

CURRICULUM VITAE

Jenifer K. McIntyre

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Education

Ph.D.	Aquatic and Fishery Sciences, University of Washington. Seattle, WA	2010
M.Sc.	Aquatic and Fishery Sciences, University of Washington. Seattle, WA	2004
B.Sc.	Environmental Sciences, Queen's University, Kingston, ON, Canada	1997

Research Experience

Postdoctoral Researcher. Washington State University, Puyallup, WA 2011-now
Lead on collaborative research projects between NOAA-Fisheries, US FWS, WSU Puyallup Research and Extension Center on the biological effectiveness of green stormwater infrastructure (GSI) for pollution reduction. Developing biological tools that identify relevant, acute impacts of stormwater runoff on fish and aquatic invertebrates. Applying tools to the study of untreated runoff and runoff treated by GSI.

Graduate Studies, Ph.D. University of Washington, Seattle, WA 2005-2010
Dissertation title: Linking sublethal copper neurotoxicity to population survival in coho salmon (*Oncorhynchus kistuch*). Included electrophysiology experiments of water quality impacts on olfaction, behavioral tests of copper impacts on predator-prey interactions, and developing individual-based and matrix population models to integrate sublethal copper effects across multiple scales of biological complexity.

Study Coordinator. NOAA-Fisheries. Seattle, WA 2004
Coordinated inter-agency study of the phenomenon of pre-spawn mortality of coho salmon in urban streams. Involved quality control of tissue samples and data management in addition to coordinating crews and leading daily spawning surveys in two urban streams in the Puget Sound basin.

Graduate Studies, M.S. University of Washington, Seattle, WA 2001-2004
Thesis title: Bioaccumulation of mercury and organochlorines in the food web of Lake Washington. Coordinated and collected tissue samples across the food web. Designed, built, and deployed sampling devices including aquatic invertebrate emergence traps. Developed models for bioaccumulation of methylmercury and organochlorines in the food web of Lake Washington. Undertook a stable isotope study of food web dynamics in Lake Washington. Worked with state health officials to issue an interim fish consumption advisory for key species in Lake Washington.

Research Technician. University of Washington, Seattle, WA 2000-2001
Managed the laboratory of Dr. David Beauchamp at the School of Aquatic and Fishery Sciences. Conducted bioenergetics research on fish including parameterization for the Wisconsin Bioenergetics Model, diet analysis, and calorimetric assays of relevant organisms. Also assisted graduate students with field research.

- Research Assistant. Daley Design. Bainbridge Island, WA 2000
Assisted fisheries restoration consultant compile information for biological assessments, involved literature research and consultations with Washington State DFW and DOE.
- Fisheries Technician. USFS, Department of Fisheries. Hayfork, CA 1999
As part of the Student Conservation Association (SCA), conducted stream condition inventories on multiple streams in watershed including assessment of in-stream fish habitat improvement structures, snorkeling surveys for juvenile fishes and adult salmonids.
- Corpsmember. Earthcorps Americorps position. Seattle, WA. 1998
Designed and constructed an amphibian pond with Seattle Parks and Thornton Creek Alliance, designed and implemented a riparian restoration project on Miller Creek, worked on other environmental restoration projects such as city and state park improvement, logging road decommission, monitoring and stewardship of restored sites.
- Ecology Intern. Native American Seed Co. Junction, TX 1998
Studied prairie ecology, prairie restoration, horticulture of rare native plants, assisted with daily operations and controlled burns.
- Honours Thesis. Queen's University. Kingston, ON 1996-1997
Studied the toxicity of a pulp mill waste on rainbow trout. Determined acute toxicity level, isolated and identified toxic fractions in the liquor by fractionation and tested for induction of hepatic mixed-function oxidase enzymes.
- Environmental Consultant. Queen's University. Kingston, ON 1996
Researched and wrote a report for Morris Chemicals on the use and effects of a pulp mill waste dust suppressant, which involved extensive literature research, investigative interviews, and survey questionnaires.
- Multimedia Author. TRICAN Multimedia Services. Ottawa, ON 1996, 2001
Researched information and formulated questions for an interactive computer-based study guide to accompany the Psychology 100 course at Carleton University in Ottawa, Ontario.
- Student Researcher. Queen's University Field Station. Chaffey's Locks, ON 1995
Designed and conducted a field study to test homing ability of bluegill sunfish in Lake Opinicon.
- Laboratory Assistant. Carleton University. Ottawa, ON 1993, 1994
Monitored EEG and behaviour of experimental animals undergoing electrical stimulation of cortical structures, performed histological work on post-experiment cortical tissues, assisted in small animal surgery.

