Tracey Mangin

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In a nutshell

Environmental data scientist with 13 years of experience designing and implementing research that examines how ecological systems, behavior, and policy choices intersect to shape environmental and socioeconomic outcomes. Research spans bioeconomic modeling, spatial data analysis, economic valuation, and large-scale data synthesis. Work has appeared in *Nature*, *Nature Energy*, *PNAS*, *Science Advances*, and *Nature Sustainability*. Has contributed applied analyses to the California Environmental Protection Agency, the Bureau of Ocean Energy Management (BOEM), the U.S. Department of Defense, the High Level Panel for a Sustainable Ocean Economy, and others. Co-Principal Investigator of a $1.1M BOEM study (2023–2026). Builds open, reproducible data pipelines and coordinates analysis across multi-institution teams.

Education

2011–2013	M.S. in Environmental Science and Management, Bren School of Environmental Science & Management, University of California, Santa Barbara. Specialization: Economics and Politics of the Environment.
2005–2009	B.A. in Philosophy and Environmental Studies, Santa Clara University.

Awards and scholarships

2011	Joanne and Gary Hunt Prize in Environmental Law & Policy, Bren School
2009	Lucky Hinkle Sustainability Award, Santa Clara University
2005	Preferred Scholarship, Santa Clara University
2005	Sister Elizabeth Barber Award

Professional experience

2021–pres.	**Senior Project Scientist, emLab, UC Santa Barbara** (Specialist IV, 2026–present; Specialist II, 2023–2026; Specialist I, 2021–2023). Lead quantitative analyst on research for state and federal agencies, foundations, and nonprofits; designs studies with PIs, manages and integrates large environmental, economic, and administrative datasets of varying spatiotemporal resolution, implements and interprets models, co-authors peer-reviewed publications, and translates results for agency and stakeholder audiences.
2017–2021	Project Scientist (Associate Specialist IV), emLab, UC Santa Barbara
2018–2019	Research Consultant, Ocean Analytics (part-time)
2014–2017	Research Consultant (full-time), Eco-Analytics, Ocean Analytics, and The Nature Conservancy
2014–2015	Staff Research Associate, Sustainable Fisheries Group (now emLab), UC Santa Barbara
2014	Fisheries Science Research Fellow, Rare
2013–2015	Latin American Fisheries Fellowship Assistant, Bren School
2013	Fisheries Research Consultant, Environmental Defense Fund

Research funding

2023–2026	**Co-Principal Investigator.** “Facilitating resilience and adaptation in commercial fisheries in response to offshore renewable energy development and climate change.” U.S. Department of the Interior, Bureau of Ocean Energy Management, Environmental Studies Program (Study PC-23-03). $1.1M. Coupled climate-driven species distribution projections with a spatially explicit, agent-based bioeconomic model (DISPLACE) to estimate harvest

and revenue impacts of offshore wind across California, Oregon, and Washington; led 2024 focus groups with fishermen in Morro Bay, Humboldt, and Newport to identify mitigation strategies. Final report submitted to BOEM.

Selected research projects (key personnel)

2026–pres. **Senior Project Scientist.** Life-cycle greenhouse gas emissions of California's refined petroleum product supply (PI R. Deshmukh). Estimates emissions from crude oil extraction, refining, and marine shipping, for both in-state production and imports.

2023–pres. **Senior Project Scientist.** Watching Sand: Mapping the global footprint of marine sand extraction (PI O. Deschenes); partner: Global Fishing Watch. Developed global maps of marine sand dredging, using vessel-tracking (AIS) data to locate extraction hotspots and identify environmental impacts.

2023–pres. **Senior Project Scientist.** Valuation of ecosystem services for military land-use and land-management decisions. U.S. Department of Defense, Strategic Environmental Research and Development Program (SERDP); Duke University lead, UCSB PI A. Plantinga. Economic valuation of timber, carbon storage, and recreation under alternative land-management scenarios.

2020–2024 **Project Scientist and Project Manager.** Using outcomes from Marine Protected Area implementation to infer socioeconomic consequences of offshore energy development to commercial fisheries. BOEM Environmental Studies Program (Study PC-21-02).

