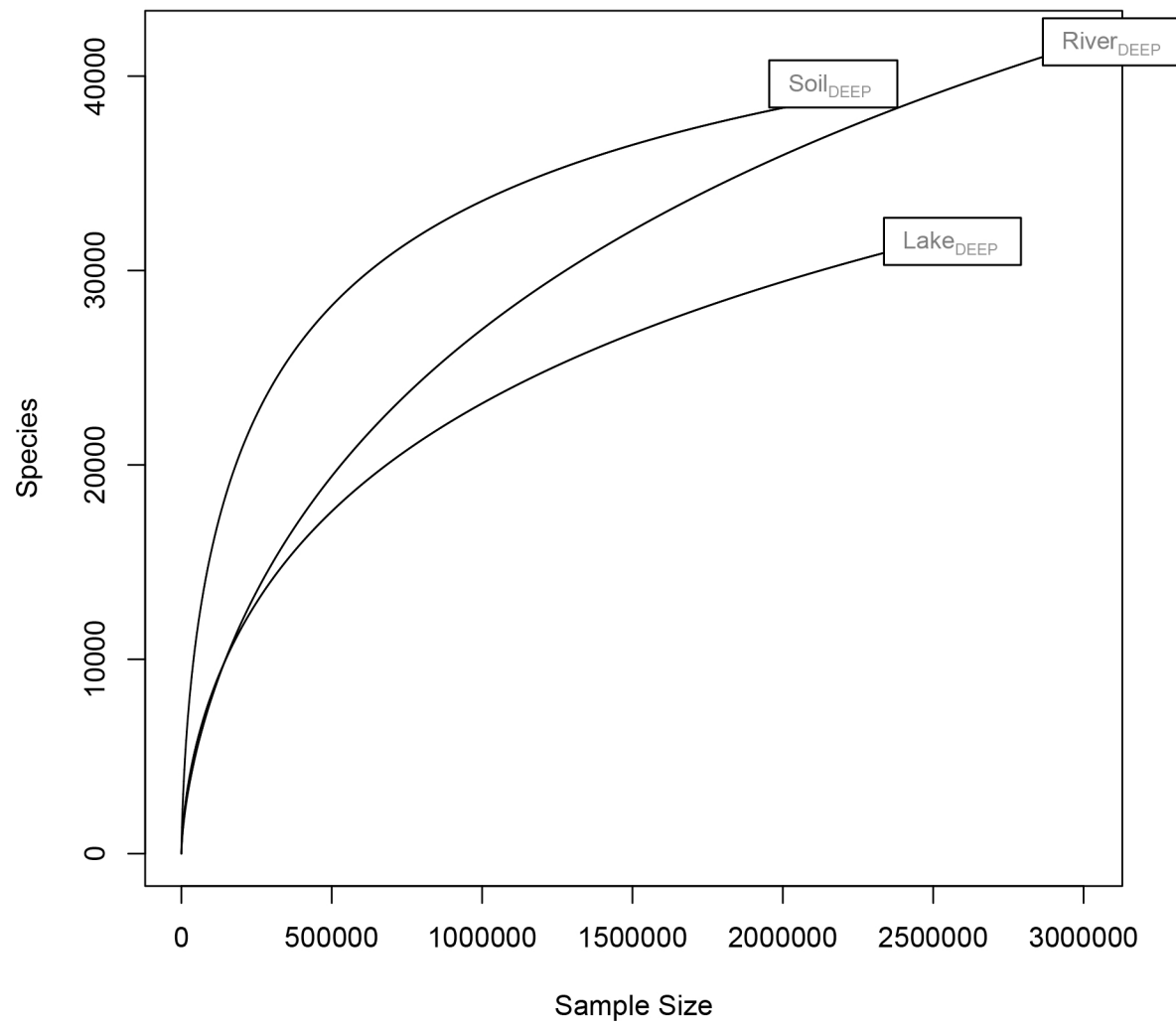


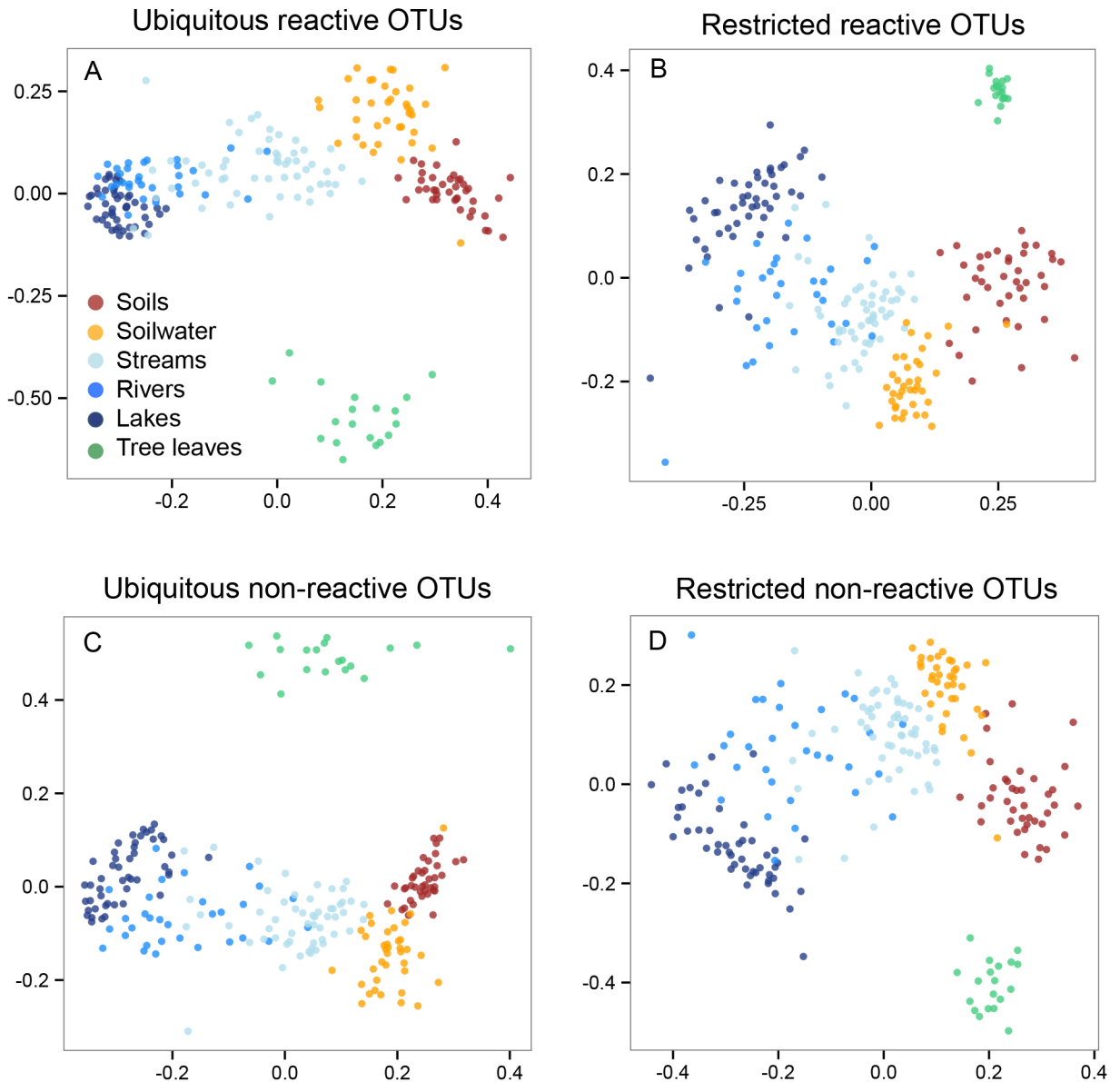
**Figure S1.** Map showing the location and distribution of sites across the sampled region. The inset map indicates the position of La Côte-Nord region in North America, and the shaded area represents the boreal zone. Colour indicates lakes (dark blue), rivers (Strahler order >2, blue), streams (Strahler order  $\leq 2$ , light grey, orange –if the adjacent soil and soil water were also sampled-, and green –if in addition to soils, tree leaves were collected-). The arrows indicate the 3 samples that were further subjected to the deep sequencing.



