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EDUCATION

- December 2000 Ph.D. Ecological Sciences - Old Dominion University, Norfolk VA, 23529
Dissertation: *Evaluation of fish scale chemistry for determining habitat associations.*
- August 1994 M.S. Biological Sciences - Old Dominion University, Norfolk, VA, 23529.
Thesis: *The reproductive biology of Chesapeake Bay black drum, Pogonias cromis, with an assessment of fixatives and stains for histological examination of teleost ovaries.*
- August 1991 B.S. Forestry and Wildlife, Fisheries Science – Virginia Polytechnic Institute and State University (VPI&SU), Blacksburg, VA, 24061.

PEER-REVIEWED PUBLICATIONS

- Santora J.A., Sydeman W.J., Schroeder I.D., Field J.C., Miller R.M., **Wells B.K.** *In review.* Persistence of trophic hotspots and relation to human impacts within an upwelling marine ecosystem. *Ecological Applications*
- Wells, B.K.**, J.A. Santora, I.D. Schroeder, W.J. Sydeman, D.D. Huff, J.C. Field. 2016. Marine ecosystem perspectives on Chinook salmon recruitment: A synthesis of empirical and modeling studies from the California upwelling system. *Marine Ecology Progress Series*. **552**:271-284
- Collie, J.S., L.W. Botsford, A. Hastings, I.C. Kaplan, J.L. Largier, P.A. Livingston, E. Plaganyi, K.A. Rose, **B. K. Wells**, F. E. Werner. 2016. Ecosystem models for fisheries management: finding the sweet spot. *Fish and Fisheries*. 17:101-125.
- Fiechter, J., D.D. Huff, B.T. Martin, D. Jackson, C.A. Edwards, K.A. Rose, E.N. Curchitser, K.S. Hodstrom, S.T. Lindley, and **B.K. Wells**. 2015. Environmental conditions impacting juvenile Chinook salmon growth off central California: an ecosystem model analysis. *Geophysical Research Letters*. 42:2910-2917
- Winship, A.J., M.R. O'Farrell, W.H. Satterthwaite, **B.K. Wells**, and M.S. Mohr. 2015. Expected future performance of salmon abundance forecast models with varying complexity. *Canadian Journal of Fisheries and Aquatic Sciences*. 72:557-569.
- Schroeder, I.D., J.A. Santora, A.M. Moore, C.A. Edwards, J. Fiechter, E.L. Hazen, S.J. Bograd, J.C. Field, and **B.K. Wells**. 2014. Application of a data-assimilative regional ocean modeling system for assessing California Current System ocean conditions, krill, and juvenile rockfish interannual variability. *Geophysical Research Letters*. 41:5942-5950
- Santora, J.A., I.D. Schroeder, J.C. Field, **B.K. Wells**, W.J. Sydeman. 2014. Spatio-temporal dynamics of ocean conditions and forage taxa reveals regional structuring of predator-prey relationships. *Ecological Applications*. 24:1730-1747.