2020–2021 **Project Scientist.** California Carbon Neutrality Study 2: Enhancing equity while eliminating emissions in California's supply of transportation fuels. California Environmental Protection Agency (PIs O. Deschenes, R. Deshmukh, D. Lea, K. Meng, P. Weber). Modeled statewide oil extraction and refining policy pathways and their GHG, air-quality health, labor, and equity outcomes for disadvantaged communities.

Peer-reviewed publications

Published

2025 Plantinga, A.J., Abowd, L., **Mangin, T.**, and O'Reilly, E. 2025. New estimates of the costs of managing forests to increase carbon storage. *Climate Change Economics*, 16(01), 2550003.

Liddell, T., Boser, A.S., Orofino, S., **Mangin, T.**, and Carleton, T. 2025. stagg: A data pre-processing R package for climate impacts analysis. *Environmental Modelling & Software*, 183, 106202.

2024 Willis-Norton, E., **Mangin, T.**, Schroeder, D.M., Cabral, R.B., and Gaines, S.D. 2024. A synthesis of socioeconomic and sociocultural indicators for assessing the impacts of offshore renewable energy on fishery participants and fishing communities. *Marine Policy*, 161, 106013.

2023 Deshmukh, R., Weber, P., Deschenes, O., Hernandez-Cortes, D., Kordell, T., Lee, R., Malloy, C., **Mangin, T.**, Meng, M., Sum, S., Thivierge, V., Uppal, A., Lea, D., and Meng, K.C. 2023. Equitable low-carbon transition pathways for California's oil extraction. *Nature Energy*, 8(6), 597–609.

Deshmukh, R., Weber, P., Deschenes, O., Lea, D., Hernandez-Cortes, D., Kordell, T., Lee, R., Malloy, C., **Mangin, T.**, Meng, M., Sum, S., Thivierge, V., Uppal, A., and Meng, K.C. 2023. Well setbacks limit California's oil supply with larger health benefits and employment losses than excise and carbon taxes. *Nature Energy*, 8(6), 562–564.

Free, C.M., **Mangin, T.**, Wiedenmann, J., Smith, C., McVeigh, H., and Gaines, S.D. 2023. Harvest control rules used in US federal fisheries management and implications for climate resilience. *Fish and Fisheries*, 24(2), 248–262.

2021 McDonald, G.G., Costello, C., Bone, J., Cabral, R.B., Farabee, V., Hochberg, T., Kroodsma, D., **Mangin, T.**, Meng, K.C., and Zahn, O. 2021. Satellites can reveal global extent of forced labor in the world's fishing fleet. *Proceedings of the National Academy of Sciences*, 118(3), e2016238117.

McDonald, G.G., Costello, C., Bone, J., Cabral, R.B., Farabee, V., Hochberg, T., Kroodsma, D., **Mangin, T.**, Meng, K.C., and Zahn, O. 2021. Reply to Swartz et al.: Challenges and opportunities for identifying forced labor using satellite-based fishing vessel monitoring. *Proceedings of the National Academy of Sciences*, 118(19), e2104563118.

2020 Costello, C., Cao, L., Gelcich, S., Cisneros-Mata, M.Á., Free, C.M., Froehlich, H.E., Golden, C.D., Ishimura, G., Maier, J., Macadam-Somer, I., **Mangin, T.**, et al. 2020. The future of food from the sea. *Nature*, 588(7836), 95–100.

Oremus, K.L., Bone, J., Costello, C., García Molinos, J., Lee, A., **Mangin, T.**, and Salzman, J. 2020. Governance challenges for tropical nations losing fish species due to climate change. *Nature Sustainability*, 3(4), 277–280.

Free, C.M., **Mangin, T.**, García Molinos, J., Ojea, E., Burden, M., Costello, C., and Gaines, S.D. 2020. Realistic fisheries management reforms could mitigate the impacts of climate change in most countries. *PLoS ONE*, 15(3), e0224347.

2019 Kritzer, J.P., Costello, C., **Mangin, T.**, and Smith, S.L. 2019. Responsive harvest control rules provide inherent resilience to adverse effects of climate change and scientific uncertainty. *ICES Journal of Marine Science*, 76(6), 1424–1435.

Cisneros-Mata, M.A., **Mangin, T.**, Bone, J., Rodriguez, L., Smith, S.L., and Gaines, S.D. 2019. Fisheries governance in the face of climate change: Assessment of policy reform implications for Mexican fisheries. *PLoS ONE*, 14(10), e0222317.