Grants

Postdoctoral Research

WA Department of Ecology Regional Stormwater Management Program 2016-2017
Project Manager: US Dept of Interior Fish and Wildlife Service
Project Title: Field test of plants and fungi on bioretention performance
Grant Amount = \$343,400

WA State Toxics Control Account 2015-2017
Project Title: Toxics sources in stormwater
Grant Amount = \$864,000

WA Department of Ecology, Green Chemistry Initiative 2015
Interagency Agreement No. C1600053
Project Title: Comparative toxicity of alternative bumper materials
Grant Amount = \$2,520

US Environmental Protection Agency Region 10 2014-2016
Project Manager: US Dept of Interior Fish and Wildlife Service
Cooperative Agreement No. F14AC00076
Project Title: Biological effectiveness of green stormwater infrastructure
Grant Amount = \$223,221

Washington Sea Grant 2014-2016
UW Award No. 758014
Project Title: The biological effectiveness of bioretention for stormwater pollution control
Grant Amount = \$172,340

US Environmental Protection Agency Region 10 2011-2013
Project Manager: US Dept of Interior Fish and Wildlife Service
Cooperative Agreement No. 13410-B-J002
Project Title: The biological effectiveness of emerging technologies for low impact development and pollution source control
Grant Amount = \$354,500

Ph.D. Research

S.T.A.R. Graduate Fellowship 2005-2008
U.S. Environmental Protection Agency, EPA Grant #F5D40859.
Project Title: Sublethal Impacts of Copper on Olfaction and Olfactory-Dependent Behaviors in Coho Salmon.
Project Amount = \$105,081

M.S. Research

King County Department of Natural Resources 2002-2004
Project Title: Lake Washington Basin Organochlorine Contaminant Modeling *within* Implications of Alternative Energy Pathways and Environmental Conditions on Ecosystem Dynamics and Salmonid Recovery in Lake Washington-Sammamish.
Project Amount = \$90,000

Publications

1. **McIntyre JK**, Edmunds RC, Anulacion BF, Davis JW, Incardona JP, Stark JD, Scholz NL. 2016. Severe coal tar sealcoat runoff toxicity to fish and reversal by bioretention filtration. *Environmental Science & Technology* 50(3): 1570-1578.
2. **McIntyre JK**, Edmunds RC, Redig MG, Mudrock EM, Davis JW, Incardona JP, Stark JD, Scholz NL. 2016. Confirmation of stormwater bioretention treatment effectiveness using molecular indicators of cardiovascular toxicity in developing fish. *Environmental Science & Technology* 50(3): 1561-1569.
3. Spromberg J, Baldwin D, **McIntyre J**, Damm S, Anulacion B, Davis J, Scholz N. 2015. Coho salmon spawner mortality in western U.S. urban watersheds: Bioinfiltration prevents lethal stormwater impacts. *Journal of Applied Ecology*. doi: 10.1111/1365-2664.12534
Open Access: <http://onlinelibrary.wiley.com/doi/10.1111/1365-2664.12534/epdf>
4. Scholz NL, **McIntyre JK**. 2015. Chemical Pollution in Closs G, Krkosek M, Olden J (Eds) *Conservation of Freshwater Fishes*. Cambridge University Press ISBN: 9781107616097.
5. **McIntyre JK**, Davis J, Macneale K, Anulacion B, Hinman C, Scholz N, Stark J. 2015. Soil bioretention protects juvenile salmon and their prey from the toxic impacts of urban stormwater runoff. *Chemosphere* 123:213-219.
Open Access: <http://www.sciencedirect.com/science/article/pii/S0045653514014805>
6. **McIntyre JK**, Davis J, Incardona J, Stark J, Anulacion B, Scholz N. 2014. Zebrafish and clean water technology: Assessing soil bioretention as a protective treatment for toxic urban runoff. *Science of the Total Environment* 500:173-178.
Open Access: <http://www.sciencedirect.com/science/article/pii/S0048969714012455>
7. Edmunds, RC, **McIntyre JK**, Luckenbach JA, Baldwin DH, Incardona JP. 2014. Toward enhanced MIQE compliance: reference residual normalization of qPCR gene expression data. *Journal of Biomolecular Techniques* 25(2): 54.
8. **McIntyre JK**, Baldwin DH, Beauchamp DA, Scholz NL. 2012. Low-level copper exposures increase visibility and vulnerability of juvenile coho salmon to cutthroat trout predators. *Ecological Applications* 22(5): 1460-1471.
9. Scholz NL, Myers MS, McCarthy SG, Labenia JS, **McIntyre JK**, Ylitao GM, Rhodes LD, Laetz CA, Stehr CM, French BL, McMillan B, Wilson D, Reed L, Lynch KD, Damm S, Davis JW, Collier TK. 2011. Recurrent die-offs of adult coho salmon returning to spawn in Puget Sound lowland urban streams. *PLoS ONE* 6(12).
Open Access: <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0028013>
10. **McIntyre JK**. 2010. Linking sublethal olfactory neurotoxicity to population survival in juvenile coho salmon *Oncorhynchus kisutch*. Ph.D. Dissertation. University of Washington. Seattle, WA. 163pp.
11. Linbo TL, Baldwin DH, **McIntyre JK**, Scholz NL. 2009. Effects of water hardness, alkalinity, and dissolved organic carbon on the toxicity of copper to the lateral line of developing fish. *Environmental Toxicology & Chemistry* 28(7): 1455-1461.
12. Overman NC, Beauchamp DB, Berge HB, Mazur MM, **McIntyre JK**. 2009. Differing forage fish assemblages influence trophic structure in neighboring urban lakes. *Transactions of the American Fisheries Society* 138:741-755.
13. **McIntyre JK**, Baldwin DH, Meador JP, Scholz NL. 2008. Influence of water hardness, alkalinity, pH, and DOC on the olfactory neurotoxicity of copper to juvenile salmon. *Environmental Science & Technology* 42:1352-1358.
14. **McIntyre JK**, Beauchamp DA. 2007. Age and trophic position dominate bioaccumulation of mercury and organochlorines in the food web of Lake Washington. *Science of the Total Environment* 372:571-584