- Satterthwaite, W.H., S. M. Carlson, S. Vincenzi, S.D. Allen-Moran, S.J. Bograd, and **B.K. Wells**. 2014. Match-mismatch dynamics and the relationship between ocean-entry timing and relative ocean recovery rates of Central Valley fall run Chinook salmon. *Marine Ecology Progress Series*. 511:237-248.
- Beakes, M.P., S. Sharron, R. Charish, J.W. Moore, W.H. Satterthwaite, E. Sturm, **B.K. Wells**, S.M. Sogard, M. Mangel. 2013. Using scale characteristics and water temperature to reconstruct growth rates of juvenile steelhead *Oncorhynchus mykiss*. *Journal of Fish Biology*. 84:58-72
- Wells, B.K.**, I.D. Schroeder, J.A. Santora, E. L. Hazen, S.J. Bograd, E.P. Bjorkstedt, V.J. Loeb, S. McClatchie, E.D. Weber, W. Watson, A.R. Thompson, W.T. Peterson, R.D. Brodeur, J. Harding, J. Field, K. Sakuma, S. Hayes, N. Mantua, W.J. Sydeman, M. Losekoot, S.A. Thompson, J. Largier, S.Y. Kim, F.P. Chavez, C. Barceló, P. Warzybok, R. Bradley, J. Jahncke, R. Georricke, G.S. Campbell, J.A. Hildebrand, S.R. Melin, R.L. DeLong, J. Gomez-Valdes, B. Lavaniegos, G. Gaiola-Castro, R.T. Golightly, S.R. Schneider, N. Lo, R.M. Suryan, A.J. Gladics, C.A. Horton, J Fisher, C. Morgan, J. Peterson, E.A. Daly, T.D. Auth, and J. Abell. 2013. State of the California Current 2012-2013: No such thing as an 'average' year. *California Cooperative Oceanic Fisheries Investigations Reports*. 54:37-71.
- Woodson, L., **B.K. Wells**, P. Weber, R.B. MacFarlane, G Whitman, and R. C. Johnson. 2013. Size, growth, and origin-dependent mortality of juvenile Chinook salmon *Oncorhynchus tshawytscha* during early ocean residence. *Marine Ecology Progress Series*. 487:163-175.
- Satterthwaite, W.H., M.S. Mohr, M.R. O'Farrell and **B.K. Wells**. 2013. A comparison of temporal patterns in the ocean spatial distribution of California's Central Valley Chinook salmon runs. *Canadian Journal of Fisheries Science*. 70:574-584.
- Santora, J.A, W.J. Sydeman, M. Messie, F. Chai, Y. Chao, S.A. Thompson, **B.K. Wells**, and F. Chavez. 2013. Triple check: Observations verify structural realism of an ocean ecosystem model. *Geophysical Research Letters*. 40:1-6
- Schroeder, I.D., E. Hazen, B.A. Black, S.J. Bograd, W.J. Sydeman, J. Santora, and **B.K. Wells**. 2013. The North Pacific High and wintertime pre-conditioning of California Current productivity. *Geophysical Research Letters*. . 40:541-546
- Woodson, L.E., **B.K. Wells**, C.B. Grimes, R.P. Franks, J.A. Santora, and M.H. Carr. 2013. Using water and otolith chemistry to identify upwelling exposure of juvenile rockfish in an open coastal system. *Marine Ecology Progress Series*. 473:261-273
- Santora J., J.C. Field, I. D. Schroeder, K.M. Sakuma., **B.K. Wells**, and W.J. Sydeman. 2012. Spatial ecology of krill, micronekton and top predators in the central California Current: Implications for defining ecologically important areas. *Progress in Oceanography*. 106:154-174
- Huff, D.D., S.T. Lindley, **B.K. Wells**, and F. Chai. 2012. Green sturgeon distribution in the Pacific Ocean estimated from modeled oceanographic features and migration behavior. *Public Library of Science*. 7:e45852
- Wells, B.K.**, J.A. Santora, J.C. Field, R.B. MacFarlane, B.B. Marinovic, and W.J. Sydeman. 2012. Population dynamics of Chinook salmon (*Oncorhynchus tshawytscha*) relative to prey availability in the central California coastal region. *Marine Ecology Progress Series*. 457:125-137
- Santora, J.A., W.J. Sydeman, I.D. Schroeder, C.S. Reiss, **B.K. Wells**, J.C. Field, A.M. Cossio, and V.J. Loeb. 2012. Krill Space: A comparative assessment of mesoscale structuring in polar and temperate marine ecosystems. *ICES Journal of Marine Science*. 69:1317-1327

- Satterthwaite W.H., M.S. Mohr, and **B.K. Wells**. 2012. A Bayesian hierarchical model of size at age in ocean-harvested stocks – quantifying effects of climate and temporal variability. *Canadian Journal of Fisheries and Aquatic Sciences*. 69:942-954.
- Hayes, S.A., M.H. Bond, **B.K. Wells**, C.V. Hanson, A.W. Jones, and R.B. MacFarlane. 2011. Using archival tags to infer habitat use of central California steelhead and coho salmon. *In Advances in Fish Tagging and Marking Technology*. American Fisheries Society Symposium. 76:471-492.
- Santora, J.A., W.J. Sydeman, I.D. Schroeder, **B.K. Wells**, J.C. Field. 2011. Mesoscale structure and oceanographic determinants of krill hotspots in the California Current: Implications for trophic transfer and conservation. *Progress in Oceanography*. 91:397-409.
- Black, B. I.D. Schroeder, W.J. Sydeman, S.J. Bograd, **B.K. Wells** and F.B. Schwing. 2011. Winter and summer upwelling modes and their biological relevance in the California Current Ecosystem. *Global Change Biology*. 17:2536-2545
- Miller, J.A, **B.K. Wells**, S.M. Sogard, C.B. Grimes, and G.M. Cailliet. 2010. Introduction to Proceedings of the 4th International Otolith Symposium. *Environmental Biology of Fishes*. 89:203-206.
- Sydeman, W.J., SA Thompson, J.A. Santora, K.L. Mills, D.F. Bertram, K.H. Morgan, M.A. Hipfner, **B.K. Wells**, and S.G. Wolf. 2009. Seabirds and climate in the California Current - A synthesis of Change. *CalCOFI Reports* 82-106
- Wells, B.K.**, J. Field, J. Thayer, C. Grimes, S. Bograd, W. Sydeman, F. Schwing, and R. Hewitt. 2008 Untangling the relationships among climate, prey, and top predators in an ocean ecosystem. *Marine Ecology Progress Series*. 364:15-29
- Elsdon, T.S., **B.K. Wells**, S.E. Campana, B.M. Gillanders, C.M. Jones, K.E. Limburg, D.H. Secor, S.R. Thorrold and B.D. Walther. 2008. Otolith chemistry to describe movements and life-history parameters of fishes: hypotheses, assumptions, limitations, and inferences. *Oceanography and Marine Biology Annual Review* 46:297-330.
- Wells, B.K.**, C.B. Grimes, J.G. Sneva, S. McPherson, and J.B. Waldvogel. 2008. Relationships between oceanic conditions and growth of Chinook salmon (*Oncorhynchus tshawytscha*) from Alaska, Washington, and California, USA. *Fisheries Oceanography*, 17:101-125
- Wells, B.K.**, C.B. Grimes, and J.B. Waldvogel. 2007. Quantifying the effects of wind, upwelling, curl, turbulence, and sea surface temperature on growth and maturation of a California Chinook salmon (*Oncorhynchus tshawytscha*) population. *Fisheries Oceanography* 16:363-382
- Jiang, H., K.H. Pollock, C. Brownie, J.M. Hoenig, R.J. Latour, **B.K. Wells**, J. Hightower, and W.S. Hearn. 2007. Tag return models for catch-and-release fisheries: striped bass natural mortality estimates change with age and calendar year. *North American Journal of Fisheries Management*. 27:387-396
- Wells, B.K.**, C.B. Grimes, J.C. Field, and C.S. Reiss. 2006. Covariation between the average lengths of mature coho (*Oncorhynchus kisutch*) and Chinook salmon (*Oncorhynchus tshawytscha*) and the ocean environment. *Fisheries Oceanography*. 15:67-79.
- Wells, B.K.**, K.D. Friedland, and L. M. Clarke. 2003. Increment patterns in otoliths and scales from mature Atlantic salmon *Salmo salar*. *Marine Ecology Progress Series*. 262:293-298.