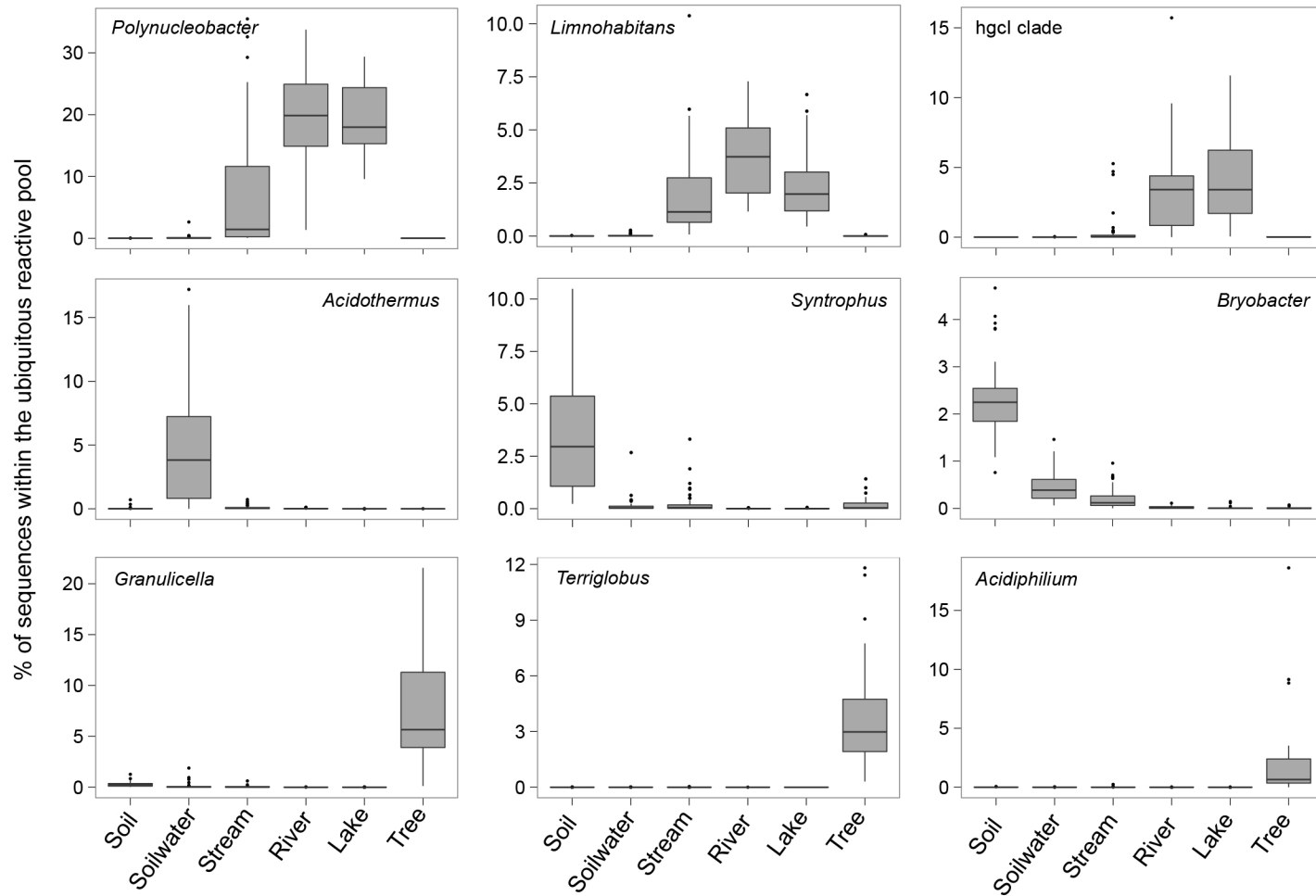
**Figure S2.** OTU accumulation curves of the 3 individual deeply sequenced samples.