15. **McIntyre JK**, Beauchamp DA, Mazur MM, Overman NC. 2006. Ontogenetic trophic interactions and benthic-pelagic coupling in Lake Washington: evidence from stable isotopes and diet analysis. *Transactions of the American Fisheries Society* 135(5): 1312-1328.
16. **McIntyre JK**. 2004. Mercury and organochlorines in the food web of Lake Washington. M.S. thesis. University of Washington, Seattle, WA. 215 pp.
17. Smith B, Brown K, Cabarrus J, Curran C, Gown JB, **McIntyre J**, Moreland E, Wong VL. 2004. Toxicity of four surfactants to juvenile rainbow trout: implications for over-water use. *Bulletin of Environmental Contamination and Toxicology* 72(3): 647-654.
18. **McIntyre JK**. 1997. A pulping liquor-based dust suppressant and its fractions causing induction of a fish mixed function oxygenase. Honors thesis, Queen's University, Kingston, Ontario.

Select Media Coverage of Research

- The Seattle Times, Print and online, Oct 8, 2015
<http://www.seattletimes.com/seattle-news/environment/whats-killing-coho-study-points-to-urban-road-runoff/>
- Civil Engineering, academic journal, Print, March 2015, Vol 85(3): 31
Bioretention systems protect sensitive aquatic species from runoff, studies show
- KUOW radio - The Record, Radio and online, Feb 12, 2015
<http://kuow.org/post/chemical-cocktail-thats-killing-salmon>
- FishSense magazine, Print and online, Jan 26, 2015
<http://magazine.fishsens.com/highway-runoff-lethal-young-coho-salmon-filters-help.htm>
- New York Times, Science section, Print and online, Jan 26, 2015
http://www.nytimes.com/2015/01/27/science/cleaning-up-water-by-running-it-through-dirt.html?_r=0
- KPLU radio, Radio and online, Jan 21, 2015
<http://www.kplu.org/post/new-study-suggests-rain-gardens-can-save-salmon>
- WSU News, Online, Jan 21, 2015
<https://news.wsu.edu/2015/01/21/simple-soil-mixture-reverses-toxic-stormwater-effects/#.VfbUznvOA28>
- KING5, Television and online, Jan 9, 2015
<http://www.king5.com/videos/news/local/2015/01/09/runoff-gardens-save-fish-and-dollars/21531993/>
- Tulalip News, Online, Dec 11, 2014
<http://www.tulalipnews.com/wp/2014/12/11/coho-salmon-eggs-put-to-the-stormwater-test/>
- KIRO radio, Radio and online, Nov 18, 2014
<http://mynorthwest.com/11/2646568/Fish-in-a-barrel-experiment-reveals-deadly-threat-to-salmon>
- Associated Press, Print, television, and online, Nov 16, 2014
Published in >600 venues including The Washington Post and The Seattle Times
<http://www.seattletimes.com/seattle-news/filtering-rain-runoff-reduces-its-threat-to-salmon-study-suggests/>
- Kitsap Sun, Print and online, Jul 16, 2014
http://www.kitsapsun.com/news/local-news/environment/stormwater-solutions-key-in-fight-for-puget-sound_98793976
- Al-Jazeera America, Television and online, Sep 27, 2013
https://archive.org/details/ALJAZAM_20131007_150000_News#start/1560/end/1620
- WSU News, Online, Sep 16, 2013