- Wells, B. K.,** S. R. Thorrold, and C. M. Jones. 2003. Stability of elemental signatures in the scales of spawning weakfish, *Cynoscion regalis*. *Canadian Journal of Fisheries and Aquatic Sciences*. 60:361-369.
- Wells, B. K.,** B. E. Rieman, J. L., J. L. Clayton, D. Horan, and C. M. Jones. 2003. Relationships between water, otolith, and scale chemistries of westslope cutthroat trout from the Coeur d'Alene River, Idaho: the potential application of hard-part chemistry to describe movements in fresh water. *Transactions of the American Fisheries Society*. 132:409-424.
- Wells, B. K.** and C. M. Jones. 2002. Reproduction of black drum, *Pogonias cromis*, in the Chesapeake Bay region. *Virginia Journal of Science*. 33:3-11.
- Jones, C. M. and **B. K. Wells**. 2001. Yield-per-recruit analysis for black drum, *Pogonias cromis*, along the East Coast of the U.S. and management strategies for the Chesapeake Bay. *Fishery Bulletin*. 99:328-337.
- Wells, B. K.,** G. E. Bath, S. R. Thorrold, and C. M. Jones. 2000. Incorporation of strontium, cadmium, and barium in juvenile spot (*Leiostomus xanthurus*) scales reflects water chemistry. *Canadian Journal of Fisheries and Aquatic Sciences*. 57: 2122-2129.
- Wells, B. K.,** S. R. Thorrold, and C. M. Jones. 2000. Geographic variation in elemental signatures of weakfish scales. *Transactions of the American Fisheries Society*. 129: 889-900.
- Jones, C. M. and **B. Wells**. 1998. Age, growth, and mortality of black drum. *Pogonias cromis*, in the Chesapeake Bay. *Fishery Bulletin* 96: 451 – 461.

TECHNICAL REPORTS

- Townsend, H.M., C. Harvey, K.Y. Aydin, R. Gamble, A. Gruss, P.S. Levin, J.S. Link, K.E. Osgood, J. Polovino, M.J. Schirripa, and **B. K. Wells**. 2014. Report of the 3rd National Ecosystem Modeling Workshop (NEMoW 3): Mingling models for marine resource management – - multiple model inference. NOAA Technical Memorandum NMFS-F/SPO-149 Dec 2014
- Wells, B.K.,** R.D. Brodeur, J.C. Field, E. Weber, A.R. Thompson, S. McClatchie, P.R. Crone, K. T. Hill and C. Barcelo. In press. Coastal pelagics and Forage Fishes. In: C. Harvey, N. Garfield (eds.), Integrated ecosystem assessment of the California Current: Phase III report 2013, p. 13-70. U.S. NOAA National Marine Fisheries Service.
- Wells, B.K.,** T. Wainwright, C. Thomson, T. Williams, N. Mantua, L. Crozier, S. Breslow, and K. Fresh. In press. Pacific Salmon. . In: C. Harvey, N. Garfield (eds.), Integrated ecosystem assessment of the California Current: Phase III report 2013, p. 13-70. U.S. NOAA National Marine Fisheries Service.
- Hazen, E. L., I.D. Schroeder, J.Peterson, W. T. Peterson, W.J. Sydeman, S.A. Thompson, **B.K. Wells**, and S. J. Bograd. 2013. Oceanographic and climatic drivers and pressures. In: P. S. Levin, **B.K. Wells**, and M. B. Sheer (eds.), Integrated ecosystem assessment of the California Current: Phase II report 2012, p. 13-70. U.S. NOAA National Marine Fisheries Service.
- Levin, P. S., and **B. K. Wells**. 2013. Preface. In: P. S. Levin, **B. K. Wells**, and M. B. Sheer (eds.), Integrated ecosystem assessment of the California Current: Phase II report 2012, p. iv-vii. U.S. NOAA National Marine Fisheries Service.

