**Table S5.** Bacteria counts, sediment (CFU/100 g) versus water (CFU/100 ml). Data shown as mean (n=3, sample point 13 n=2 for sediment).

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample Site | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| *E. coli*  CFU/100 g | 0 | 3000 | 12667 | 6000 | 13667 | 1000 | 0 | 12000 | 13333 | 1667 | 1667 | 7667 | 24000 | 333 | 3667 | 2667 | 1000 | 9000 | 10667 | 0 | 333 |
| *E.coli* CFU/100 ml | 7 | 10 | 5 | 9 | 20 | 15 | 13 | 9 | 8 | 21 | 159 | 88 | 17 | 19 | 14 | 3 | 6 | 3 | 3 | 2 | 6 |
| Coliforms CFU/100 g | 5667 | 145667 | 173667 | 185667 | 399333 | 1667 | 1667 | 191000 | 281667 | 26000 | 20667 | 153667 | 546000 | 13000 | 126000 | 114667 | 39333 | 60333 | 156000 | 0 | 8000 |
| Coliforms CFU/100 ml | 147 | 147 | 171 | 157 | 265 | 215 | 311 | 297 | 333 | 423 | 1865 | 664 | 255 | 281 | 302 | 161 | 163 | 45 | 57 | 39 | 59 |
| *Vibrio* spp.  CFU/100 g | 11667 | 224167 | 1208333 | 1204167 | 934167 | 9167 | 10000 | 801667 | 817500 | 676667 | 48333 | 774167 | 671250 | 19167 | 164167 | 300833 | 173333 | 795833 | 546667 | 6667 | 87500 |
| *Vibrio* spp.  CFU/100 ml | 3467 | 5067 | 4200 | 6067 | 12200 | 12933 | 4667 | 7000 | 6733 | 7000 | 5667 | 17267 | 17200 | 8600 | 8133 | 6733 | 6733 | 4867 | 5733 | 7600 | 6467 |

|  |  |  |  |
| --- | --- | --- | --- |
| Presumed | Closest blast search identity match | Querycov/  Max ident % | Sequence length |
| *Campylobacter* spp. | *Acinetobacter calcoaceticus* | 99 / 100 | 1425 |
| *Campylobacter* spp. | *Acinetobacter calcoaceticus* | 100 / 100 | 1409 |
| *Campylobacter* spp. | *Acrobacter butzleri* | 100 / 99 | 1250 |
| *Campylobacter* spp. | *Ochrobactrum intermedium* | 99 / 100 | 1382 |
| *Campylobacter* spp. | *Escherichia coli* | 100 / 99 | 1440 |
| *Campylobacter* spp. | *Agrobacterium tumefaciens* | 100 / 100 | 1372 |
| *Campylobacter* spp. | *Pseudomonas flourescens* | 100 / 99 | 1416 |
| *Escherichia coli* | *Escherichia coli* | 100 / 100 | 1425 |
| *Escherichia coli* | *Escherichia coli* | 100 / 99 | 1420 |
| *Escherichia coli* | *Escherichia coli* | 100 / 99 | 1430 |
| *Escherichia coli* | *Escherichia coli* | 100 / 99 | 1428 |
| *Escherichia coli* | *Escherichia coli* | 100 / 99 | 1428 |
| *Escherichia coli* | *Escherichia coli* | 100 / 99 | 1428 |
| *Escherichia coli* | *Escherichia coli* | 100 / 99 | 1437 |
| *Escherichia coli* | *Escherichia coli* | 100 / 99 | 1441 |
| *Escherichia coli* | *Escherichia coli* | 100 / 99 | 1438 |
| *Escherichia coli* | *Escherichia coli* | 100 / 99 | 1428 |
| *Escherichia coli* | *Acinetobacter spp.* | 100 / 99 | 1434 |
| *Vibrio* spp. | *Shewanella* spp. | 100 / 99 | 1430 |
| *Vibrio* spp. | *Vibrio splendidus* | 99 / 99 | 1448 |
| *Vibrio* spp. | *Vibrio splendidus* | 100 / 99 | 1450 |
| *Vibrio* spp. | *Vibrio splendidus* | 100 / 99 | 1440 |
| *Vibrio* spp. | *Vibrio splendidus* | 100 / 99 | 1451 |
| *Vibrio* spp. | *Shewanella piezotolerans* | 100 / 99 | 1439 |
| *Vibrio* spp. | *Vibrio artabroborum* | 100 / 97 | 1449 |
| *Vibrio* spp. | *Photobacterium frigidiphilum* | 100 / 98 | 1442 |
| *Vibrio* spp. | *Vibrio* spp. | 100 / 96 | 1445 |
| *Enterococcus* spp. | *Enterococcus faecalis* | 100 / 99 | 1358 |
| *Enterococcus* spp. | *Enterococcus faecalis* | 100 / 99 | 1447 |
| *Enterococcus* spp. | *Enterococcus hirae* | 100 / 99 | 1335 |

