

Isaac C. Kaplan

NOAA-Fisheries
Northwest Fisheries Science Center
Conservation Biology Division
2725 Montlake Blvd E.
Seattle, WA 98112
Isaac.Kaplan@noaa.gov
(206)302-2446

Research Interests

I am a quantitative ecologist and ecosystem modeler interested in marine fisheries and ecosystems. My work includes statistical analysis of survey data, stock assessment, food web modeling, and "end-to-end" Atlantis simulation models that include oceanography, ecology, and fishing fleet dynamics.

Professional Preparation

National Research Council Post-doctoral Fellowship, NOAA NWFSC, 2005-2006. Phillip S. Levin, Advisor Ph.D., Limnology and Marine Science, University of Wisconsin-Madison, 2005. James F. Kitchell, Advisor M.S., Biological Sciences, Stanford University, 2000
B.S., Biological Sciences, Stanford University, 1999

Appointments

2008-present	Research Fishery Biologist, NOAA NWFSC
2006-2007	Research Associate at NOAA NWFSC
2005-2006	NRC postdoctoral research fellow, NOAA NWFSC
2001-2004	Research Assistant on NSF Apex Predators Project, with James F. Kitchell.
2000-2001	University of Wisconsin Graduate Fellowship

Publications

- Adams, J., **Kaplan, I.C.**, Chasco, B., Marshall, K.N., Acevedo-Gutiérrez, A., and Ward, E.J. 2016. A century of Chinook salmon consumption by marine mammal predators in the Northeast Pacific Ocean. *Ecol. Inform.* 34: 44–51.
- Bednaršek, N., Harvey, C.J., **Kaplan, I.C.**, Feely, R.A., and Možina, J. 2016. Pteropods on the edge: Cumulative effects of ocean acidification, warming, and deoxygenation. *Prog. Oceanogr.* 145: 1–24. doi:10.1016/j.pocean.2016.04.002.
- Hodgson, E.E., Essington, T.E., and **Kaplan, I.C.** 2016. Extending Vulnerability Assessment to Include Life Stages Considerations. *PloS One* 11(7): e0158917.
- Kaplan, I.C.**, and Marshall, K.N. 2016. A guinea pig's tale: learning to review end-to-end marine ecosystem models for management applications. *ICES J. Mar. Sci. J. Cons.*: fsw047. doi:10.1093/icesjms/fsw047.
- Kaplan, I.C.**, Williams, G.D., Bond, N.A., Hermann, A.J., and Siedlecki, S.A. 2016. Cloudy with a chance of sardines: forecasting sardine distributions using regional climate models. *Fish. Oceanogr.* 25(1): 15–27. doi:10.1111/fog.12131.
- Koehn, L.E., Essington, T.E., Marshall, K.N., **Kaplan, I.C.**, Sydeman, W.J., Szoboszlai, A.I., and Thayer, J.A. 2016. Developing A High Taxonomic Resolution Food Web Model of the California Current Ecosystem To Assess the Trophic Position of Forage Fish and their Predators. *Ecol. Model.*

