Dr. Joshua Steele

Microbiologist
Microbiology Department
Southern California Coastal Water Research Project

Education

Ph.D., marine environmental biology, University of Southern California, 2010

B.S., molecular biology, University of California, San Diego, 2000

Professional Experience

Senior Scientist, Southern California Coastal Water Research Project, Costa Mesa, CA, 2021-present

Scientist, Southern California Coastal Water Research Project, Costa Mesa, CA. 2014-2021

Associate Research Scientist, Geobiology, California Institute of Technology, Pasadena, CA. 2013-2014

Postdoctoral Scholar in Geobiology, California Institute of Technology, Pasadena, CA. 2010-2013

Research Assistant, University of Southern California, Los Angeles, CA. 2001-2010

Knauss Marine Policy Fellow: Legislative Assistant for Rep. Sam Farr (CA-17), U.S. House of Representatives, Washington, DC. 2008-2009

Teaching Assistant, University of Southern California, Los Angeles, CA. 2001-2006

Doctoral Fellow, NSF Integrative Graduate Education, Research, and Training: Environmental Studies, Policy and Engineering- Sustainable Cities Program, University of Southern California, Los Angeles, CA 2003-2004

Participant USC Sustainable Cities Internship in Hong Kong SAR, China 2004

Sea Grant Trainee, Beach Water Quality Study, 2002

Laboratory Technician, CalBioMarine Technologies, Inc. Carlsbad, CA 2000-2001

Professional Appointments

AWWA Standard Methods Committee, Joint Task Group 9810 for Wastewater Concentration 2024-present

American Society for Microbiology Council on Microbial Sciences Division Councilor 2022-present

National Institute of Standards and Technology Standards for Wastewater Surveillance Working Group 2021-present

Honors and Awards

Knauss Sea Grant Fellowship in Marine Policy 2008-2009
Rose Hills Graduate Internship 2005, 2006
National Science Foundation IGERT Doctoral Fellowship in Sustainable Cities 2003-2004
Student travel Award ASLO Ocean Sciences Conference, Honolulu, HI 2004
Traineeship, USC Sea Grant Program 2002

Professional Societies and Certifications

American Society for Microbiology
American Water Works Association
Association for the Sciences of Limnology and Oceanography
International Water Association
Society for Applied Microbiology

Selected Presentations and Conference Proceedings

Steele, J.A., Griffith, J.F. A microbial sequencing approach to identify contamination from sewers in an urban watershed. American Water Works Association Water Quality Technology Conference. November 9-12, 2025. Tacoma, WA

Steele, J.A., A. Zimmer-Faust, T. Clerkin, A. González-Fernández, S. Lowry, K. Raygoza, K.

Langlois, A. Leang, A. Boehm, R. Noble, K. Schiff, J. Griffith. Linking Indicators of Fecal Contamination to Human Health Risk in Urban Stormwater. American Society for Microbiology Microbe Annual Conference. June 19-22, 2025. Los Angeles, CA

Steele, J., E. Dudley, B. Badgeley, E. Owings, S. Ulrich. Solving Tomorrow's Challenges in Applied and Environmental Microbiology. American Society for Microbiology Microbe Annual Conference. June 19-22, 2025. Los Angeles, CA

Steele, J.A. Applying Rapid Indicator Methods and Advances in Source Tracking in California Coastal Waters. Clean Waters Initiative: Pathogen Indicators. Houston-Galveston Area Council. November 20, 2024. Houston, TX

Steele, J, S. Lowry, J. Griffith, K. Schiff, A. Boehm. Linking Indicators of Fecal Contamination to Human Health Risk in Southern California Stormwater California Association of Stormwater Quality Agencies (CASQA) Annual Meeting. October 21-24, 2024. Sacramento, CA.

Griffith, J., J. Steele, K. Schiff. San Diego River Investigative Order: Quantifying Sanitary Sewer Exfiltration in the San Diego River Watershed California Association of Stormwater Quality Agencies (CASQA) Annual Meeting. October 21-24, 2024. Sacramento, CA.

Schiff, K., J. Steele, J. Griffith. The San Diego River Investigative Order: A Synthesis of Research into Sources of Human Fecal Pollution. California Association of Stormwater Quality Agencies (CASQA) Annual Meeting. October 21-24, 2024. Sacramento, CA

Steele, J.A., K. Langlois, K.C. Schiff, and J.F. Griffith. Application of a Microbial Community Sequencing Approach to Identify Contamination from Sewers in an Urban Watershed. ASM Microbe, American Society for Microbiology. June 15-19, 2023. Houston, TX.