- Levin, P.S., **B.K. Wells**, and M. B. Sheer (eds.). 2013. Integrated ecosystem assessment of the California Current: Phase II report 2012. U.S. NOAA National Marine Fisheries Service. 958 p.
- Lovewell, M. A., I.C. Kaplan, Y. deReynier, M.B. Sheer, R.Howell, L.Wooninck, J.Lindsay, P. S. Levin, and **B.K. Wells**. 2013. Developing the capacity to assess policy priorities - Engagement with stakeholders and managers. In: P.S. Levin, **B.K. Wells**, and M. B. Sheer (eds.), Integrated ecosystem assessment of the California Current: Phase II report 2012, p. 1-12. U.S. NOAA National Marine Fisheries Service.
- McClatchie, S., Richard D. B., J. C. Field, E.Weber, A.R. Thompson, R.L. Emmett, P.R. Crone, K.T. Hill, C.Barcelo, and **B.K. Wells**. 2013. Coastal pelagics and forage fishes. In: P.S. Levin, **B. K. Wells**, and M.B. Sheer (eds.), Integrated ecosystem assessment of the California Current: Phase II report 2012, p. 374-399. U.S. NOAA National Marine Fisheries Service.
- Wainwright, T., Williams T.W, Fresh, K, , E.Weber, and **B.K. Wells**. 2013. Chinook and coho. In: P.S. Levin, **B. K. Wells**, and M.B. Sheer (eds.), Integrated ecosystem assessment of the California Current: Phase II report 2012. U.S. NOAA National Marine Fisheries Service.
- Redfern, J.V., L. T. Ballance, J. P. Barlow, S.J. Chivers, M. B. Hanson, E. L. Hazen, I. D. Schroeder, J. L. Laake, M.S. Lowry, S. R. Melin, J. E. Moore, D.P. Noren, W. L. Perryman, B. L. Taylor, D.W. Weller, and **B. K. Wells**. 2013. Marine mammals - Indicators and status. In: P. S. Levin, **B. K. Wells**, and M. B. Sheer (eds.), Integrated ecosystem assessment of the California Current: Phase II report 2012, p. 339-373. U.S. NOAA National Marine Fisheries Service.
- Andrews, K. S., G.D. Williams, I. C. Kaplan, N. Tolimieri, J. F. Samhour, P. S. Levin, **B. K. Wells**, S. J. Bograd, C. B. Grimes, E. L. Hazen, D. Huff, S.T. Lindley, and I. D. Schroeder. 2011. Selecting and evaluating indicators for the California Current. In: Levin, P. S., and F. B. Schwing (eds.), Technical background for an Integrated Ecosystem Assessment of the California Current: groundfish, salmon, green sturgeon, and ecosystem health, p. 7-59. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-109.
- Tolimieri, N., G. D. Williams, K.S. Andrews, P. S. Levin, **B. K. Wells**, S. J. Bograd, C.B. Grimes, E. L. Hazen, D. Huff, S. T. Lindley, and I. D. Schroeder. 2011. Status of the California Current Ecosystem: major EBM components. In: Levin, P.S., and F.B. Schwing (eds.), Technical background for an Integrated Ecosystem Assessment of the California Current: groundfish, salmon, green sturgeon, and ecosystem health, p. 60-98. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-109.
- Tolimieri, N., G. D. Williams, K. S. Andrews, P. S. Levin, E. L. Hazen, W. J. Sydeman, I. D. Schroeder, S. A. Thompson, **B. K. Wells**, S. T. Lindley, C. B. Grimes, S. J. Bograd, and F. B. Schwing. 2011. Appendix C: Data sources. In: Levin, P. S., and F. B. Schwing (eds.), Technical background for an Integrated Ecosystem Assessment of the California Current: groundfish, salmon, green sturgeon, and ecosystem health, p. 275-284. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-109.
- Lindley, S. T., C. B. Grimes, M. S. Mohr, W. Peterson, J. Stein, J. T. Anderson, L. W. Botsford, D. L. Bottom, C. A. Busack, T. K. Collier, J. Ferguson, J. C. Garza, A. M. Grover, D. G. Hankin, R. G. Kope, P. W. Lawson, A. Low, R. B. MacFarlane, K. Moore, M. Palmer-Zwahlen, F. B. Schwing, J. Smith, C. Tracy, R. Webb, **B. K. Wells**, and T. H. Williams. 2009. What caused the Sacramento River fall Chinook stock collapse? Pre-publication report to the Pacific Fishery Management Council, March 18, 2009. 118 p.