<https://news.wsu.edu/2013/09/16/creating-cleaner-water-source-vital-to-aquatic-life-people/#.VfbVDnvOA28>

- PBS News Hour, Public television, Mar 14, 2013
http://www.pbs.org/newshour/bb/environment-jan-june13-pledge_03-14/
- Science News for Students, Dec 13, 2012
<https://student.societyforscience.org/article/when-nose-no-longer-knows>
- KING5, Television and online, Nov 8, 2012
<http://www.king5.com/story/tech/science/environment/2014/08/03/13187510/>
- Fishermen's News, Print and online, Jul 18, 2012
<http://fnonlinenews.blogspot.com/2012/07/copper-makes-salmon-vulnerable-to.html>
- National Geographic, Online, Jul 11, 2012
<http://voices.nationalgeographic.com/2012/07/11/copper-mining-coho-salmon-predation/>
- Kitsap Sun, Print and online, Jul 11, 2012
<http://www.kitsapsun.com/news/local-news/environment/copper-can-make-salmon-vulnerable-to-predators>
- WSU News, Online, Jul 10, 2012
<https://news.wsu.edu/2012/07/10/copper-exposed-salmon-prone-to-predators/#.VfbVUHvOA28>
- Washington State Magazine, Print and online, Summer 2012
<http://wsm.wsu.edu/s/index.php?id=953>

Awards

- Salish Sea Science Prize - for research and advocacy on copper toxicity resulting in laws that will improve the Salish Sea marine ecosystem
By Sea Doc Society, Vancouver, BC, Apr 2016
- Nominated for Seattle Aquarium Conservation Research Award
By Puget Soundkeepers Alliance, Seattle, WA, Jul 2015
- American Water Resources Association Annual Conference
Best Student Presentation, Seattle, WA, Nov 2009
- Puget Sound Georgia Basin Research Conference
Best Student Oral Presentation, Seattle, WA, Feb 2009
- Annual Meeting of Pacific Northwest Chapter of Society of Environmental Toxicology and Chemistry (SETAC)
Second Place Ph.D. Oral Presentation, Port Townsend, WA, Apr 2009
Best Ph.D. Oral Presentation, Corvallis, OR, Mar 2008
Best pre-doctorate Poster, Port Townsend, WA, Apr 2006
Best Student Oral Presentation, Port Townsend, WA, Apr 2004
Best Student Oral Presentation, Port Townsend, WA, May 2003
Best Student Poster Award, Portland, OR, May 2002
- School of Aquatic and Fishery Sciences Graduate Student Symposium, University of Washington, Seattle, WA,
Best Ph.D. Oral Presentation, Jan 2008
Best Ph.D. Oral Presentation, Feb 2006
Best Student Poster, Nov 2002
Best M.S. Oral Presentation, Nov 2001
- 7th International Congress on the Biology of Fish, Olfactory Session, St. John's, Newfoundland, Canada, July 2006
Best Student Oral Presentation

- Washington Cooperative Fish and Wildlife Research Unit's Annual Cooperators Meeting Research Symposium, Olympia, WA
Best Student Oral Presentation, May 2006
Best Student Oral Presentation, Oct 2002
- H. Mason Keeler Endowment for Excellence. School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA. 2002-2004
- North America SETAC Student Travel Award 2002

Presentations, webinars, and videos (* invited)

*What is the problem with stormwater? Feb 2016

Film produced with The Nature Conservancy for use in advocacy and philanthropy campaigns

*Congressional Caucus on Stormwater Impacts to Salmon

Presentation to US Representatives Kilmer and Heck, WSU Puyallup, WA Nov 10, 2015

*Green Gardening Workshop, South Seattle Community College, Seattle, WA Oct 21, 2015

<https://www.youtube.com/watch?v=qpoQTiiXcoc&list=PLO5EstoEwik1hloyLv0T8gVqDpuikN39W&index=4>

*Mitigating effects of stormwater runoff on salmonids

Cedar River Salmon Journey volunteer training, Seattle Aquarium, Sep 17, 2015

*State of science of stormwater pollution and bioretention effectiveness

With Cedar Grove composting, for the Governor's Natural Resources advisor (Rob Duff) and WA DOE personnel, WA DOE Headquarters, Lacey, WA, Aug 28, 2015

*Featured in a documentary on green stormwater infrastructure

American Planning Association. July 28, 2015. *Not yet available online.*

*Solutions to stormwater pollution.