- Punt, A.E., MacCall, A.D., Essington, T.E., Francis, T.B., Hurtado-Ferro, F., Johnson, K.F., **Kaplan, I.C.**, Koehn, L.E., Levin, P.S., and Sydeman, W.J. 2016. Exploring the implications of the harvest control rule for Pacific sardine, accounting for predator dynamics: A MICE model. *Ecol. Model.* 337: 79–95.
- Siedlecki, S.A., **Kaplan, I.C.**, Hermann, A.J., Nguyen, T.T., Bond, N.A., Newton, J.A., Williams, G.D., Peterson, W.T., Alin, S.R., and Feely, R.A. 2016. Experiments with Seasonal Forecasts of ocean conditions for the Northern region of the California Current upwelling system. *Sci. Rep.* 6: 27203. doi:10.1038/srep27203.
- Kaplan, I.C.**, Holland, D.S., and Fulton, E.A. 2014. Finding the accelerator and brake in an individual quota fishery: Linking ecology, economics, and fleet dynamics of US West Coast trawl fisheries. *ICES J. Mar. Science* 71(2): 308-319
- Collie, J.S., Botsford, L.W., Hastings, A., **Kaplan, I.C.**, Largier, J.L., Livingston, P.A., Plagányi, É., Rose, K.A., Wells, B.K., and Werner, F.E. 2014. Ecosystem models for fisheries management: finding the sweet spot. *Fish Fish.* doi: 10.1111/faf.12093.
- Marshall, K.N., **Kaplan, I.C.**, and Levin, P.S. 2014. New target fisheries lead to spatially variable food web effects in an ecosystem model of the California Current. *Ecol. Model.* 289: 96–105.
- Kaplan, I.C.**, Brown, C.J., Fulton, E.A., Gray, I.R., Field, J.C., Smith, A.D.M. 2013. Impacts of depleting forage species in the California Current. *Environmental Conservation.* 40(4): 380-393.
- Morzaria-Luna, H.N., Ainsworth, C.H., **Kaplan, I.C.**, Levin, P.S. and Fulton, E.A. 2013. Indirect Effects of Conservation Policies on the Coupled Human-Natural Ecosystem of the Upper Gulf of California. *PLoS ONE* 8, e64085.
- Kaplan, I.C.**, Gray, I.A., Levin, P.S. 2012. [Cumulative impacts of fisheries in the California Current](#). *Fish and Fisheries* doi: 10.1111/j.1467-2979.2012.00484.x.
- Kaplan, I.C.**, Horne, P.J., Levin, P.S. 2012. [Screening California Current Fishery Management Scenarios Using the Atlantis End-to-End Ecosystem Model](#). *Progress in Oceanography* 102: 5-18. <http://dx.doi.org/10.1016/j.pocean.2012.03.009>.
- Kaplan, I.C.**, Leonard, J. 2012. [From Krill to Convenience Stores: Forecasting the Economic and Ecological Effects of Fisheries](#). *Marine Policy* 36:947-954.
- Ainsworth, C., Morzaria-Luna, H., Kaplan, I.C., Levin, P.S., Fulton, E.A. 2012. New fisheries regulations must be accompanied by effective enforcement: a Gulf of California case study. *Marine Policy* 36: 1275-1283.
- Morzaria-Luna, H., Ainsworth, C.H., **Kaplan, I.C.**, Levin, P.S., Fulton, E.A. 2012. Exploring Trade-Offs between Fisheries and Conservation of the Vaquita Porpoise (*Phocoena sinus*) Using an Atlantis Ecosystem Model. *PloS one* 7:e42917. Available: <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0042917>
- Ainsworth, C., Morzaria-Luna, H., **Kaplan, I.C.**, Levin, P.S., Fulton, E. 2012. Full compliance with harvest regulations yields economic and ecological benefits: Northern Gulf of California case study. *Journal of Applied Ecology* 49(1) 63-72.
- Fulton, E.A, Link, J.S., **Kaplan, I.C.**, Savina-Rolland, M., Johnson, P., Ainsworth, C., Horne, P., Gorton, R., Gamble, R.J., Smith, A.D.M., Smith, D.C. 2011. Lessons in modelling and management of marine ecosystems: The Atlantis experience. *Fish and Fisheries* 12(2) 171–188.
- Smith, A.D.M., Brown, C.J., Bulman, C.M., Fulton, E.A., Johnson, P., **Kaplan, I.C.**, Lozano-Montes, H., Mackinson, S., Marzloff, M., Shannon, L.J., Shin, Y., Tam, J. 2011. Impacts of Fishing Low–Trophic Level Species on Marine Ecosystems. *Science* 333 1147-1150.
- Kaplan, I.C.**, Burden, M., Levin, P.S., Fulton, E.A. 2010. Fishing Catch Shares in the Face of Global Change: A Framework for Integrating Cumulative Impacts and Single Species Management. *Canadian Journal of Fisheries and Aquatic Sciences* 67: 1968–1982.
- Ainsworth, C.H., **Kaplan, I.C.**, Levin, P.S., Mangel, M. 2010. Estimating Diet Compositions of Fish Species In The Northern Gulf of California, With Application To Ecosystem Modeling For Fishery Management. *Ecological Applications* 20(8): 2188-2202.

