

Stephen L. Katz

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Fields of Expertise: Resource Ecology & Management, Informatics, Conservation Biology, Marine Biology, Fisheries Ecology, Biostatistics, Physiology, Biomechanics, Fluid Dynamics, Microfluidics Engineering, Science & Research Diving

Education

Ph.D. University of British Columbia, Vancouver, B.C., Canada, Zoology/Biomechanics, 1992.
B.A. Occidental College, Los Angeles, California, Biological Sciences (Marine Biology emphasis), 1986.

Professional History

Associate Professor, School of the Environment, Washington State University, Pullman, WA 2014-Present.

Research Coordinator, Channel Islands National Marine Sanctuary, NOAA Office of National Marine Sanctuaries. Santa Barbara, CA, 2007 – 2013.

Monitoring and Evaluation Coordinator for Salmon Recovery, NOAA, National Marine Fisheries Service. Seattle, WA, 2001 – 2007.

Unit Diving Supervisor, Pacific Northwest. NOAA NMFS & ONMS. 2004 – 2014.

Research Associate. Zoology Department, Duke University. Durham, NC 1998-2000. Field: Microfluidics, Biomechanics, Fluid Dynamics.

Post-Doctoral Fellow. Center for Marine Biomedicine and Biotechnology, Scripps Institution of Oceanography, UCSD. San Diego, CA 1993-1998.
Field: Physiology & Biomechanics of pelagic fish

Awards for Research

2016. Bruce Gardner Memorial Prize for Applied Policy Analysis: Benefit-Cost Analysis of the Yakima Basin Integrated Plan Project. Agricultural and Applied Economics Association.

2015. Team Interdisciplinary Award, College of Agricultural, Human and Natural Resource Sciences, Washington State University

Grantsmanship (Successful and in Process)

2018. Western Water Spoke: A Big Data Synthesis and Delivery Framework for Coordinated and Timely Management of Surface Water and Groundwater National Science Foundation (NSF). Alexander Fernald, Lead PI, Co-PI's: S. Katz, D. T. Scott, S. Cutchin & I. Zaslavsky. Pending.

2016. INFEWS: Global Food, Energy, Water, and Land Security in a Climate Constrained World. National Science Foundation (NSF). J. Adam, Lead PI, Co-PI's: S. Katz, D. McLarty, J. Padowski, J. Boll (14 Senior Personnel total). Partial administrative duties. Awarded \$2.999M.

2015-2017. LTREB: Invasions in Highly Variable Environments: Long-term Zooplankton Research to Understand Fundamental Processes of Population and Community Ecology. (NSF) S. Bollens, Lead PI, Co-PI's: S. Katz, J. Cordell, S. Hampton, G. Rollwagen-Bollens. Pending.

2012. Spatial pattern in the distribution and diversity of deep water corals and sponges in the Channel Islands National Marine Sanctuary. NOAA Coral Reef Conservation Program (Competitive Program). [Sole PI] Awarded \$109,000.
[Role: Sole PI on the proposal.]
- 2009-2010. Evaluation of large whale responses to large ships and data coordination to evaluate ship activity and whale strike risk in the Santa Barbara Channel. NOAA NMFS Office of Science and Technology (Competitive Program). Sole PI; full administrative duties. Awarded \$38,000.
[Role: Sole PI on the proposal.]
2008. Building the Foundation: New statistical tools for analyzing community dynamics with applications to marine zooplankton. NSF & NOAA via CAMEO joint program (Competitive Program). Co-PIs: S. Katz (NOAA-ONMS), E. Holmes, M. Scheuerell (NMFS) & S. Hampton (NCEAS); partial administrative duties. Awarded \$347,293; 24 months.
[Role: Principal PI on the proposal.]
2007. Alternative Approaches to Evaluating Effectiveness of Habitat Restoration Actions. NOAA (Competitive Program). Sole PI; full administrative duties. Awarded \$86,000.
[Role: Sole PI on the proposal.]
- 2006-2007. Synthesis of regional diversity in the terms "Limiting Factors" into a common data dictionary of limiting factors for salmon recovery. NOAA. Sole PI; full administrative duties. Awarded \$340,000. [Role: Sole PI on the proposal.]
- 2005-2007. Deployment of Comprehensive Habitat Restoration Action Database as regional resource for salmon recovery. NOAA (Competitive Program). Awarded \$367,952. [Role: Sole PI on the proposal.]
- 1996-1998. Integrative Functions of Swimming. National Science Foundation; Integrative Animal Biology (IBN95-14203). Co-PIs: R. E. Shadwick, J. W. Covell & J. B. Graham. Awarded \$240,000; 36 months.
[Role: Senior Personnel on and author of the proposal.]