GRANTS AND CONTRACTS (Wells PI)

Wells, B.K., S. Bograd., and F. Werner 2012-2014. California Current Integrated Ecosystem Assessment \$1,400,000. NOAA CCIEA

Wells, B.K., S. Bograd., and F. Werner 2011. California Current Integrated Ecosystem Assessment \$620,000 NOAA IEA

Wells, B.K. 2010 California Current Integrated Ecosystem Assessment. \$340,000 NOAA IEA

Wells, B.K., S. Lindley, E. Bjorkstedt, L. Botsford, J. Field, J. Garza, C. Grimes, D. Hankin, S. Hayes, B. MacFarlane, M. Palmer-Zwahlen, M. O'Farrell, W. Sydeman, and C. Thompson. 2010. The future of the California Chinook salmon fishery: Roles of climate variation, habitat restoration, hatchery practices, and biocomplexity. \$720,000 Ocean Protection Council and California Sea Grant.

Wells, B.K. 2010 Integrated Ecosystem Assessment: Klamath River Chinook. \$72,000 NOAA IEA.

Chavez, F. (Co-PI), **B.K. Wells** (Co-PI), E. Danner, W. Sydeman, Y Chao, F Chai, S. Ralston, J. Field, D. Foley, J. Santora, S. Bograd, S. Lindley, and W. Peterson. 2009. Utilizing ecosystem information to improve the decision support system for central California salmon. \$920,000. NASA Decision Support through Earth Science Research Results

Wells, B. M. Mohr, M. Fujiwara, and C. Grimes. 2007. Incorporation of ocean environmental variation in the Klamath River fall Chinook salmon stock assessment. \$69,000. NOAA Fisheries and the Environment Program.

Wells, B. K. K. L. Stierhoff, C. B. Grimes, and S. M. Sogard. 2006. The effect of upwelling on growth and recruitment of juvenile rockfishes. \$50,000. National Science Foundation.

Wells, B.K. and G.B. Grimes. 2004. Quantifying the effect on environmental variation of growth of Pacific salmon. \$71,000. NOAA Fisheries and the Environment Program.

Wells, B. K. 2002. Fellowship award to examine the influence of growth rate, stock, and sex on the maturation schedule of Atlantic salmon from National Research Council. Including salary, benefits, research and publication expenses. ~\$80,000.

Wells, B. K. 2001. Examination of westslope cutthroat trout otolith and scale chemistries to evaluate their use for describing population structure within a river basin. USDA Forest Service, Rocky Mountain Research Station. \$2,500.

Wells, B. K., C. M. Jones, and S. R. Thorrold. 1998. ID-ICP-MS analysis of scales from laboratory reared juvenile spot (*Leiostomus xanthurus*) to examine the effects of ambient elemental concentrations on the elemental signature of the scale. Virginia Graduate Marine Science Consortium (R/MG-99-01) through the Virginia Sea Grant. \$6,825.

SELECT NATIONAL AND INTERNATIONAL PRESENTATIONS

Wells, B.K., D. Huff, J. Fiechter, I. Schroeder, M. Henderson, and J. Santora. 2015. Evaluating and using numerical ocean and biological model products to assess habitat, salmon survival, and forage dynamics along the coastal California Current system. Eastern Pacific Ocean Conference, South Lake Tahoe, CA

Invited: Wells, B.K. 2014. Process studies to quantify ecosystem dynamics. Department of Natural Resources, Cornell University, Ithaca, NY

Invited: Wells, B.K. 2014. A process study to evaluate environmental influences on recruitment of Chinook salmon. ICES Working Group on Recruitment Forecasting in a Variable Environment, Copenhagen, DK.

Wells, B.K., J. Santora, I. Schroeder, S. Hayes, J. Field, and D. Huff. 2014. The ocean according to Chinook salmon. National Salmon Ocean Ecology Meeting, Santa Cruz, CA

Invited: Wells, B.K. 2013. State of the California Current 2012-2013. CalCOFI, La Jolla, CA

Wells, B.K., R. Mendelsohn, I. Schroeder, J. Santora, and V. Brown. 2012 Coastal turbulence, upwelling, and wind shear time series examined 1946-2012: Extending Schwing and Mendelsohn (1997). Eastern Pacific Ocean Conference, Mt. Hood, OR

Invited: Wells, B.K., C. Grimes, J. Field, S. Lindley, A. MacCall, and S. Ralston. 2012. The role of the environment and harvest on stock status: contrasting California salmon and rockfish fisheries. American Institute for Fisheries Research Biologist Workshop, New Bedford, MA.