WRIA 8: Salmon Recovery Council meeting, WA Dept Ecology NW Regional Office, Bellevue, WA, Jul 16, 2015

*Where municipal stormwater hits the road and the salmon.

Webinar. Washington Stormwater Center, Lunchtime Municipal Webinar Series. July 16, 2015
<http://www.wastormwatercenter.org/lunchtime-muni-webinar-series>

*Selected by EPA as the U.S. representative

Town Hall forum for the Annual Meeting of the Commission for Environmental Cooperation
One of 8 international representatives invited to speak - Jul 15, 2015 (at 3:27)

http://www.cec.org/Page.asp?PageID=1209&ContentID=25840&SiteNodeID=1173&BL_ExpandID

*Toxics in stormwater pollution.

Sustainability TALKS series, Liberty High School, Issaquah, WA, May 20, 2015

<http://www.sustainabilityambassadors.org/apps/videos/videos/show/18820331-toxics-in-stormwater-pollution>

*Stormwater runoff – Toxicity and treatment

Keynote address at Northwest Environmental Business Council (NEBC) conference on Managing Stormwater in Washington, Tacoma, WA, Mar 11, 2015

*Stormwater pollution & solutions

International Erosion Control Association (IECA) Annual Conference, Portland, OR Feb 16, 2015

Reduced toxicity in aquatic animals exposed to coal tar runoff treated with soil bioretention filtration
SETAC Annual North American Meeting, Vancouver, BC, Nov 10, 2014

*Stormwater toxicity and green stormwater treatment

South Sound Science Symposium, Shelton, WA, Oct 23, 2014

*Featured in the documentary 'Preventing zinc pollution in stormwater'

Pacific Northwest Pollution Prevention Resource Center. Oct 21, 2013. <https://vimeo.com/99672983>

Can bioretention treatment prevent toxicity to aquatic animals exposed to PAH-enriched stormwater runoff?

The biological effectiveness of bioretention: Preventing toxicity to aquatic animals exposed to highway runoff

Salish Sea Conference, Seattle, WA, May 2, 2014

Does green stormwater infrastructure prevent toxicity in aquatic animals exposed to urban runoff?

- *USGS Seminar Series, Tacoma, WA, Sep 25, 2014
- STORMCON, Portland, OR, Aug 6, 2014
- Joint Aquatic Sciences Meeting, Portland, OR, May 21, 2014
- PNW-SETAC, Tacoma, WA, April 25, 2014

*Solutions to stormwater pollution

- Sound Living, Snohomish Beach Watchers, Everett, WA, Oct 25, 2014
- Skagit Valley Planning Commission, Mt Vernon, WA, Sep 9, 2014
- http://skagit.granicus.com/MediaPlayer.php?view_id=8&clip_id=1869
- APWA Stormwater Managers Committee, Federal Way, WA, May 16, 2014
- Trout Unlimited, Bellevue/Issaquah Chapter, Issaquah, WA, April 9, 2014
- Community Salmon Investigation, Normandy Park, March 20, 2014

*The effect of water chemistry on copper neurotoxicity in fish

Southwest Alaska Salmon Science Symposium, SW Alaska Fish Habitat Partnership, Hyatt Hotel, Anchorage, AK. Dec 4, 2013

*Urban stormwater runoff: Toxicity and Solutions

STORM Symposium. Keynote address. Bellevue City Hall, Bellevue, WA. Nov 14, 2013

*Green stormwater infrastructure: Reducing impacts of toxic runoff on salmon and their habitats

Monster Jam Seminar Series, NOAA Northwest Fisheries Science Center. Seattle, WA. Nov 7, 2013

*Biological effectiveness of green stormwater infrastructure

- Wellspring Conference, Water Partners of Tacoma. University of Washington, Tacoma, WA. Oct 24, 2013
- Low Impact Development Annual Review, WSU Puyallup REC. Aug 6, 7, 2013

*Featured in video: Innovative Stormwater BMP: Oyster shells for copper removal

Washington Stormwater Center, Stormwater Channel, May 16, 2013

https://www.youtube.com/watch?v=NEeNFU80rqM&index=3&list=PLXny_Je3KsDy9dpFs6lSTM8IaOSr0e151