Service

2017

- Graduate Studies Committee, WSU School of the Environment [Member]
- Faculty Advisor, Palouse Unit of American Fisheries Society (Combined WSU & U of Idaho).

2016

- Graduate Studies Committee, WSU School of the Environment [Member]
- Quantitative Forest Ecology Search Committee, WSU School of the Environment [Member]
- Faculty Advisor, Palouse Unit of American Fisheries Society (Combined WSU & U of Idaho).

2015

- Environmental Studies Curriculum Review Committee, WSU School of the Environment [Member]
- Faculty Advisor, Palouse Unit of American Fisheries Society (Combined WSU & U of Idaho).
- U.S.G.S. Northwest Climate Science Center Review Team. External to WSU [Member]

2014

- Environmental Geochemistry Search Committee, WSU School of the Environment Vancouver campus [Member]
- WSU Review Team for Yakima Basin Integrated Water Management Plan. [Member]
- Faculty Advisor, Palouse Unit of American Fisheries Society (Combined WSU & U of Idaho).

2014-2016 Ad hoc reviewer for the following journals:

Water, Comparative Biochemistry and Physiology, Inland Waters, Ecological Research

Professional experience

Research Coordinator for Channel Islands National Marine Sanctuary. (2007-2014):

Collaborate with approximately two dozen diverse partner organizations and investigators to facilitate and implement research and monitoring around the Channel Islands National Marine Sanctuary. Where appropriate, design, obtain funding for, and execute internal research to address Sanctuary management needs. Activities also include the co-coordination of the activities of two regional oceanographic research vessels with a combined 210 days at sea per year.

Monitoring Coordinator for Salmon Recovery. (2001 – 2007):

Design monitoring plans for recovery efforts of endangered salmonids within the North West Anadromous Zone (WA, OR, ID, N. CA), an activity that requires extensive coordination with dozens of stakeholders and navigation of policy complexities. The monitoring plans include facilities for measuring population status as well as population response to specific recovery actions.

Unit Diving Supervisor for NOAA-Fisheries and NOAA-Office of National Marine Sanctuaries (2004 – 2014): Coordinate diving activities in support of NOAA's mission, and participate in training as an instructor. Coordinate and analyze operational, safety and technological development activities of NDP in cooperation with staff of NOAA Dive Center.

Microfluidics Engineering & Microscopic Imaging (1998-2000):

Design, fabricate and use devices and associated software to perform tests on microfluidic and MEMS devices.

Animal Biomechanics and Physiology (1987-2001):

Analyze biomechanics of locomotion in organisms from insects to tuna, including the design and fabrication of equipment and software for biomechanics measurement and analysis.

Instructor of record

Washington State University (2014; Current)

Introductory Oceanography (GEO 230; Large Enrollment, UCORE course)

Quantitative Data Analysis for Environmental Science (ENVR_SCI 592 & GEO 596)

Fisheries Science and Management (ENV_SCI 419)

Bren School of the Environment – University of California, Santa Barbara (2010)

Statistics & Data Analysis for Environmental Science & Management (ESM 206)

Marine Science Institute – University of California, Santa Barbara (2008)

Distributed Graduate Seminar – The Role of Marine Protected Areas in Ecosystem-based Management: Examining the science and politics of an ocean conservation strategy.

Biology Department – University of California, San Diego (1998)

Vertebrate Physiology Lecture w/ Laboratory (BIPN 105).

Scripps Institute of Oceanography – Univ. of California, San Diego (1994)

Advanced topics in Marine Biology – Biomechanics of Marine Organisms (SIO296).

Publications

Google Scholar:

Citations: 3002,

h-index: 22

Peer-reviewed articles

[Currently in Review]

Katz, S.L., J.C. Padowski, M. Goldsby, M.P. Brady and S.E. Hampton, (In Review). Defining the Nature of the Nexus: Specialization, Connectedness, Scarcity and Scale in Food-Energy-Water Management. **Earth's Future**.

Cramer, A.N., J. Lindholm, S.L. Katz, R. Starr and C. Logan., (In Review). Cross-species patterns in marine fish home range as determined from a meta-analysis of acoustic telemetry studies. **Mar. Ecol. Prog. Ser.** [Grad Student Paper]

Scheuerell, M.D., E.J. Ward and S.L. Katz, (In Review). Predator reintroduction alters species interactions and stability in a kelp forest. **Science Advances**.