Steele, J.A. Measuring Bacteria and Viruses. How do we evaluate if waters are safe to swim in or shellfish are safe to eat? California Water Boards/CASQA California Bacterial Summit September 14-16, 2022. Sacramento, CA

Journal Articles

Grimm, S.L., J.A. Rothman, W.J. Bradshaw, K. Langlois, J.A. Steele, J.F. Griffith, J.T. Kaufman, K.L. Whiteson. 2026. Deep metatranscriptomic sequencing data of wastewater from Los Angeles, USA, 2023–2024. *Scientific Data* DOI:10.1038/s41597-025-06475-7.

Zhang, Y., Y. Kong, K. Osborn, E. Tsutakawa, C. Beale, E. Moreno, A. Muhammad, A. Sinacori, V. Tong, L. Tran, D. Velazquez, M.C. De Lucca, N. Bui, A. Casillas, M. Chang, A. Ding, S. Jun, J. Kuo,

T. Lakhanpal, J. Lin, J. Vuong, Z. Asnani, R. Chowdhry, A. Espinoza, H. Hill, K. McMillan, M. Cheema, J.F. Griffith, J.A. Steele, C. Dickerson, L. Henning, N. Korir, J.A. Jay. 2026. Elevated Antibiotic Resistance in Escherichia coli from Surface Waters Impacted by Concentrated Animal Feeding Operations in California and Michigan. *Water* DOI:10.3390/w18020207.

Steele, J.A., A.G. Zimmer-Faust, T.J. Clerkin, A. Gonzalez-Fernandez, S.A. Lowry, A.D. Blackwood, K. Raygoza, K. Langlois, A.B. Boehm, R.T. Noble, J.F. Griffith, K.C. Schiff. 2025. Survey of pathogens and human fecal markers in stormwater across a highly populated urban region. *Environmental Science: Processes & Impacts* 27:1354-1367.

Lowry, S.A., J.A. Steele, J.F. Griffith, K.C. Schiff, A.B. Boehm. 2025. Simulated gastrointestinal risk from recreational exposure to Southern California stormwater and relationship to human-associated Bacteroidales marker HF183. *Environmental Science: Processes & Impacts* DOI:10.1039/d4em00577e.

Theroux, S., A. Sepulveda, C.L. Abbott, Z. Gold, A.W. Watts, M.E. Hunter, K.E. Klymus, S.L. Hirsch, J.M. Craine, D.N. Jones, R.J. Brown, J.A. Steele, M. Takahashi, R.T. Noble, J.A. Darling. 2025. What is eDNA method standardisation and why do we need it?. *Metabarcoding and Metagenomics* 9:91-106.

Jimenez, K., Y. Kong, Y. Zhang, D. Ferketic, S.K. Nagori, J. Yang, A.A. Yulo, B. Kramer, O.G. Prado, T. Cason, R. Chowdhry, A. Kemsley, L.M. Espinosa, J.A. Steele, J.F. Griffith, J.A. Jay. 2025. Evaluation of a modified IDEXX method for antimicrobial resistance monitoring of extended Beta-lactamases-producing Escherichia coli in impacted waters near the U.S.-Mexico border. *One Health* 20:100997.

Griffith, J.F., J.A. Steele, A. Gonzalez-Fernandez, K.C. Schiff. 2025. Towards quantifying exfiltration from in situ sanitary sewer pipes. *Frontiers in Environmental Science* DOI:10.3389/fenvs.2024.1458146.

Steele, J.A., A. Gonzalez-Fernandez, J.F. Griffith, D. Ebentier McCargar, S. Wallace, K.C. Schiff. 2025. Extrapolating empirical measurements of wastewater exfiltration from sanitary sewers to estimate watershed-scale fecal pollution loading in urban stormwater runoff. *Frontiers in Environmental Science* DOI:10.3389/fenvs.2024.1458153.

Klymus, K.E., J.D. Baker, C.L. Abbott, R.J. Brown, J.M. Craine, Z. Gold, M.E. Hunter, M.D. Johnson, D.N. Jones, M.J. Jungbluth, S.P. Jungbluth, Y. Lor, A. Maloy, C.M. Merkes, R. Noble, N.V. Patin, A.J. Sepulveda, S.F. Spear, J.A. Steele, M. Takahashi, A.W. Watts, S. Theroux. 2024. The MIEM guidelines: Minimum information for reporting of environmental metabarcoding data. *Metabarcoding and Metagenomics* 8:489-518.