**Table S2** Identification of sequenced isolates.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | *E. coli* | Total coliforms | *Salmonella* spp. | Enterococci | Heterotrophs | *Vibrio* spp. | |
| *E. coli* | 1.000 |  |  |  |  |  | |
| Total coliforms | 0.945\*\* | 1.000 |  |  |  |  | |
| *Salmonella* spp. | 0.763\*\* | 0.759\*\* | 1.000 |  |  |  | |
| Enterococci | 0.817\*\* | 0.780\*\* | 0.729\*\* | 1.000 |  |  | |
| Heterotrophs | 0.536\* | 0.574\*\* | 0.476\* | 0.645\*\* | 1.000 |  | |
| *Vibrio* spp. | 0.847\*\* | 0.859\*\* | 0.709\*\* | 0.817\*\* | 0.720\*\* | 1.000 | |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | | | | | |
| \*. Correlation is significant at the 0.05 level (2-tailed). | | | | | | |

**Table S3** Correlation coefficient (rs) matrix demonstrating the relationship between the abundance of each cultured bacterial group within estuarine sediments (n = 21).

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | *E. coli* | Total coliforms | *Salmonella* spp. | Enterococci | *Vibrio* spp. | Clay  (<4 µm) | Silt  (4 µm-63 µm) | Very fine sand (63 µm-125 µm) | Fine sand  (125 µm-250 µm) | Medium sand  (250 µm-500 µm) | Coarse sand  (500 µm-1000 µm) | Very coarse Sand  (1000 µm-2000 µm) |
| *E. coli* | 1.000 |  |  |  |  |  |  |  |  |  |  |  |
| Total coliforms | 0.945\*\* | 1.000 |  |  |  |  |  |  |  |  |  |  |
| *Salmonella* spp. | 0.763\*\* | 0.759\*\* | 1.000 |  |  |  |  |  |  |  |  |  |
| Enterococci | 0.817\*\* | 0.780\*\* | 0.729\*\* | 1.000 |  |  |  |  |  |  |  |  |
| *Vibrio* spp. | 0.847\*\* | 0.859\*\* | 0.709\*\* | 0.817\*\* | 1.000 |  |  |  |  |  |  |  |
| Clay | 0.543\* | 0.495\* | 0.568\*\* | 0.664\*\* | 0.663\*\* | 1.000 |  |  |  |  |  |  |
| Silt | 0.570\*\* | 0.547\* | 0.578\*\* | 0.687\*\* | 0.688\*\* | 0.958\*\* | 1.000 |  |  |  |  |  |
| Very fine sand | 0.432 | 0.446\* | 0.368 | 0.625\*\* | 0.605\*\* | 0.804\*\* | 0.828\*\* | 1.000 |  |  |  |  |
| Fine sand | -0.457\* | -0.403 | -0.462\* | -0.618\*\* | -0.504\* | -0.795\*\* | -0.840\*\* | -0.539\* | 1.000 |  |  |  |
| Medium sand | -0.450\* | -0.416 | -0.419 | -0.650\*\* | -0.648\*\* | -0.899\*\* | -0.923\*\* | -0.935\*\* | 0.668\*\* | 1.000 |  |  |
| Coarse sand | 0.334 | 0.223 | 0.361 | 0.448\* | 0.266 | 0.486\* | 0.517\* | 0.214 | -0.774\*\* | -0.292 | 1.000 |  |
| Very coarse sand | 0.443\* | 0.353 | 0.398 | 0.634\*\* | 0.504\* | 0.625\*\* | 0.696\*\* | 0.461\* | -0.851\*\* | -0.578\*\* | 0.864\*\* | 1.000 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | | | | | | | | | | | |
| \*. Correlation is significant at the 0.05 level (2-tailed). | | | | | | | | | | | | |

**Table S4** Correlation coefficient (rs) matrix demonstrating the relationship between the abundance of each cultured bacterial group within estuarine sediments and sediment grain size (n=21).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Organic matter | Clay | Silt | Very fine sand | Fine sand | Medium sand | Coarse sand | Very coarse sand |
| Organic matter | 1.000 |  |  |  |  |  |  |  |
| Clay | 0.917\*\* | 1.000 |  |  |  |  |  |  |
| Silt | 0.926\*\* | 0.958\*\* | 1.000 |  |  |  |  |  |
| Very fine sand | 0.810\*\* | 0.804\*\* | 0.828\*\* | 1.000 |  |  |  |  |
| Fine sand | -0.834\*\* | -0.795\*\* | -0.840\*\* | -0.539\* | 1.000 |  |  |  |
| Medium sand | -0.903\*\* | -0.899\*\* | -0.923\*\* | -0.935\*\* | 0.668\*\* | 1.000 |  |  |
| Coarse sand | 0.527\* | 0.486\* | 0.517\* | 0.214 | -0.774\*\* | -0.292 | 1.000 |  |
| Very coarse sand | 0.736\*\* | 0.625\*\* | 0.696\*\* | 0.461\* | -0.851\*\* | -0.578\*\* | 0.864\*\* | 1.000 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | | | | | | | |
| \*. Correlation is significant at the 0.05 level (2-tailed). | | | | | | | | |