**Figure S3.** Non-metric multidimensional scaling (NMDS) plots based on Bray–Curtis distances of taxonomic composition of bacterial communities considering only those taxa belonging to the reactive pool (a,b) or the non-reactive pool (c,d) depending on whether they were detected (A,C) or not (B,D) in the 3 deeply sequenced samples.



**Figure S4.** Contribution of some of the most abundant identified genera to the ‘ubiquitous reactive’ pool across the different types of ecosystems. Percentages were calculated with respect to the total sequences associated to the ‘ubiquitous reactive’ OTUs present at each site.



**Table S1.** Mean (and range) of the measured environmental parameters per type of ecosystem.

	Soils	Soil water	Streams	Rivers	Lakes
Temperature (°C)	14.8 (10.4-21.0)	15.3 (11.1-22.7)	13.9 (6.2-25.3)	17.3 (10.5-24.2)	16.2 (10.7-24.8)
pH	5.0 (3.8-6.1)	6.0 (5.1-7.2)	6.2 (4.5-7.9)	6.5 (4.9-7.4)	6.0 (4.8-7.0)
DO (%)	-	60.7 (22.8-101.1)	87.7 (50.2-117.4)	95.6 (63.7-117.4)	98.7 (83.5-129.9)
Conductivity ( $\mu\text{S cm}^{-1}$ )	-	346 (4-5386)	35.2 (10-201)	25.2 (8.0-73)	14.6 (6-28)
DOC ( $\text{mg L}^{-1}$ )	-	16.9 (3.6-64.7)	11.9 (1.8-57.2)	8.5 (3.6-24.4)	8.3 (3.2-13.1)
cDOM ( $a_{440}, \text{m}^{-1}$ )	-	16.9 (1.4-69.7)	9.6 (0.5-58.8)	6.13 (1.7-23.0)	4.4 (0.9-9.8)
Organic matter content (%)	15.2 (0.5-92.9)	-	-	-	-
Water content (%)	34.4 (6.2-87.9)	-	-	-	-

**Table S2.** Criteria used for categorizing OTUs within the different pools of taxa, and number of total OTUs and associated sequences represented by each pool.

	Selection criteria	Number of total OTUs	Number of total sequences
Reactive OTUs	> 0.01% local relative abundance at least once*	34164	7191744
Ubiquitous reactive	*and presence in any of the 3 deep samples	20969	6152190
Restricted reactive	*and absence in all 3 deep samples	13195	1039554
Non-reactive OTUs	< 0.01% local relative abundance always**	121673	849133
Ubiquitous non-reactive	**and presence in any of the 3 deep samples	55260	477243
Restricted non-reactive	**and absence in all 3 deep samples	66413	371890

**Table S3.** Number of OTUs considered for each of the 3 comparisons shown in Figure 4. Note that despite very different number of OTUs considered, the percentage of recovered reactive OTUs does not change (Fig. 4A), suggesting that these patterns are not influenced by differences in the distribution of OTUs among samples.

Number of OTUs in deeply sequenced samples		Number of reactive OTUs in shallowly sequenced samples
1 Soil	vs.	72 lakes and rivers
38842		9145
1 Lake + 1 River	vs.	78 soils and soilwaters
58408		19480
1 Soil + 1 Lake + 1 River	vs.	20 phyllosphere samples
89492		2311