Schroeder I, **B Wells**, J Santora, and S Bograd. 2012. El-Niño's role on Klamath River Chinook Salmon Abundances . Ocean Sciences AGU, Salt Lake City, UT

Huff D, S Lindley, **B Wells**, and F Chai. 2012. Range-wide, seasonal distribution of green sturgeon habitat in the Pacific Ocean derived from acoustic tag data and a regional oceanographic modeling system. Ocean Sciences AGU, Salt Lake City, UT

Werner F., **B. Wells**, P Levin, J Stein. 2012. The California Current large marine ecosystem's integrated ecosystem assessment (CCIEA): A case study on California salmon. Ocean Sciences AGU, Salt Lake City, UT

Stein J, P Levin, F Werner, **B Wells**. 2012. Integrated ecosystem assessment: A process for implementation of EBM. Ocean Sciences AGU, Salt Lake City, UT

Satterthwaite, WH, MS Mohr, MR O'Farrell, and **BK Wells**. 2011. Size-specific maturation probability in California Chinook - variation across years and among runs. American Fisheries Society Annual Meeting. September 5 2011, Seattle, WA.

- Woodson L, R Johnson, **B Wells**, G Whitman, P Weber, RB MacFarlane. 2012. Growth rate, size or stock? – Evaluating selective survival of central California juvenile fall Chinook salmon (*Oncorhynchus tshawytscha*) when faced with poor ocean conditions. Salmon Ocean Ecology Meeting, Newport OR
- Wells B**, JA Santora, JC Field, EB MacFarlane, BB Marinovic, WJ Sydeman, F Chai, Y Chao, F Chavez. 2012. Quantifying the dynamics of Chinook salmon (*Oncorhynchus tshawytscha*) relative to prey availability in the central California coastal region and using ROMS-NPZ approaches for forecasting . Salmon Ocean Ecology Meeting, Newport OR
- Invited: Wells B**, F. Werner, P Levin, J Stein. 2011. Integrated Ecosystem Assessment of the California Current. CalCOFI, San Diego, CA
- Wells B**, JA Santora, JC Field, EB MacFarlane, BB Marinovic, WJ Sydeman, F Chai, Y Chao, F Chavez. 2011. An ecosystem perspective for quantifying the dynamics of juvenile Chinook salmon (*Oncorhynchus tshawytscha*) and prey in the central California coastal region. Eastern Pacific Oceanography Conference, South Lake Tahoe, CA
- Wells, B**, S Bograd, F Chai, Y chai, F Chavez, E Danner, J Field, D Foley, C Grimes, E Hazen, D Huff, S Lindley, W Peterson, S Ralston, J Santora, W Satterthwaite, I Schroeder, F Schwing, C Werner. 2011. Integrated Ecosystem Assessment for managed fishes: salmon example. *International Marine Conservation Congress*, Portland, OR
- Invited: Wells B**, F. Werner, P Levin, J Stein. 2011. Integrated Ecosystem Assessment of the California Current. 4th National Workshop o the SSC, Williamsburg, VA
- Starrett, L.E., **B.K. Wells**, R. Barnett-Johnson, G. Whittman, B. MacFarlane, S. Hayes. 2011. Size-dependent mortality of juvenile Chinook salmon across years of varying ocean productivity as revealed by otolith increment analysis. Salmon Ocean Ecology Meeting, Seattle, WA.
- Wells, B.K.** 2010. Relationship of ocean environmental factors to salmon growth, survival and maturation. PFMC, Foster City, CA
- Invited: Wells, B.K.**, J. Field and R. Rykaczewski. 2010. Understanding the environmental causes of variability in fish productivity by applying a mechanistic ecosystem model. AGU Oceans Sciences, Portland, OR
- Invited: Wells BK**, Chavez, F., E. Danner, W. Sydeman, Y Chao, F Chai, S. Ralston, J. Field, D. Foley, J. Santora, S. Bograd, S. Lindley, and W. Peterson. 2010. Utilizing ecosystem information to improve decision support for central California salmon. NASA Biodiversity workshop, Washington DC.
- Invited: Wells, B.K.**, J. Field and R. Rykaczewski. 2010. Pelagic habitats and ecosystem considerations for salmon of the central coast of California. Salmon Ocean Ecology Meeting, Santa Cruz, CA
- Sydeman W.J., J.A. Santora , S. Thompson, K. L. Mills, J C. Field, **B K. Wells**, B Marinovic, and BA. Black. 2010. Numerical Responses of Krill Predators to Variation in Krill Abundance and Spatial Organization. PICES, Portland OR
- Invited: Strange, J and B. Wells.** 2010. Ecology and fishes of the estuary and nearshore marine environments. Klamath River Conference. Medford OR
- Invited: Wells B.K.** 2010 Pelagic habitats and ecosystem considerations for salmon and other pelagics of the central coast of California. National Habitat Assessment Workshop, New Orleans, LA