**Table S5** Correlation coefficient (rs) matrix demonstrating the relationship between estuarine sediment grain size (%) and organic matter content (%) (n=21).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | *E. coli* | Total Coliforms | *Salmonella* spp. | Enterococci | *Vibrio* spp. | | Organic matter |
| *E. coli* | 1.000 |  |  |  |  | |  |
| Total coliforms | 0.945\*\* | 1.000 |  |  |  | |  |
| *Salmonella* spp. | 0.763\*\* | 0.759\*\* | 1.000 |  |  | |  |
| Enterococci | 0.817\*\* | 0.780\*\* | 0.729\*\* | 1.000 |  | |  |
| *Vibrio* spp. | 0.847\*\* | 0.859\*\* | 0.709\*\* | 0.817\*\* | 1.000 | |  |
| Organic matter | 0.594\*\* | 0.545\* | 0.497\* | 0.765\*\* | 0.712\*\* | | 1.000 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | | | | |
| \*. Correlation is significant at the 0.05 level (2-tailed). | | | | | |

**Table S6** Correlation coefficient (rs) matrix demonstrating the relationship between the abundance of each cultured bacterial group within estuarine sediments and sediment organic matter content (n=21).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | *E. coli* | Total coliforms | *Salmonella* spp. | Enterococci | *Vibrio* spp. | Salinity | Temperature | Depth |
| *E. coli* | 1.000 |  |  |  |  |  |  |  |
| Total coliforms | 0.945\*\* | 1.000 |  |  |  |  |  |  |
| *Salmonella* spp. | 0.763\*\* | 0.759\*\* | 1.000 |  |  |  |  |  |
| Enterococci | 0.817\*\* | 0.780\*\* | 0.729\*\* | 1.000 |  |  |  |  |
| *Vibrio* spp. | 0.847\*\* | 0.859\*\* | 0.709\*\* | 0.817\*\* | 1.000 |  |  |  |
| Salinity | -0.002 | -0.106 | -0.042 | -0.049 | -0.175 | 1.000 |  |  |
| Temperature | -0.129 | -0.014 | 0.077 | -0.048 | 0.084 | -0.884\*\* | 1.000 |  |
| Depth | 0.253 | 0.170 | 0.288 | 0.165 | 0.098 | 0.569\*\* | -0.353 | 1.000 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | | | | | | | |

**Table S7** Correlation coefficient (rs) matrix demonstrating the relationship between the abundance of each cultured bacterial group within estuarine sediments and physico-chemical parameters measured directly above the bottom sediments (n=2).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | *E. coli* | Total coliforms | *Vibrio* spp. | Salinity | Temperature | Depth |
| *E. coli* | 1.000 |  |  |  |  |  |
| Total coliforms | 0.808\*\* | 1.000 |  |  |  |  |
| *Vibrio* spp. | 0.474\* | 0.349 | 1.000 |  |  |  |
| Salinity | -0.294 | -0.336 | 0.544\* | 1.000 |  |  |
| Temperature | -0.164 | -0.194 | -0.614\*\* | -0.596\*\* | 1.000 |  |
| Depth | -0.332 | -0.403 | 0.091 | 0.511\* | -0.073 | 1.000 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). | | | | | | |
| \*. Correlation is significant at the 0.05 level (2-tailed). | | | | | | |

**Table S8** Correlation coefficient (rs) matrix demonstrating the relationship between the abundance of each cultured bacterial group within estuarine water and physico-chemical parameters measured at 0.2 m depth (n=21

|  |  |  |
| --- | --- | --- |
| Bacterial group | Media | Incubation period |
| *E.coli* / Coliforms\* | Harlequin (LabM HAL008) | 24 h 37 ̊C |
| *Salmonella*  spp. | Harlequin Salmonella ABC Medium (LabM HAL001) | 24 h 37 ̊C |
| *Enterococci*  spp. | Slanetz & Bartley Medium (LabM LAB166) | 48 h 37 ̊C |
| *Campylobacter* spp. | Campylobacter Blood-free Selective Medium (LabM LAB112) supplemented with cefoperazone and amphotericin (LabM X112) | 48 h 37 ̊C under microaerophilic conditions using Campygen sachets (Oxoid, CN0035) |
| Total heterotrophs | Marine Agar (Deben Diagnostics Ltd, Ipswich UK) | 24 h Room temperature |
| *Vibrio*  spp. | Cholera Medium TCBS (Oxoid Ltd, Basingstoke, UK) | 24 h Room temperature |

**Table S9** Selective media used to enumerate target bacterial groups.