Callejas, I.A., Y. Kong, K. Osborn, W. Hung, M. Cira, T. Cason, A. Sloane, A. Shenkiryk, A. Masikip,

A. Singh, A. Jones, J.A. Steele, J.A. Jay. 2024. The influence of urbanization and water reclamation plants on fecal indicator bacteria and antibiotic resistance in the Los Angeles River watershed: A case study with complementary monitoring methods. *Science of The Total Environment* 957:177577.

Schiff, K.C., A. Zimmer-Faust, D. Nguyen, J.F. Griffith, J.A. Steele, D.E. McCargar, S. Wallace. 2024. Using HF183 to Estimate Watershed-Wide Annual Loadings of Human Fecal Pollution from Onsite Wastewater Treatment Systems. *Sustainability* 16:9503.

McLellan, S.L., A. Chariton, A. Codello, J.S. McClary-Gutierrez, M.K. Schussman, E.M. Marzinelli, J.M. O'Neil, E.J. Schott, J.L. Bowen, J.H. Vineis, L. Maignien, C. Lemonnier, M. Perennou, K.S. Gibbs, G.J. Zhou, K.M.Y. Leung, M. Kirs, J.F. Griffith, J.A. Steele, S.E. Wearer, A.L. O'Brien, D. Song, S. Liang, J. Li, L. Airoldi, F.P. Mancuso, P.S. Salomon, A.W. Silva-Lima RC Pereira, A.B. Boehm, E.W.X. Lim, S. Wuertz, E. Fernandez, E. Teira, M.L. Liao, Y.W. Dong, P.D. Steinberg. 2024. Universal microbial indicators provide surveillance of sewage contamination in harbours worldwide. *Nature Water* DOI:10.1038/s44221-024-00315-5.

Keenum, I., N.J. Lin, A. Logan-Jackson, A.J. Gushgari, N. D'Souza, J.A. Steele, D. Kaya, L.R. Gushgari. 2024. Optimizing Wastewater Surveillance: The Necessity of Standardized Reporting and Proficiency for Public Health. *American Journal of Public Health* 114:859-863.

Rothman, J.A., A. Saghir, A.G. Zimmer-Faust, K. Langlois, K. Raygoza, J.A. Steele, J.F. Griffith, K.L. Whiteson. 2024. Longitudinal Sequencing and Variant Detection of SARS-CoV-2 across Southern California Wastewater. *Applied Microbiology* 4:635-649.

Hinds, J.B., T. Garg, S. Hutmacher, A. Nguyen, Z. Zheng, J.F. Griffith, J.A. Steele, A. Gonzalez Fernandez, K.C. Schiff. 2024. Assessing the defecation practices of unsheltered individuals and their contributions to microbial water quality in an arid, urban watershed. *Science of the Total Environment* 920:170708.

Kelly, R.P., D.M. Lodge, K.N. Lee, S. Theroux, A.J. Sepulveda, C.A. Scholin, J.M. Craine, E.A. Allan, K.M. Nichols, K.M. Parsons, K.D. Goodwin, Z. Gold, F.P. Chavez, R.T. Noble, C.L. Abbott, M.R. Baerwald, A.M. Naaum, P.M. Thielen, A.L. Simons, C.L. Jerde, J.J. Duda, M.E. Hunter, J.A. Hagan, R.S. Meyer, J.A. Steele, M.Y. Stoeckle, H.M. Bik, C.P. Meyer, E.D. Stein, K.E. James, A.C. Thomas, E. Demir-Hilton, M.A. Timmers, J.F. Griffith, M.J. Weise, S.B. Weisberg. 2024. Toward a national eDNA strategy for the United States. *Environmental DNA* DOI:10.1002/edn3.432.

Philo, S.E., K.B. De Leon, R.T. Noble, N.A. Zhou, R. Alghafri, I. Bar-Or, A. Darling, N. D'Souza, O. Hachimi, D. Kaya, S. Kim, K. Gaardbo Kuhn, B.A. Layton, C. Mansfeldt, B. Oceguera, T.S. Radniecki, J.L. Ram, L.P. Saunders, A. Shrestha, L.B. Stadler, J.A. Steele, B.S. Steveson, J.R. Vogel, K. Bibby, A.B. Boehm, R.U. Halden, J. Delgado Vela. 2023. Wastewater surveillance for bacterial targets: current challenges and future goals. *Applied and Environmental Microbiology*

DOI:10.1128/aem.01428-23.