[2017]

Yoder, J., J. Adam, M. Brady, J. Cook, S.L. Katz, S. Johnson, K. Malek, J. McMillan and Q. Yang, (2017). Benefit-Cost analysis of integrated water resource management: The Yakima Basin integrated plan. **J. Amer. Water Resources Assoc.** (JAWRA) 1–22. doi: 10.1111/1752-1688.12507.

Hassett, W., S.M. Bollens, T. Counihan, G. Rollwagon-Bollens, S.L. Katz, J. Zimmerman and J. Emerson. (2017). Veligers of the invasive Asian clam *Corbicula fluminea* in the Columbia River Basin: Broadscale distribution, abundance and ecological association. **Lake and Reservoir Management**. doi: 10.1080/10402381.2017.1294218.

[2015]

Katz, S.L., Izmet'eva, L.R., Hampton, S.E., T. Ozersky, K. Shchapov, M.V. Moore, S.V. Shimerava and E.A. Silow, (2015). The “Melosira years” of Lake Baikal: winter environmental conditions at ice onset predict under-ice algal blooms in spring. **Limnology and Oceanography**. doi: 10.1002/lno.10143

Barnas, K.A., S.L. Katz, D. Hamm, M. Diaz and C.E. Jordan (2015). Is habitat restoration targeting relevant ecological needs for Pacific Salmon across the Pacific Northwest? **Ecosphere**. 6:art110. <http://dx.doi.org/10.1890/ES14-00466.1> [Paper by Technician]

[2014]

Francis, T., E.M. Wolkovich, M.D. Scheuerell, S.L. Katz, E.E. Holmes and S.E. Hampton (2014). Shifting regimes and changing interactions in the Lake Washington, U.S.A., plankton community from 1962-1992. **PLoS ONE**. DOI: 10.1371/journal.pone.0110363

[Prior to Washington State University]

Hampton, S.E., E.E. Holmes, L.P. Scheef, M.D. Scheuerell, S.L. Katz, D.E. Pendleton and E.J. Ward (2013). Quantifying effects of abiotic and biotic drivers on community dynamics with multivariate autoregressive (MAR) models. **Ecology**. 94: 2663–2669

McKenna, M.F., S.L. Katz, C. Condit & S. Walbridge (2012). Response of commercial ships to a voluntary speed reduction measure: Are voluntary strategies adequate for mitigating ship-strike risk? **Coastal Management** 40(6): 634-650. doi: 10.1080/08920753.2012.727749 [Grad Student Paper]

McKenna, M.F., S.L. Katz, S.M. Wiggins, D. Ross & J.A. Hildebrand (2012) A Quieting Ocean: Unintended consequence of management in a fluctuating economy. **J. Acoustical Soc. Am.** 132: 169–175. doi.org/10.1121/1.4740225 [Grad Student Paper]

Shears, N.T., D.J. Kushner, S.L. Katz and S.D. Gaines (2012). Reconciling conflict between the direct and indirect effects of marine reserve protection. **Environmental Conservation** 39: 225-236 doi: 10.1017/S0376892912000082