Miller, S., Rassweiler, A., Dee, L., Kleisner, K.M., **Mangin, T.**, Oliveros-Ramos, R., Tam, J., Chavez, F.P., Ñiquen, M., Lester, S.E., and Burden, M. 2019. Optimal harvest responses to environmental forecasts depend on resource knowledge and how it can be used. *Canadian Journal of Fisheries and Aquatic Sciences*, 76(9), 1495–1502.

Alzugaray, R., Puga, R., Valle, S., Morales, O., Grovas, A., López, L., Kleisner, K., Boné, E., **Mangin, T.**, Kritzer, J., and Fujita, R. 2019. Un enfoque multiinstitutional para modelar el beneficio bioeconómico de perspectivas de manejo pesquero en Cuba. *Revista Cubana de Investigaciones Pesqueras*, 36(2).

2018 **Mangin, T.**, Costello, C., Anderson, J., Arnason, R., Elliott, M., Gaines, S.D., Hilborn, R., Peterson, E., and Sumaila, R. 2018. Are fishery management upgrades worth the cost? *PLoS ONE*, 13(9), e0204258.

Mangin, T., Cisneros-Mata, M.Á., Bone, J., Costello, C., Gaines, S.D., McDonald, G., Rodriguez, L., Strauss, C.K., and Zapata, P. 2018. The cost of management delay: The case for reforming Mexican fisheries sooner rather than later. *Marine Policy*, 88, 1–10.

Gaines, S.D., Costello, C., Owashi, B., **Mangin, T.**, Bone, J., García Molinos, J., Burden, M., Dennis, H., Halpern, B.S., Kappel, C.V., Kleisner, K.M., et al. 2018. Improved fisheries management could offset many negative effects of climate change. *Science Advances*, 4(8), eaao1378.

2016 McDonald, G.†, **Mangin, T.**†, Thomas, L.R.†, and Costello, C. 2016. Designing and financing optimal enforcement for small-scale fisheries and dive tourism industries. *Marine Policy*, 67, 105–117. †Shared first authorship.

Under review

Meng, M., Hernandez-Cortes, D., Malloy, C., **Mangin, T.**, Thivierge, V., Weber, P., Meng, K.C., Lea, D.W., Deschenes, O., and Deshmukh, R. Health, labor, and equity in the low-carbon transition of California's petroleum refineries. Under review.

Free, C.M., Andrews, K.S., Carbó-Mestre, P., Feist, B.E., Gaines, S.D., Guerra, A.S., **Mangin, T.**, Samhouri, J.F., Schroeder, D.M., and Willis-Norton, E. Strategically mitigating the impacts of offshore wind on marine fisheries can also promote climate resilience. Under review, *Marine Policy*.

Abowd, L., Calder, R., **Mangin, T.**, and Plantinga, A.J. The value of outdoor recreation at U.S. military bases. Under review, *Journal of Outdoor Recreation and Tourism*.

In preparation

Carleton, T., **Mangin, T.**, Qiu, M., O'Brien, S., McCusker, K., and Auffhammer, M. Local vulnerability reshapes the geography of climate damages across California communities.

Carbó-Mestre, P., **Mangin, T.**, Bastardie, F., Willis-Norton, E., Schroeder, D.M., Cabral, R.B., Gaines, S.D., and Free, C.M. Small projected economic impacts of planned offshore wind development on a Californian groundfish fishery.

Feist, B.E., Whitmire, C.E., **Mangin, T.**, Carbó-Mestre, P., Liu, O.R., Bizzarro, J.J., Black, B., Cohn, L., Hanshew, G., Molitor, C., and Gaines, S.D. Mapping the footprint of trawl rockfish conservation area closures on the U.S. West Coast.