*Ecotoxicology of urban runoff

Stormwater Treatment Engineering Workshop, University of Washington, Tacoma, WA. Apr 5, 2013

*Weathering the storm: Ecotoxicology of urban runoff

- Managing Stormwater in the Northwest, Northwest Environmental Business Council (NEBC). University of Washington, Tacoma, WA. March 7, 2013
- Local Source Control Specialists Training. Washington State Department of Ecology, Puyallup, WA, Nov 7, 2012
- 2nd Annual Sound Living 'Communiversality'. WSU Snohomish Co Extension Beach Watchers. Everett, WA, Oct 20, 2012
- 12th Annual Bainbridge Island Environmental Conference. Bainbridge Is, WA, Sep 23, 2012
- WSU Low Impact Development Research Program Annual Review, Puyallup, WA, Aug 1-2, 2012
- 12th Annual Comprehensive Seminar on Stormwater and Runoff. Law Seminars International. Seattle, WA, Apr 4, 2012
- Our Puget Sound Seminar Series. WSU Beachwatchers. Mukilteo, WA, Jan 4, 2012
- Environmental Science Seminar Series. University of Washington. Tacoma, WA, Oct 10, 2011
- Water Courses – Connecting West Sound. WSU Kitsap Extension. Keyport, WA, Oct 14, 2011

Biological Effectiveness of Green Stormwater Infrastructure: Assessing Sublethal Impacts of Urban Stormwater Runoff to Developing Fish and Invertebrates

Annual Meeting of Pacific Northwest Chapter of Society of Environmental Toxicology and Chemistry (SETAC), Vancouver, BC. Apr. 28, 2012

Linking sublethal copper neurotoxicity to survival in juvenile coho salmon

Salish Sea Conference. Vancouver, BC. Oct 26, 2011.

*Integrating sublethal copper neurotoxicity across scales of biological complexity

Annual Meeting of American Fisheries Society. Seattle, WA, Sep 6, 2011.

*Impacts of copper on salmon behavior and survival

National Sudden Oak Death Water Workshop. Puyallup, WA. Jun 29, 2011.

*Urban stormwater impacts on salmon: Prespawn mortality and copper neurotoxicity

CONNECT 2011. Oregon Conservation Employees Meeting. Warm Springs, OR, Apr 26, 2011.

*Extrapolating loss of alarm behavior to population survival in coho salmon using IBM and population matrix models

Washington Cooperator's Meeting at the WA-BC American Fisheries Society Annual Meeting. Gig Harbor, Mar 24, 2011.

Linking copper neurotoxicity to population survival in coho salmon

- Annual Meeting of the North American Society of Environmental Toxicology and Chemistry (SETAC), Portland, OR, Nov 8, 2010.
- Salish Sea Conference, Vancouver, BC, Canada, Oct 26, 2011.

*Linking copper olfactory neurotoxicity to population survival in coho salmon

Lecture presented to scientists at Seattle Public Utilities. Jan 13, 2010.

Weathering the storm: Copper impacts juvenile coho behavior and survival

- *Annual Conference of the American Water Resources Association, Seattle, WA. Nov 10, 2009.
- *Annual Meeting of the Washington-British Columbia Chapter of the American Fisheries Society, Shelton, WA. Apr 21, 2009.
- Annual Meeting of Pacific Northwest Chapter of Society of Environmental Toxicology and Chemistry (SETAC), Port Townsend, WA. Apr 16-16, 2009.
- Puget Sound Georgia Basin Research Conference. Seattle, WA. Feb 10, 2009.

Weathering the storm: Copper impacts juvenile coho behavior and survival

Annual Meeting of Pacific Northwest Chapter of Society of Environmental Toxicology and Chemistry (SETAC), Corvallis, OR. Mar 28-30, 2008.

*POPs in the food web and copper in the nose: One student's career in ecotoxicology. Washington State Cooperators Seminar Series, Olympia, WA. Feb 13, 2008.

Olfactory-impairment by copper affects juvenile salmon behavior and survival with cutthroat trout predators.

Annual Graduate Student Symposium, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA, Jan 29, 2008.

Putting the 'eco' in Ecotoxicology: Integrating sublethal impacts of copper on salmon in urban streams.

Annual Graduate Student Symposium, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA, Feb 9, 2007.

*Copper neurotoxicity: Influence of water quality in west coast streams.

Annual Meeting of the North American Society of Environmental Toxicology and Chemistry (SETAC), Montreal, Canada. Nov 5-9, 2006.