Rabe, A., S. Ravuri, E. Burnor, J.A. Steele, R.S. Kantor, S. Choi, S. Forman, R. Batjiaka, S. Jain, T.M. León, D.J. Vugia, A.T. Yu. 2023. Correlation between wastewater and COVID-19 case incidence rates in major California sewersheds across three variant periods. *Journal of Water & Health* 21:1303-1317.

Rothman, J.A., A. Saghir, S. Chung, N. Boyajian, T. Dinh, J. Kim, J. Oval, V. Sharavanan, C. York, A.G. Zimmer-Faust, K. Langlois, J.A. Steele, J.F. Griffith, K.L. Whiteson. 2023. Longitudinal metatranscriptomic sequencing of Southern California wastewater representing 16 million people from August 2020–21 reveals widespread transcription of antibiotic resistance genes. *Journal of Water Research* 329:119421.

Zimmer-Faust, A.G., J.F. Griffith, J.A. Steele, B. Santos, Y. Cao, L. Asato, T. Chiem, S. Choi, A. Diaz, J. Guzman, D. Laak, M. Padilla, J. Quach-Cu, M. Woo, S.B. Weisberg. 2023. Relationship between coliphage and Enterococcus at southern California beaches and implications for beach water quality management. *Journal of Water Research* 230:119383.

Schiff, K.C., J.F. Griffith, J.A. Steele, A.G. Zimmer-Faust. 2023. Dry and Wet Weather Survey for Human Fecal Sources in the San Diego River Watershed. *Water* 15:2239.

Simons, A.L., S. Theroux, M. Osborne, S. Nuzhdin, R.D. Mazor, J.A. Steele. 2023. Zeta diversity patterns in metabarcoded lotic algal assemblages as a tool for bioassessment. *Ecological Applications* DOI:10.1002/eap.2812.

Kim, S., L.C. Kennedy, M.K. Wolfe, C.S. Criddle, D.H. Duong, A. Topol, B.J. White, R.S. Kantor, K.L. Nelson, J.A. Steele, K. Langlois, J.F. Griffith, A.G. Zimmer-Faust, S.L. McLellan, M.K. Schussman, M. Ammerman, K.R. Wigginton, K.M. Bakker, A.B. Boehm. 2022. SARS-CoV-2 RNA is enriched by orders of magnitude in primary settled solids relative to liquid wastewater at publicly owned treatment works. *Environmental Science Water Research and Technology* 8:757-770.

Zimmer-Faust, A.G., J.F. Griffith, J.A. Steele, L. Asato, T. Chiem, S. Choi, A. Diaz, J. Guzman, M. Padilla, J. Quach-Cu, V. Ruiz, B. Santos, M. Woo, S.B. Weisberg. 2022. Assessing cross-laboratory performance for quantifying coliphage using EPA Method 1642. *Journal of Applied Microbiology* DOI:10.1111/jam.15523.

Ahmed, W., S.L. Simpson, P.M. Bertsch, K. Bibby, A. Bivins, L.L. Blackall, S. Bofill-Mas, A. Bosch, J. Brandão, P.M. Choi, M. Ciesielski, E. Donner, N. D'Souza, A.H. Farnleitner, D. Gerrity, R. Gonzalez, J.F. Griffith, P. Gyawali, C.N. Haas, K.A. Hamilton, H.C. Hapuarachchi, V.J. Harwood, R. Haque, G. Jackson, S.J. Khan, W. Khan, M. Kitajima, A. Korajkic, G. La Rosa, B.A. Layton, E. Lipp, S.L. McLellan, B. McMinn, G. Medema, S. Metcalfe, W.G. Meijer, J.F. Mueller, H. Murphy, C.C. Naughton, R.T. Noble, S. Payyappat, S. Petterson, T. Pitkänen, V.B. Rajal, B. Reyneke, F.A. Roman

Jr, J.B. Rose, M. Rusiñol, M.J. Sadowsky, L. Sala-Comorera, Y.X. Setoh, S.P. Sherchan, K. Sirikanchana, W. Smith, J.A. Steele, R. Sabburg, E.M. Symonds, P. Thai, K.V. Thomas, J. Tynan, S. Toze, J. Thompson, A.S. Whiteley, J.C. Wong, D. Sano, S. Wuertz, I. Xagoraraki, Q. Zhang, A.G. Zimmer-Faust, O.C. Shanks. 2022. Minimizing errors in RT-PCR detection and quantification of SARS-CoV-2 RNA for wastewater surveillance. *Science of the Total Environment* DOI:10.1016/j.scitotenv.2021.149877.