- Starrett, Lindsay E., **Wells, B, K**, Grimes, C. B. 2009. Barium as an indicator of upwelling exposure in the otoliths of central California juvenile rockfish. International Otolith Symposium, Monterey, CA. Talk.
- Invited: Wells, B.K.**, J Field, S. Lindley, R. Rykaczewski. 2009. Linkages between climate variation and the pelagic ecosystem of the CA current. Climate Change Workshop/USFWS/USGS, Tahoe, CA
- Wells, B.K.**, R. Rykaczewski, J Field, S Bograd, F Schwing, W Sydeman, J Santora, S. Lindley, S Ralston, RB MacFarlane, J Thayer, C Grimes, A MacCall. 2009. Intensified off-shore and weak in-shore winds may have led to poor recruitment of 2005-2006 salmon cohorts. Salmon Ocean Ecology Meeting, Juneau, AK
- Wells B.K.**, J. Field, M Fujiwara, C Grimes, and M. Mohr. 2008. Examination of the effects of environmental variability on cohort dynamics of Klamath river Chinook salmon. FATE NOAA.
- Invited: Wells B.K.** 2008 Effects of climate change in marine environment on salmonid populations. Workshop Sponsored by Protected Resources Division.
- Wells B.K.**, J. Field, M. Fujiwara, C. Grimes, B. MacFarlane, M. Mohr, M. O'Farrell. 2008. Examination of the effects of environmental variability on cohort dynamics of Central Valley and Klamath River, California Chinook salmon. Salmon Ocean Ecology Meeting, Nanaimo, BC
- Wells B.K.**, CB Grimes, JG Sneva, S. McPherson, JB Waldvogel. 2007. Relationships between oceanic conditions and growth of Chinook salmon from Alaska, Washington, and California. Salmon Ocean Ecology Meeting, Newport, OR.
- Wells B.K.**, J. Thayer, J. Field, S. Bograd, W. Sydeman, F. Schwing, C. Grimes, R. Hewitt, and K. Hill. 2007. Bottom-up modeling to fit central California Cassin's and rhinoceros auklet production to environmental and biological variables. CalCOFI, Monterey, CA
- Wells B.K.**, C. Grimes, J. Sneva, S. McPherson, J. Waldvogel. 2006. Effects of oceanic conditions on growth of Chinook salmon across their range and life-history types. American Fisheries Society Annual National Meeting.
- Wells B.K.**, C. Grimes, J. Waldvogel, J. Field, C Reiss. 2005. Quantifying the effect of ocean environment on the growth rates and age and length at maturity of a California Chinook salmon population. FATE NOAA.
- Wells B.K.**, C. Grimes, and J Waldvogel. 2005. Effects of oceanic conditions on growth of Chinook salmon revealed by scale increments. American Fisheries Society Annual National Meeting, Anchorage, AK.
- Invited: Wells, B.K.**, B Rieman, R. Barnett-Johnson, M. deVries, C. Donohoe, S. Thorrold, and C. Zimmerman. 2005. The application of otolith microchemical techniques to address fish ecology questions in freshwaters. American Society of Limnology and Oceanography, Annual Meeting, Salt Lake City, UT
- Wells B.K.** and C Grimes. 2004. Synchrony between the growth of Pacific salmon and the environment. American Fisheries Society Annual National Meeting.
- Wells B.K.**, C. Grimes, and J Waldvogel. 2004. The effects of coastal environmental variation on California Chinook salmon (*Oncorhynchus tshawytscha*) as revealed by scale increment analysis. PICES, Honolulu, HI.

Invited: Wells B.K. 2003. Answering population ecology questions with scale chemistry. American Fisheries Society Annual National Meeting, Madison, WI.

Rieman B, D. Horan, **B. Wells.** 2003. Movement patterns and life history diversity in freshwater systems. American Fisheries Society Annual National Meeting, Madison, WI.

PROFESSIONAL APPOINTMENTS

August 2008 – Present

Research Fishery Biologist, National Oceanic and Atmospheric Administration (NOAA), Santa Cruz, ZP-0482-04

My research relates to the effects of environmental variability on ecosystem ecology and recruitment dynamics of fishes (e.g. Wells et al *Marine Ecology Progress Series* 2012 and Woodson et al. *Marine Ecology Progress Series* 2013). Largely, external funding has supported this work (e.g., 2010 OPC/SG, \$720,000 and 2009 NASA, \$920,000).

2006 - 2008

Research Associate supported off grants awarded to me as Principal Investigator, University of California Santa Cruz (UCSC) and NOAA, Santa Cruz

My research was dedicated to deriving biological and ecosystem indices along the California Current system. As the organizing and analytical member of a team of researchers along the California Current, I examined trends in production and abundance of mammals, rockfish, sea birds, salmon, prey species, krill, and squid relative to a varying environment and community structure (Wells *Marine Ecology Progress Series* 2008). I also obtained competitive grants and advised graduate students (e.g. Wells et al 2006 *NSF*).

2003 - 2006.