Influence of water hardness, alkalinity, pH, and DOC on olfactory neurotoxicity of copper in juvenile salmon. Poster.

- U.S. Environmental Protection Agency Graduate Fellowship Conference. Washington D.C. Jul 26-26, 2006.
- Annual Meeting of Pacific Northwest Chapter of Society of Environmental Toxicology and Chemistry (SETAC), Port Townsend, WA, Apr 14-16, 2006.
- Forum on Toxics in Puget Sound, Seattle, WA, Apr 5, 2006.

Acute toxicity of copper to juvenile salmon: Contrasting effects on osmoregulation and olfaction

7th International Congress on Fish Biology. Physiology Section of the American Fisheries Society. St. John's, Newfoundland, Canada. Jul 18-21, 2006.

*Influence of water hardness, alkalinity, pH, and DOC on olfactory neurotoxicity of copper in juvenile salmon

Annual meeting of the Washington State Cooperators. Olympia, WA. May 16, 2006.

*Weathering the storm: Stormwater impacts on salmon in the Pacific Northwest

- Monthly meeting of Puget Sound Action Team, Olympia, WA, Apr 3, 2006.
- Monthly meeting of ARCS Foundation Board members. Seattle, WA, Dec 12, 2005.

Can water quality ameliorate copper neurotoxicity?

Annual Graduate Student Symposium, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA, Feb 10, 2006.

*Bioaccumulation of mercury and organochlorines in the food web of Lake Washington

- Monthly seminar of King County Department of Natural Resources, Seattle, WA, Nov 23, 2004.
- Annual Meeting of the Society of Environmental Toxicology and Chemistry (SETAC), Portland, OR, Nov 14-18, 2004.

Bioenergetics of seasonal variability in mercury concentrations in Lake Washington fishes.

- Annual Graduate Student Symposium, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA, Nov 14, 2003.
- World Congress and Annual Meeting of the Society of Environmental Toxicology and Chemistry (SETAC), Austin, TX, Nov 9-13, 2003.

Exploring bioaccumulation of persistent contaminants in fish with a bioenergetics model

Annual Meeting of Pacific Northwest Chapter of Society of Environmental Toxicology and Chemistry (SETAC), Port Townsend, WA, Apr 17-19, 2003.

Modeling bioaccumulation of mercury & PCBs in the Lake Washington food web

Annual Conference on Lakes, Reservoirs, and Watersheds, Washington State Lake Protection Association, Chelan, WA, Apr 2-4, 2003.

Simulating bioaccumulation of methylmercury in fishes of Lake Washington using bioenergetics models. Poster.

- Annual Graduate Student Symposium, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA, Nov 7, 2002
- Annual Meeting of Pacific Northwest Chapter of Society of Environmental Toxicology and Chemistry (SETAC), Portland, OR, May 16-18, 2002.
- Annual Meeting of Pacific Northwest Chapter of Society of Environmental Toxicology and Chemistry (SETAC), Portland, OR, May 16-18, 2002.

Modeling contaminant bioaccumulation by fishes in Lake Washington

Washington Cooperative Fish and Wildlife Research Unit's Annual Cooperators Meeting Research Symposium, Olympia, WA, Oct 2, 2002.

Developing models of mercury accumulation in Lake Washington fishes

Annual Graduate Student Symposium, School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA, Nov 8, 2001.

Additional Educator Experience

Student mentoring. Washington State University. Puyallup, WA.

- Currently mentoring four M.S. students:
WSU-Puyallup: Alex Taylor on fungi in long-term real-world effectiveness test of bioretention;
Taylor Haskins on toxicity of roof runoff to developing fish
Evergreen State College: Stephanie Blair on biological effectiveness of permeable pavement
University of Washington: Michelle Chow on stormwater toxicity mechanisms in coho salmon
- July 2015. Mentored two students from Lakeside High School (Seattle, WA) in pilot testing the toxicity of automobile tires to juvenile coho salmon.
- Mar-Apr 2014, 2015. Mentored pairs of students from Sumner High School (Sumner, WA) in developing and conducting a research project focused on the effects of urban stormwater runoff on aquatic biota. Students placed first in both the regional and State Science Fair.
- Jun-Jul 2014. Mentored two Hollings scholars (NOAA scholarship program for B.S. students) in developing and conducting experiments of urban stormwater runoff toxicity to zebrafish embryos.
- Aug 2014-Apr 2015. Mentored a M.S. candidate from Evergreen Community College in the development and implementation of a research project on bioretention effectiveness.