Rothman, J.A., T.B. Loveless, J. Kapcia III, E.D. Adams, J.A. Steele, A.G. Zimmer-Faust, D. Wanless, M.L. Griffith, L. Mao, J. Chokry, J.F. Griffith, K.L. Whiteson, K. Langlois. 2021. RNA Viromics of Southern California Wastewater and Detection of SARS-CoV-2 Single-Nucleotide Variants. *Applied and Environmental Microbiology* 87:e01448-21.

Zimmer-Faust, A.G., J.A. Steele, X. Xiong, C. Staley, M.L. Griffith, M.J. Sadowsky, M. Diaz, J.F. Griffith. 2021. A Combined Digital PCR and Next Generation DNA-Sequencing Based Approach for Tracking Nearshore Pollutant Dynamics Along the Southwest United States/Mexico Border. *Frontiers in Marine Science* DOI:10.3389/fmicb.2021.674214.

Diner, R.E., D. Kaul, A. Rabines, H. Zheng, J.A. Steele, J.F. Griffith, A.E. Allen. 2021. Pathogenic Vibrio Species Are Associated with Distinct Environmental Niches and Planktonic Taxa in Southern California (USA) Aquatic Microbiomes. *mSystems* DOI:10.1128/mSystems.00571-21.

McClary-Gutierrez, J.S., Z.T. Aanderud, M. Al-faliti, C. Duvallet, R. Gonzalez, J. Guzman, R.H. Holm, M.A. Jahne, R.S. Kantor, P. Katsivelis, K.G. Kuhn, L.M. Langan, C. Mansfeldt, S.L. McLellan, L.M. Mendoza-Grijalva, K.S. Murnane, C.C. Naughton, A.I. Packman, S. Paraskevopoulos, T.S. Radniecki, F.A. Roman, A. Shrestha, L.B. Stadler, J.A. Steele, B.M. Swalla, P. Vikesland, B. Wartell, C.J. Wilusz, J.C. Ching-Wong, A.B. Boehm, R.U. Halden, K. Bibby, J.D. Vela. 2021. Standardizing data reporting in the research community to enhance the utility of open data for SARS-CoV-2 wastewater surveillance. *Environmental Science Water Research & Technology* DOI:10.1039/d1ew00235j.

Crain, C., K. Kezer, S. Steele, J. Owiti, S. Rao, M. Victorio, B. Austin, A. Volner, W. Draper, J.F. Griffith, J.A. Steele, M. Seifert. 2021. Application of ddPCR for detection of Enterococcus spp. in coastal water quality monitoring. *Journal of Microbiological Methods* DOI:10.1016/j.mimet.2021.106206.

Rothman, J.A., T.B. Loveless, M.L. Griffith, J.A. Steele, J.F. Griffith, K.L. Whiteson. 2020. Metagenomics of Wastewater Influent from Southern California Wastewater Treatment Facilities in the Era of COVID-19. *Microbiology Resource Announcements* 9:e00907-20.

Zimmer-Faust, A.G., J.A. Steele, J.F. Griffith, K.C. Schiff. 2020. The challenges of microbial source tracking at urban beaches for Quantitative Microbial Risk Assessment (QMRA). *Marine Pollution Bulletin* DOI:10.1016/j.marpolbul.2020.111546.

Steele, J.A., A.D. Blackwood, J.F. Griffith, R.T. Noble, K.C. Schiff. 2018. Quantification of pathogens and markers of fecal contamination during storm events along popular surfing beaches in San Diego, California. *Water Research* 136:137-149.

Arnold, B.F., K.C. Schiff, A. Ercumen, J. Benjamin-Chung, J.A. Steele, J.F. Griffith, S.J. Steinberg, P.D. Smith, C.D. McGee, R. Wilson, C. Nelsen, S.B. Weisberg, J.M. Colford Jr. 2017. Acute Illness Among Surfers After Exposure to Seawater in Dry- and Wet-Weather Conditions. *American Journal of Epidemiology* 186:866-875.

Soller, J.A., M. Schoen, J.A. Steele, J.F. Griffith, K.C. Schiff. 2017. Incidence of gastrointestinal illness following wet weather recreational exposures: Harmonization of quantitative microbial risk assessment with an epidemiologic investigation of surfers. *Water Research* 121:280-289.