- Scheef, L.P., D.E. Pendelton, S.E. Hampton, S.L. Katz, E.E. Holmes, M.D. Scheuerell and D.G. Johns. (2012). Assessing marine plankton community structure from long-term monitoring data with multivariate autoregressive (MAR) models: a comparison of fixed station versus spatially distributed sampling data. **Limnol. Oceanog.: Methods** 10: 54-64.
- Williams, G.D., K.S. Andrews, S.L. Katz, M.L. Moser, N. Tolimieri, D.A. Ferrer and P.S. Levin. (2012). Scale and pattern of broadnose sevengill shark *Notorynchus cepedianus* movement in estuarine embayments. **J. of Fish Biol.** 80: 1380–1400. doi:10.1111/j.1095-8649.2011.03179.x
- Katz, S.L., Hampton, S.E., Izmet'seva, L.R. and M.V. Moore (2011). Long-distance climate teleconnection deciphered through non-stationary long-term environmental data in Siberia. **PLoS ONE**. 6(2): e14688. doi:10.1371/journal.pone.0014688
- Barnas, K., S. L. Katz. (2010). The challenges of tracking habitat restoration at various spatial scales. **Fisheries**, 35(5): 232-241
- Tolimieri, N., K. Andrews, G. Williams, S.L. Katz & P.S. Levin, (2009). Home range size and patterns of space use by lingcod, copper rockfish and quillback rockfish in relation to diel and tidal cycles. **Mar. Ecol. Prog. Ser.** 380: 229-243. doi:10.3354/meps07930.
- Hampton, S.E., L.R. Izmet'seva, M.V. Moore, S.L. Katz, B. Dennis and E.A. Silow, (2008). Sixty years of environmental change in the world's largest freshwater lake – Lake Baikal, Siberia. **Global Change Biology**. 14:1-12. doi:10.1111/j.1365-2486.2008.01616.x
- Courbois, J.-Y., Katz, S.L., Jordan, C., Thurow, R.F., Isaak, D.J., Rub, M., Steel, A. and T. Olsen, (2008). An evaluation of probability sampling strategies for estimating Chinook-salmon population size from redd count surveys. **Can. J. Fish. Aquat. Sci.** 65: 1814–1830.
- Katz, S.L., Barnas, K., Hicks, R., Cowen, J. & R. Jenkinson, (2007) Freshwater habitat restoration in the Pacific Northwest: a decade's investment in habitat improvement. **Rest. Ecol.** 15(3): 494-505.
- Rumps, J., S.L. Katz, K. Barnas, M. Morehead, R. Jenkinson, S.R. Clayton and P. Goodwin. (2007) Stream restoration in the Pacific Northwest: Analysis of interviews with project managers. **Rest. Ecol.** 15(3): 506-515. [Grad Student Paper]
- Andrews, K.S., P.S. Levin, S.L. Katz, D. Farrer, V. Gallucci, and G. Bargmann (2007). Acoustic monitoring of sixgill shark movements in Puget Sound: evidence for localized movement. **Can. J. of Zool.** 85(11): 11369-1143.
- McMillan J., Katz, S.L. & G. Pess. (2007). Mating system and reproductive tactics of sympatric steelhead (*Oncorhynchus mykiss*) and resident rainbow trout on the Olympic Peninsula, Washington State. **Trans. Am. Fish. Soc.** 136: 736-748.
- Bernhardt, E.S., Palmer, M.A., Allan, J.D., Alexander, G., Barnas, K., Brooks, S., Carr, J., Clayton, S., Dahm, C., Follstad-Shah, J., Galat, D., Gloss, S., Goodwin, P., Hart, D., Hassett, B., Jenkinson, R., Katz, S., Kondolf, G.M., Lake, P.S., Lave, R., Meyer, J.L., O'donnell, T.K., Pagano, L., Powell, B., Sudduth, E. (2004). Synthesizing U.S. river restoration efforts. **Science** 308(5722): 636-637.
- Zabel, R. W., Harvey, C., Katz, S. L., Good, T. P. and Levin, P. S., (2003). Ecologically Sustainable Yield. **Amer. Sci.** 91: 150-157.
- Katz, S. L., (2002). Design of Heterothermic Muscle in Fish. **J. exp. Biol.** 205: 2251-2266.
- Katz, S. L., Syme, D. A. and Shadwick, R. E., (2000). Enhanced Power in Yellowfin Tuna. **Nature** 410: 770-771.
- Shadwick, R. E., Katz, S. L., Korsmeyer, K. E., Knower T. and Covell, J. W., (1999). Muscle dynamics in skipjack tuna, *Katsuwonus pelamus*: Timing of red muscle shortening and body curvature during steady swimming. **J. exp. Biol.** 202: 2139-2150.