The fowl way: Raising backyard chickens. Public seminar.

- EOS Alliance Sustainability Lecture Series, Seattle, WA. Jul 28, 2009, May 22, 2010, Jul 2011.
- Sustainable West Seattle Annual Sustainability Festival, Seattle, WA. May 3, 2009, Jun 5, 2010.

Science mentor. Bryant Elementary School. Seattle, WA. Volunteer scientist mentor for a group of 4th and 5th graders. Guided the group through the scientific process of a chosen project to final presentation at the annual science fair. Jan-Mar 2008.

Field naturalist. Environmental Science Center. Burien, WA. Taught salmon biology, stream community ecology, and conservation ethics to 4-6th graders in 3-hr field trips to Normandy Park Cove in Burien, WA with this non-profit group. Sep-Dec 2007.

Which one is different, which doesn't belong? Field trip leader for BIOL 180. Designed trip and led multiple groups of first-year biology students on a nature hike on Kitsap peninsula, exploring native/non-native plant ecology, stream restoration, and salmon habitat issues. Jul & Aug 2007.

Modeling bioaccumulation of contaminants. Guest lecturer for FISH 530: Application of Bioenergetics Models to Aquatic Food Webs. University of Washington, SAFS, Seattle, WA. Mar 9, 2007; Mar 11, 2004; Jan 15, 2003.

Mercury in the environment. Guest lecturer for environmental science elective course. Seattle Art Institute, Seattle, WA. November 20, 2002.

Salmon and the Pacific Northwest. Earthcorps, Seattle, WA. September 18, 1998. Lectured on salmonid biology and ecology.

Amphibians, their habitat requirements, and pond construction. Earthcorps, Seattle, WA. August 14, 1998. Lectured on amphibian biology and pond construction.

PNW ecological restoration. Seattle, WA. Demonstrated planting techniques and supervised native planting for groups of volunteers throughout the fall of 1998 and spring of 1999 while representing Earthcorps, and as an SCA group leader.

The mammalian brain. Junction, TX. January 20, 1998. Led a discussion and dissection of a deer brain for the fifth-grade gifted class at Junction Public School.

Wilderness camping and canoe skills. Algonquin Provincial Park. Ontario, Canada. 1997. Led groups of high-risk youth on ten days of wilderness camping and canoeing for a volunteer camp (Camp Outlook), based in Kingston, Ontario. Organized all aspects of trips, taught survival and naturalist skills.

Research statistics. Algonquin College, Ottawa, ON. 1994. Privately taught introductory statistics to a group of continuing education nursing students.

Professional Affiliations

Society of Environmental Toxicology and Chemistry (SETAC). 2001-present

SETAC NA Student Advisory Council 2005-2007

Pacific Northwest Chapter of SETAC. 2002-present

PNW SETAC. Student Board Member. 2005-2007

School of Aquatic and Fishery Sciences, University of Washington. Faculty Committee student member. 2006-2007

Technical Skills

Molecular Biology – RT qPCR, immunofluorescent antibody staining

Aquatic Toxicology – including developmental toxicity testing using zebrafish, LC50 testing, sublethal toxicity testing by EROD activity analysis, fluorometer microplate reading, TIE column fractionation, fish behavior testing, broodstock rearing (Daphniids, rainbow trout, zebrafish)

Neurophysiology – including electrophysiology (EOG; electro-olfactograms), electrode implantation, EEG recording, tissue sampling, vibratome slicing, Cresyl violet and TIMM tissue staining, microscope slide preparation

Fisheries/Naturalist – semi-micro oxygen bomb calorimetry, bioenergetics modeling, stomach content analysis, fish ageing, backpack electroshocking, multiple netting techniques, snorkling surveys, identification of exotic and native northwest plants, freshwater fishes, invertebrates, and algae, Department of Interior MOCC certified

Limnology – water quality sampling including Secchi disk, Van Dorn sampler, Eckman dredge, Schindler trap, plankton net, Winkler and oxygen titrations

Stream Survey - including stream condition inventory, channel-typing, riparian wildlife and vegetation survey, salmonid and lamprey redd identification, in-stream FHIP evaluation, map and compass navigation

Environmental Restoration – including erosion control & bank stabilization techniques, swale and pond construction, native planting, invasive plant removal, site stewardship and restoration monitoring, site design and mapping, trail maintenance and construction

Modeling – Fish Bioenergetics, MATLAB

Languages – fluent in English, Spanish, French

Other Interests – mountain biking, rock climbing, urban farming, sustainability