Technical reports

Submitted	Gaines, S.D., Free, C.M., **Mangin, T.**, Carbó-Mestre, P., Fang, Y., and Smith, C. Facilitating resilience and adaptation in commercial fisheries in response to offshore renewable energy development and climate change. Report to the Bureau of Ocean Energy Management (Study PC-23-03).
2026	Incorporating fishermen's knowledge: Changing ocean conditions and offshore wind farm development. Summary report of 2024 focus groups held in Morro Bay, CA; Humboldt, CA; and Newport, OR. Shared with participants and BOEM.
Submitted	Gaines, S.D., Cabral, R.B., Lynham, J., Ruttenberg, B., White, C., Walter, R., Free, C.M., Carbó-Mestre, P., **Mangin, T.**, Spindel, N.B., and Willis-Norton, E. Using outcomes from Marine Protected Area implementation to infer potential socioeconomic consequences of offshore energy development to commercial fisheries. Report to the Bureau of Ocean Energy Management (Study PC-21-02).
2024	Carleton, T., **Mangin, T.**, Qiu, M., Ludwig, M., and O'Reilly, E. A framework for integrating wildfire into the Climate Vulnerability Metric. Report to the California Air Resources Board.
2023	Plantinga, A.J., Abowd, L., **Mangin, T.**, and O'Reilly, E. Informing natural climate solution pathways for the Emerald Edge. The Nature Conservancy.
2021	Deschenes, O., Deshmukh, R., Lea, D., Meng, K., Weber, P., Cobian, T., Hernandez-Cortes, D., Lee, R., Malloy, C., **Mangin, T.**, Meng, M., Oliver, M., Sum, S., Thivierge, V., Uppal, A., Kordell, T., et al. Enhancing equity while eliminating emissions in California's supply of transportation fuels. Report to the California Environmental Protection Agency. Zenodo. https://doi.org/10.5281/zenodo.4707966
2020	Deschenes, O., Deshmukh, R., Lea, D., Meng, K., Weber, P., Hernandez Cortes, D., Lee, R., Malloy, C., **Mangin, T.**, Thivierge, V., Uppal, A., Clemence, M., Kordell, T., and O'Reilly, E. Carbon neutrality and California's transportation fossil fuel supply. Report to the California Environmental Protection Agency.
2019	Costello, C., Cao, L., Gelcich, S., et al. (incl. **Mangin, T.**). The future of food from the sea. High Level Panel for a Sustainable Ocean Economy. World Resources Institute, Washington, DC.
2015	Costello, C., and **Mangin, T.** Country-level costs vs. benefits of improved fishery management. University of California, Santa Barbara.

Data and software

2025	Carbó-Mestre, P., **Mangin, T.**, Molitor, C., Feist, B., and Whitmire, C. Trawl Rockfish Conservation Areas spatial data. Dataset, NOAA GeoPlatform.
	Liddell, T., Boser, A.S., Orofino, S., **Mangin, T.**, and Carleton, T. *stagg*: Data pre-processing R package for climate impacts analysis. Software.
2021	**Mangin, T.**, Costello, C., et al. Data from: The future of food from the sea. Data publication.

Presentations

Conference presentations

2026 Small projected economic impacts of planned offshore wind development on a Californian groundfish fishery. ICES Annual Science Conference.

2025 Evaluating the environmental and economic trade-offs of offshore industries. STAR Conference, Suva, Fiji.

Projected impacts of offshore energy development on California's DTS fishery. ICES Annual Science Conference, Klaipėda, Lithuania (poster).

Estimating the magnitude and extent of global marine sand extraction. Association of Environmental and Resource Economists (AERE) Summer Conference, Santa Ana Pueblo, NM (poster).

2024 A synthesis of socioeconomic and sociocultural indicators for assessing the impacts of offshore renewable energy on fishery participants and fishing communities. Marine Socio-Ecological Systems Conference, Yokohama, Japan (poster).

2023 stagg: A data pre-processing R package for climate impacts analysis. The Workshop in Environmental Economics and Data Science (TWEEDS), Portland, OR.

Seminars, workshops, and panels

2025 Estimating the socioeconomic implications of offshore wind energy development for California fisheries under a changing climate. Kaffeklubben Seminar, National Institute of Aquatic Resources (DTU Aqua), Technical University of Denmark.

Expert panelist. China Council for International Cooperation on Environment and Development (CCICED) Sustainable Ocean Development Workshop, San Francisco, CA.

Examining socioeconomic impacts of offshore wind development on West Coast fisheries. 7c Fisheries Working Group Meeting, Santa Barbara, CA.