- Knower, T., Shadwick, R. E., Katz, S. L., Graham, J. B., and Wardle, C. S., (1999). Red muscle activation patterns in yellowfin (*Thunnus albacares*) and skipjack (*Katsuwonus pelamis*) tunas during steady swimming. **J. exp. Biol.** 202: 2139-2150.
- Katz, S. L., Shadwick, R. A. and Rappoport, H. S., (1999). Muscle strain histories in swimming milkfish in steady and sprinting gaits. **J. exp. Biol.** 202: 529-541.
- Katz, S. L. and Shadwick, R. E., (1998). Curvature of swimming fish midlines as an index of muscle strain suggests swimming muscle produces net positive work. **J. theor. Biol.** 193: 243-256.
- Shadwick, R. E., Steffensen, J. F., Katz, S. L., and Knower, T., (1998). Muscle dynamics in fish during steady swimming. **Am. Zool.** 38(4): 755-770.
- Muir, G. S., Katz, S. L., Gosline, J. M. and Steeves, J. D., (1998). Asymmetric bipedal locomotion – an adaptive response to incomplete spinal injury in the chick. **Exp. Brain Res.** 122(3): 275-282.
- Katz, S. L. and Jordan, C. E., (1997). A case for building integrated models of aquatic locomotion that couple internal and external forces. Proc. 10th Int. Symp. on Unmanned, Unteathered Submersibles. AUSI. pp. 135-152.
- Lai, N. C., Korsmeyer, K. E., Katz, S. L., Holts, D. B., Laughlin, L. M. and Graham, J. B., (1997). Hemodynamics and blood properties of the shortfin Mako Shark, *Isurus oxyrinchus*. **Copeia** 2: 424-428.
- Katz, S. L., (1996). Ventilatory control in a primitive fish: signal conditioning via non-linear O₂ affinity. **Resp. Physiol.** 103: 165-175.
- Gosline, J. M., Nichols, C., Guerette, P., Cheng, A. and Katz, S. L., (1995). The macromolecular design of spider silks. In: Biomimetics: Design and Processing of Materials. Sarikaya, M. & Aksay, I. Ed's., Amer. Inst. of Physics. pp. 237-261. [Book chapter]
- Hedrick, M. S. Katz, S. L. and Jones, D. R., (1994). Periodic air-breathing behaviour in a primitive fish revealed by spectral analysis. **J. exp. Biol.** 197: 429-436.
- Katz, S. L. and Gosline, J. M., (1994). Scaling modulus as a degree of freedom in the design of locust legs. **J. exp. Biol.** 187: 207-223.
- Katz, S. L. and Gosline, J. M., (1993). Ontogenetic scaling of jump performance in the African Desert Locust (*Schistocerca gregaria*). **J. exp. Biol.** 177: 81-111.
- Katz, S. L. and Gosline, J. M., (1992). Ontogenetic scaling and mechanical behaviour of the tibiae of the African Desert Locust (*Schistocerca gregaria*). **J. exp. Biol.** 168: 125-150.

Book Chapters and Technical Manuals/Papers:

- Rolland, J., P. B. Duffy, C. Duke, D. Helweg, S. L. Katz, O. E. LeDee, and S. Quiring. (2017). Five-year external reviews of the eight Department of Interior Climate Science Centers: Northwest Climate Science Center. American Fisheries Society, Bethesda, Maryland. pp:73. [Peer-Reviewed Report for U.S. Department of Interior and American Fisheries Society]
- Hedrick, M.S. and S.L. Katz (2015). Control of Breathing in Primitive Fishes. In: Phylogeny, Anatomy and Physiology of Ancient Fishes. G. Zaccane, K. Dabrowski, M.S. Hedrick, J.M.O. Fernandes, J.M. Icardo Ed's., IUPS. [Book chapter]
- Katz, S.L. (2013). Population Monitoring. In: Grzimek's Animal Life Encyclopedia: Extinction. N. MacLeod, J.D. Archibald, and P.S. Levin Ed's., Gale/Cengage Learning, Farmington Hills, MI. ISBN-10: 1414490674, pp. 800. [Book chapter]
- McElhany, P., S.R. Alin, D.S. Busch, R. Pavia, K. Higgason, S.L. Katz, J. Phinney, A.J. Sutton, R.A. Feely, J.E. Stein, M.S. Brancato, E. Bowlby, J. Roletto, and L. Etherington, (2010). West Coast

Region Ocean Acidification Research Plan. In: NOAA Ocean and Great Lakes Acidification Research Plan, NOAA Special Report, 143 pp. [Technical Report]

- Katz, S.L., K.A. Barnas and S. Toshach (2007). Data Management Needs for Regional Project Tracking to Support Implementation and Effectiveness Monitoring. NOAA-National Marine Fisheries Service for the Pacific Northwest Aquatic Monitoring Partnership. [Technical Report]
- Dinsmore, DA., SL. Katz, ET. Johnson and JG. Duran (2006). Risk Management Plan for the NOAA Working Diver Training Program. 14 pp. [Technical Report]
- Dinsmore, DA., SL. Katz and ET. Johnson (2005). The NOAA Diving Program: Report for Peer Review on the Working Diver training Program. 71 pp. [Technical Report]
- Paulsen, C., Katz, S. L., Hillman, T., Giorgi, A., Jordan, C., E., Newsom, M. and Geiselman, J., (2002). Guidelines for Action Effectiveness Research Proposals for FCRPS Offsite Mitigation Habitat Measures. (Federal Agencies monitoring guidelines for habitat improvement actions in the Columbia River Basin). [Technical Report]
- Jordan, C. (15 other authors including S. L. Katz) (2002). Mainstem/Systemwide Province Stock Status Program Summary: *Guidelines for Conducting Population and Environmental Status Monitoring*. [Technical Report]
- Katz, S. L. and Shadwick, R. E., (2000). *In vivo* function and functional design in steady swimming fish muscle. In *Muscle Mechanics: From Molecules to Function*. (Ed. W. Herzog) John Wiley and Sons., N. Y. pp. 475-501.