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Marlow, J. J., Steele, J. A., Ziebis, W., Thurber, A. R., Levin, L. A., & Orphan, V. J. 2014 Carbonate-hosted methanotrophy represents an unrecognized methane sink in the deep sea. *Nature Communications*, 5, 5094. doi:10.1038/ncomms6094

Glass, J.B., H. Yu, J.A. Steele, K.S. Dawson, S. Sun, K.Chourey, R.L. Hettich, V.J. Orphan. 2014 Geochemical, metagenomic and metaproteomic insights into trace metal utilization of methane-oxidizing microbial consortia in sulfidic marine sediments. *Environmental Microbiology* 16(6), 1592–1611. doi:10.1111/1462-2920.12314

Hatosy, S.M., J.B.H. Martiny, R. Sachdeva, J. Steele, J.A. Fuhrman, A.C. Martiny 2013 Beta-diversity of marine bacteria depends on temporal scale. *Ecology* 94 (9), 1898-1904

Chow, C.E.T., R. Sachdeva, J.A. Cram, J.A. Steele, D.M. Needham, A. Patel, A.E. Parada, J.A.

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Gilbert, J.A., J.A. Steele, J.G. Caporaso, L. Steinbrück, P. Somerfield, J. Reeder, B. Temperton, S. Huse, I. Joint, A.C. McHardy, R. Knight, J.A. Fuhrman, D. Field. 2012 Defining seasonal marine microbial community dynamics. *ISME Journal* 6:298-308.

Steele, J.A., P.D. Countway, L. Xia, P. D. Vigil, J.M. Beman, D.Y. Kim, C. T. Chow, R. Sachdeva, A.C. Jones, M.S. Schwalbach, J. M. Rose, I. Hewson, A. Patel, F. Sun, D.A. Caron, J.A. Fuhrman. 2011 Marine bacterial, archaeal, and protistan association networks reveal ecological linkages *ISME Journal* 5:1414-1425.

Xia, L. C., J.A. Steele, J. Cram, Z.G. Cardon, S.L. Simmons, J.J. Vallino , J.A. Fuhrman, F. Sun 2011. Extended local similarity analysis (eLSA) of microbial community and other time series data with replicates. *BMC Systems Biology* 5:S15.

Beman, J.M., J.A. Steele, and J.A. Fuhrman. 2011 Co-occurrence patterns for abundant marine archaeal and bacterial lineages in the deep chlorophyll maximum of coastal California. *ISME Journal* 5:1077-1085.

Fuhrman J.A., J.A. Steele. 2008 Community Structure of Marine Bacterioplankton: Patterns, Networks, and Relationships to Function. *Aquatic Microbial Ecology* 53:69-81.

Fuhrman, J.A., J.A. Steele, I. Hewson, M. S. Schwalbach, M.V. Brown, J. Green, Brown, J.H. 2008 A Latitude Diversity Gradient in Planktonic Marine Bacteria. *Proceedings of the National Academy of Sciences* 105:7774-7778.

Patel, A., R. Noble, J.A. Steele, M.S. Schwalbach, I. Hewson, J.A. Fuhrman 2007 Virus and Prokaryote Enumeration from Planktonic Marine Environments by Epifluorescence Microscopy with SYBR Green I. *Nature Protocols* 2:269-276.

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Fuhrman, J. A., Hewson, I., Schwalbach, M. S., Steele, J. A., Brown, M. V., & Naeem, S. 2006. Annually reoccurring bacterial communities are predictable from ocean conditions. Proceedings of the National Academy of Sciences, 103(35): 13104–13109.

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Hewson, I, J.A. Steele, D.G. Capone, J.A. Fuhrman. 2006 Remarkable Heterogeneity in Meso- and Bathypelagic Bacterioplankton Community Composition. *Limnol*. *Oceanography* 51:1274-1283.

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Steele, J.A., F. Ozis, J.A. Fuhrman, J.S. Devinny. 2005. Structure of Microbial Communities in Ethanol Biofilters. *Chemical Engineering Journal* 113:135-143.

Technical Reports

Schiff, K.C., J.F. Griffith, J.A. Steele, A. Gonzalez-Fernandez. 2024. Summary of Technical Research: Quantifying Sources of Human Fecal Pollution in the Lower San Diego River Watershed. Technical Report 1380. Southern California Coastal Water Research Project. Costa Mesa, CA.

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