Joint Postdoctoral Fellow, UCSC and NOAA, Santa Cruz

My research with UCSC and NOAA Fisheries was targeted at modeling the effects of environmental variation on growth of Pacific salmon and the impact on size-related vital rates (e.g. fecundity) and production. This work was accomplished primarily by increment analysis of scales and examination of coded-wire-tagged returning fish from along their entire North Pacific range (Wells et al. *Fisheries Oceanography*, 2006, 2007, and 2008).

2002 - 2003.

National Research Council Research Associate, NOAA Northeast Fisheries Science Center, Cooperative Marine Education and Research Program, University of Massachusetts, Amherst

My research at University of Massachusetts CMER included examining the effect of growth rate, stock, and sex on the maturation schedule of Atlantic salmon. Importantly, there appears to be an increase in the proportion of fish maturing early (after one sea-winter). Such a reduction in age-at-maturity, coupled with a significant positive size-fecundity relationship, reduces the production potential of the populations. Through an examination of otolith microchemistry and circuli patterns, I teased apart some of the factors that contribute to early maturation. See Wells et al. *Marine Ecology Progress Series* 2003.

Other projects on which I worked included the study of cutthroat trout population dispersal and life history (Wells et al. *Transactions of the American Fisheries Society*, 2003) and the description of bluefish vital rates. These studies used laboratory facilities at ODU and analyses were performed in collaboration with graduate and undergraduate researchers. I also continued to develop a new histological method for fecundity estimation that has required collaborative work with scientists along the Atlantic and Gulf Coasts; each sending me samples from their species of interest.

2000 –2002

Fishery Biologist (GS-482-11) - U. S. Fish and Wildlife Service

Research included mining striped bass coast-wide tagging data to determine mortality and dispersal patterns along the Atlantic coast. The fish is considered recovered and the tagging data may serve to monitor fishing mortality rates. My work included the first application of an age-structured tag-recovery model to fish. Specifically, I determined the partial recruitment vector for the Chesapeake Bay stock with the age-structured tagging model (Jiang et al., *North American Journal of Fisheries Management* 2007). I also developed yield-per-recruit and egg-per-recruit models for striped bass to evaluate the potential of over-fishing the stocks. Part of my duties included serving on numerous technical and assessment committees for the Atlantic States Marine Fisheries Management Council (e.g. Atlantic striped bass and weakfish) and participation in the associated preparation of reports.

1991 - 2000

Graduate Research Assistantships – Old Dominion University, funded through Virginia Marine Resources Commission and Virginia Sea Grant.

I headed and collaborated on many research projects that all resulted in published products. Research included the description of age, growth and mortality of black drum (Jones and Wells *Fishery Bulletin* 1996), yield-per-recruit and management of black drum along the Atlantic Coast (Jones and wells *Fishery Bulletin* 1998), and reproduction of black drum (Wells and Jones *Virginia Journal of Science* 2002). In addition, I became acknowledged as having defined the proper use of scale chemistry to determine habitat associations of fish populations both spatially and temporally. This research resulted in three publications (Wells et al. *Transactions of the American Fisheries Society* 2000, and *Canadian Journal of Fisheries and Aquatic Sciences* 2000 & 2003).

1989 –1991

Field and Laboratory Technician – VPI&SU.

HONORS AND AFFILIATIONS

- **NOAA Bronze Medal** for achievements in Integrated Ecosystem Assessment 2012
- Guest editor for special issue of *Environmental Biology of Fishes*
- **SWFSC Team Member of the Year** 2007
- **Best Paper** in Transactions of the American Fisheries Society 2003 (Awarded in 2004).
- National Research Council Postdoctoral Fellowship.

OUTREACH AND COMMITTEE SERVICE

Outreach (since employed by NOAA):

- Communications Committee for the California Current Ecosystem Assessment, 2011-present

- *Exploratorium*, Scientist in Residence, 2010-present
- Worked with CDFG on numerical tag recovery models; lead Dean Marston, 2007-2010
- Presented work demonstrating the utility of the *FSV Bell M Shimada* during open house, 2010
- Presented work to PFMC: B.K. Wells. 2010. Relationship of ocean environmental factors to salmon growth, survival and maturation. PFMC, Foster City, CA.
- Docent training and NOAA laboratory tours for Seymour Center at Long Marine Laboratory, UCSC
- Presentation to UC Merced seminar on salmon and ecosystem dynamics, 2008
- Since employed by NOAA, reviewed more than 30 manuscripts and/or proposals.

Committee service (external and internal)

- Organizing Committee for Salmon Ocean Ecology Meeting, 2010
 - Master's committee member and supervisor for Lindsay Starrett, 2007-2010 UCSC: *Using comparative otolith and seawater microchemistry to determine the role of coastal upwelling in recruitment variability of marine fishes.*
 - Organizing Committee for The International Otolith Conference, 2009
 - Chair of Program Committee for International Otolith Conference, 2009
 - Striped Bass Technical Committee, ASMFC, 2000-2002
 - Striped Bass Tagging Committee, ASMFC, 2000-2002
 - Striped Bass Stock Assessment Committee, ASMFC, 2000-2002
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