- Chittaro, P.M., **Kaplan, I.C.**, Keller, A., Levin, P.S. 2010. Trade-offs between species conservation and the size of marine protected areas. *Conservation Biology* 24 (1): 197 - 206.
- Kaplan, I.C.**, Levin, P.S. 2009. Ecosystem based management of what? An emerging approach for balancing conflicting objectives in marine resource management. In R.J. Beamish and B.J. Rothschild, eds. *The Future of Fisheries In North America*. Springer, NY 736 pages.
- Levin, P.S., **Kaplan, I.C.**, Grober-Dunsmore, R., Chittaro, P.M., Oyamada, S., Andrews, K., Mangel, M. 2009. A framework for assessing the biodiversity and fishery aspects of marine reserves. *Journal of Applied Ecology* (46):4 735 – 742.
- Kaplan, I.C.**, Kitchell, J.F. 2007. Circle Hooks for Pacific Longliners: Not a Panacea for Marlin and Shark Bycatch, but Part of the Solution. *Transactions of the American Fisheries Society* 136:392-401.
- Kaplan, I.C.**, Helsler, T.E. 2007. Stock assessment of the arrowtooth flounder (*Atheresthes stomias*) population off the west coast of the United States in 2007. Pacific Fishery Management Council, Portland, OR. http://www.pcouncil.org/bb/2007/0907/G4a_Att13_Arrowtooth_Assess.pdf
- Roth, B.M., **Kaplan, I.C.**, Havlicek, T., Johnson, P., Willis, T., Yannarell, A., Carpenter, S., Turner, M. 2007. Effects of forest dynamics and coarse woody habitat on aquatic fish communities. *Ecological Modelling* 203 439-52.
- Kitchell, J. F., Martell, S. J. D., Walters, C.J., Jensen, O.P., **Kaplan, I.C.**, Watters, J.R., Essington T.E., Boggs, C.H. 2006. Billfishes in an ecosystem context. *Bulletin of Marine Science*: 79(3): 669-682.
- Kaplan, I.C.** 2005. A risk assessment for Pacific leatherback turtles. *Canadian Journal of Fisheries and Aquatic Sciences* 62: 1710-1719.
- Hinke, J. T., **Kaplan, I.C.**, Aydin, K., Watters, G., Olson, R.J., Kitchell, J.F. 2004. Visualizing the food-web effects of fishing for tunas in the Pacific Ocean. *Ecology and Society* 9(1): 10. URL: <http://www.ecologyandsociety.org/vol9/iss1/art10> .
- Kitchell, J.F., **Kaplan, I.C.**, Cox, S.P., Boggs, C.H. 2004. Ecological and economic components of managing rare or endangered species in a tropical pelagic ecosystem. *Bulletin of Marine Science* 74 (3):607-619.
- Cox, S.P., Essington, T.E., Kitchell, J.F., Martell, S.J.D., Walters, C.J., Boggs, C., **Kaplan, I.** 2002. Reconstructing ecosystem dynamics in the Central Pacific Ocean, 1952-1998. I. Estimating population biomass and recruitment of tunas and billfishes. *Canadian Journal of Fisheries and Aquatic Sciences* 59: 1724-1735.
- Cox, S.P., Essington, T.E., Kitchell, J.F., Martell, S.J.D., Walters, C.J., Boggs, C., **Kaplan, I.** 2002. Reconstructing ecosystem dynamics in the Central Pacific Ocean, 1952-1998. II. A preliminary assessment of the trophic impacts of fishing and effects on tuna dynamics. *Canadian Journal of Fisheries and Aquatic Sciences* 59: 1736-1747

NOAA Technical Reports

- Weijerman M, **Kaplan I**, Fulton E, Gordon B, Grafeld S, Brainard R. 2014. Design and parameterization of a coral reef ecosystem model for Guam. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-43, 113 p. + Appendices
- Kaplan, I.C.**, et al. 2013. Management Testing and Scenarios for the California Current. In: Levin, P.S., Wells, B.K., and M.B. Sheer, (Eds.), *California Current Integrated Ecosystem Assessment: Phase II*. Available from www.noaa.gov/iea/CCIEA-Report/index.html.
- Kaplan, I.C.**, Horne, P., Levin, P.S. 2011. Chapters in: Technical background for an Integrated Ecosystem Assessment of the California Current: Groundfish, Salmon, Green Sturgeon, and Ecosystem Health. Levin, P.S., and F. Schwing, (eds.). NOAA Technical Memorandum NMFS-NWFSC-109. Available online: http://www.nwfsc.noaa.gov/assets/25/7772_07122011_125959_CalCurrentIEATM109WebFinal.pdf