Co-authored conference abstracts

2024 Matthews, E., Abowd, L., Borsuk, M.E., Krapu, C., **Mangin, T.**, Mason, S., et al. Modeling forest dynamics to characterize delivery of ecosystem services on military installations across the United States. AGU Fall Meeting, GC51O-0168.

Schroeder, D.M., Willis-Norton, E., **Mangin, T.**, Cabral, R., and Gaines, S.D. Review of impact-producing factors from floating offshore wind installations to fish populations. Ocean Sciences Meeting.

2022 Orofino, S., Liddell, T., Boser, A., Carleton, T., and **Mangin, T.** Stagg: An R package for spatiotemporal aggregation of ERA5 climate data. AGU Fall Meeting, GC42F-0767.

2021 Deshmukh, R., Deschenes, O., Lea, D., Meng, K., Weber, P., et al. (incl. **Mangin, T.**). Improving equity outcomes in the low-carbon transition of California's oil extraction and refining. AGU Fall Meeting, GC22C-07.

2020 Gaines, S., Free, C., Cabral, R., Ojea, E., and **Mangin, T.** The geography of climate challenges and solutions for national food systems. Ocean Sciences Meeting, SI12A-01.

Stakeholder engagement

2024 Co-led the "Incorporating Fishermen's Knowledge: Changing Ocean Conditions & Offshore Wind Farm Development" focus groups with commercial fishermen in Morro Bay, CA; Humboldt, CA; and Newport, OR (BOEM PC-23-03).

Student projects

2024 Client, Master of Environmental Data Science capstone project, Bren School, UC Santa Barbara: "Assessing the impact of supply-side policies on oil extraction, GHG emissions, health, and employment in California."

Service

2025–pres. Member, emLab Data AI Task Force (developing AI best practices for the lab).

2025–pres.	Member, emLab Ethics Task Force (ethical considerations and best practices for lab research).
2021–pres.	Member, emLab Data Streamlining Group and High-Performance Computing Task Force.
2026	Participant, peer mentorship group formed at the International Institute of Fisheries Economics and Trade (IIFET) 2026 conference, Faroe Islands.
2025	Mock interview volunteer, Partners in Education.
2025	Counselor volunteer, Project:Camp.

Professional memberships

Association of Environmental and Resource Economists (AERE); International Institute of Fisheries Economics and Trade (IIFET); EcoDataScience; Santa Barbara R-Ladies.

Data science training and leadership

2026	Git & GitHub at emLab. emLab training session.
2023	An introduction to targets for R. R-Ladies Santa Barbara; emLab study group.
2020	Intro to the data.table R package. EcoDataScience training session.
2019	GitHub for collaboration. EcoDataScience training session.
2018	rebus package for working with strings in R. R-Ladies session.

Technical skills

R	Advanced. tidyverse, data.table; reproducible pipelines with targets, groundhog, and pak; spatial analysis (vector, raster); Shiny app development; R Markdown/Quarto; bioeconomic and statistical modeling; data visualization.
Analysis	Cost-benefit and distributional analysis; spatially explicit and agent-based bioeconomic modeling; ecosystem service valuation (incl. InVEST); statistical modeling.
Data	SQL and Google BigQuery (incl. Global Fishing Watch AIS data); Google Earth Engine; QGIS; gridded climate data (ERA5).
Workflow	Git and GitHub (github.com/traceybit); LaTeX/Overleaf.

Contract employment

2022	Ocean-Analytics. “Harvest control rules used in U.S. federal fisheries and implications for climate resilience.” Free, C.M., **Mangin, T.**, McVeigh, H., Smith, C., and Gaines, S.D.
2021	Estimated economic ecosystem service benefits from land-use decisions using InVEST and other ecosystem valuation models. Plantinga, A., and **Mangin, T.**
2019	Eco-Analytics. “Economic and environmental implications of sand trade in Asia.” Costello, C., Deschenes, O., **Mangin, T.**, and Eddy, N.
2017	Eco-Analytics. “‘Underfishing’ and its possible drivers.” Costello, C., and **Mangin, T.**
	The Nature Conservancy. “Review of fishery reform elements in cases of successful fisheries management reform.” **Mangin, T.**
2013	Environmental Defense Fund. Research on marine area closures and quota-managed fisheries in New Zealand and Australia.