- Ainsworth, C.H., **Kaplan**, I.C., Levin, P.S., Cudney Bueno, R., Fulton, E.A., Mangel, M., Turk-Boyer, M., Torre Cosio, J., Pares Sierra, A., Morzaria Luna, H. 2011. Atlantis model development for the Northern Gulf of California. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-110. Available online: http://www.nwfsc.noaa.gov/assets/25/7784_08012011_125850_AtlantisModelTM110WebFinal.pdf
- Horne, P., **Kaplan**, I.C., Marshall, K., Levin, P.S., Fulton, E.A. 2010. Central California Atlantis Model (CCAM): Design and parameterization. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-104. Available online: http://www.nwfsc.noaa.gov/assets/25/7048_03232010_145542_ModelCalCurrentTM104WebFinal.pdf
- Dufault, A. M., Marshall, K., **Kaplan**, I.C. 2009. A synthesis of diets and trophic overlap of marine species in the California Current. U.S. Dept. of Commerce, NOAA Tech. Memo., NMFS-NWFSC-103, 81 p. Available online: http://www.nwfsc.noaa.gov/assets/25/7024_12212009_134730_DietsCalCurrentTM103WebFinal.pdf
- Brand, E. J., **Kaplan**, I.C., Harvey, C.J., Levin, P.S., Fulton, E.A., Hermann, A.J., Field, J.C. 2007. A spatially explicit ecosystem model of the California Current's food web and oceanography. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-84. Online at <http://www.nwfsc.noaa.gov/publications/index.cfm>

Other Reports (not peer-reviewed)

- Kaplan, I.C.** 2013. A Scientific Perspective on Ecosystem Relationships of Forage Fish. Proceedings of Managing Our Nation's Fisheries III conference, http://www.managingfisheries.org/2013%20documents/All_Session_2_papers.pdf
- Busch et al. (2015). Stress Tests for the Sea: Can Fisheries Withstand Ocean Acidification? Earthzine. <http://earthzine.org/2015/06/03/stress-tests-for-the-sea-can-fisheries-withstand-ocean-acidification/>

Synergistic Activities

My main focus since 2007 has been the development of decision support tools for ecosystem-based fisheries management in California and Mexico. This has involved close cooperation with stakeholders and management agencies, to tailor our modeling to real-world conservation and fisheries needs. Examples include [Atlantis end-to-end ecosystem modeling](#) and contributing to [J-SCOPE ocean forecasts](#).

Much of our Integrated Marine Ecology Team's current work focuses on decision support tools for NOAA's Integrated Ecosystem Assessment (IEA) of the California Current (<http://www.noaa.gov/iea/CCIEA-Report/index.html>). My role is to evaluate ecosystem indicators and to test alternative management strategies, most recently with respect to climate change and ocean acidification.

Cameron Ainsworth, Peter Horne, and I have developed a three day "Introduction to the Atlantis Ecosystem Model" course, focusing on theory and practice of ecosystem modeling and Management Strategy Evaluation, and a hands-on introduction to Atlantis. We have taught the course three times since September 2009, in Seattle, Ensenada Mexico (CICESE), and Galveston Texas (NOAA SEFSC).

Referee for Science, Nature, Fisheries Research, Ecological Applications, Canadian Journal of Fisheries and Aquatic Sciences, Progress in Oceanography, Frontiers in Ecology and the Environment, Conservation Biology, Biological Conservation, North American Journal of Fisheries Management, Oecologia, Bulletin of

Marine Science, Aquatic Living Resources, Ecological Modelling, Marine Ecology Progress Series, Global Change Biology, Communications in Mathematical Sciences, Indian Journal of Marine Science, and the African Journal of Marine Science

Collaborators

Cameron Ainsworth (NMFS), Paul Chittaro (NMFS), Ana Cinti (University of Arizona), John Field (NMFS), Elizabeth Fulton (CSIRO-Australia), Chris Harvey (NMFS), Dan Holland (Gulf of Maine Research Institute), James Kitchell (University of Wisconsin), Phillip Levin (NMFS), Jason Link (NMFS), Marc Mangel (UC Santa Cruz), Tony Smith (CSIRO), Ian Stewart (NMFS)

Graduate and postdoctoral advisors

Ph.D. Advisor: James F. Kitchell, University of Wisconsin-Madison

Postdoctoral advisor: Phillip S. Levin, NOAA Northwest Fisheries Science Center