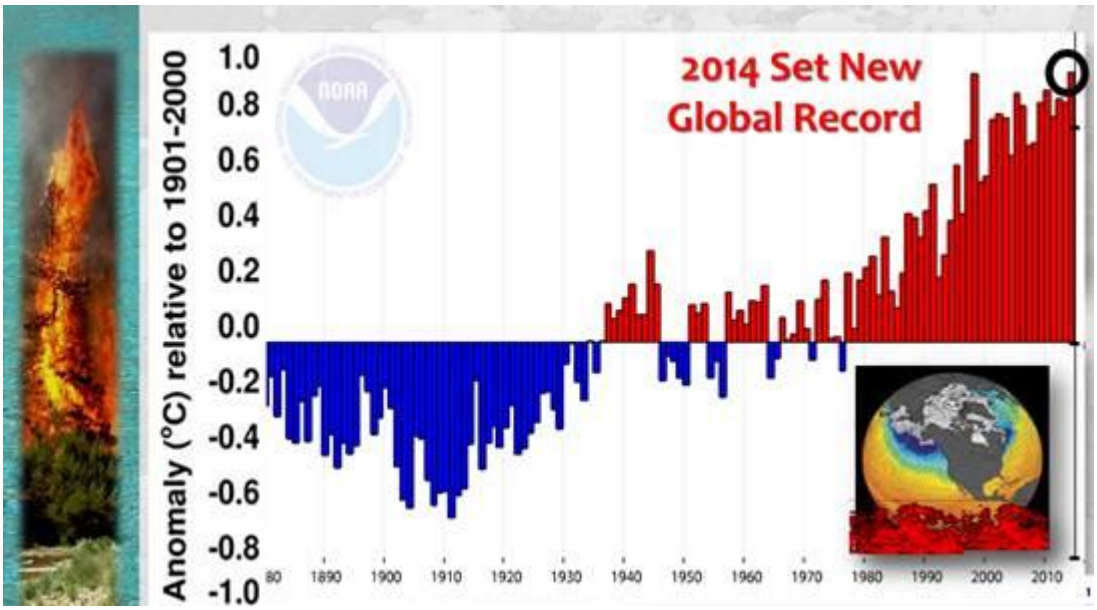
Climate-Aquatics Bonus Blog #61: Significant new, non-American stream temperature-climate change studies

Thar' she blows!



Hi Everyone,
Though the blog be sporadic these days, climate change continues its relentless march onward and 2014 just set a new global air temperature record. When dealing with global phenomena, here is the same as everywhere so thought it apropos to highlight a spate of new, non-American, highly relevant studies & review articles dealing with measuring/modeling/describing stream temperature responses and/or patterns associated with climate & climate change…and how we might adapt.

Getting those stream temperature sensor networks established, coordinated among agencies, & maintained long-term will be key to understanding what's happening in the Earth's lotic systems and predicting their futures this century (Blog #3, Blog #4, Blog #60).

More blogs soon as a few mega-projects wind down…

Best regards,
Dan

Long-term stream temperature trend description…

Orr HG, Simpson GL, des Clers S, et al. (2014) Detecting changing river temperatures in England and Wales. Hydrological Processes. doi: 10.1002/hyp.10181. http://onlinelibrary.wiley.com/doi/10.1002/hyp.10181/abstract

Rice KC, Jastram JD (2015) Rising air and stream-water temperatures in Chesapeake Bay region, USA. Climatic Change 128:127-138. (technical note: Chesapeake Bay in US of A). http://link.springer.com/article/10.1007/s10584-014-1295-9

Reviews & adaptation measures…

Hannah D, Garner G (2015) River water temperature in the United Kingdom: Changes over the 20th century and possible changes over the 21st century. Progress in Physical Geography 39: 68–92. http://ppg.sagepub.com/content/39/1/68.full.pdf+html

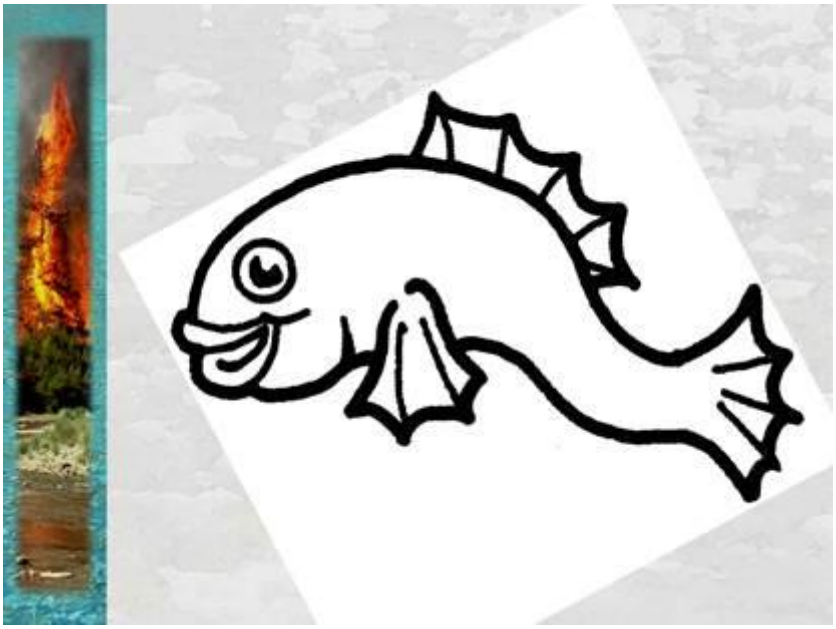
Orr HG, Johnson M, Wilby RL et al. (2015) What else do managers need to know about warming rivers? A United Kingdom perspective. Wiley Interdisciplinary Reviews – Water 2 doi: 10.1002/wat2.1062 http://wires.wiley.com/WileyCDA/WiresArticle/wisId-WAT21062.html

Identifying & protecting thermal refugia on larger streams & rivers…

Dugdale SJ, et al. (2015) Spatial distribution of thermal refuges analysed in relation to riverscape hydromorphology using airborne thermal infrared imagery. Remote Sensing of Environment doi.org/10.1016/j.rse.2014.12.021 http://www.sciencedirect.com/science/article/pii/S0034425714005136

Dugdale SJ, Bergeron NE, St-Hilaire A (2013) Temporal variability of thermal refuges and water temperature patterns in an Atlantic salmon river. Remote Sensing of Environment 136:358–373. http://www.sciencedirect.com/science/article/pii/S0034425713001727

Kurylyk BL, MacQuarrie TB, Linnansaari T, et al. (2014) Preserving, augmenting, and creating cold-water thermal refugia in rivers: concepts derived from research on the Miramichi River, New Brunswick (Canada). Ecohydrology doi: 10.1002/eco.1566 http://onlinelibrary.wiley.com/doi/10.1002/eco.1566/abstract?deniedAccessCustomisedMessage=&userIsAuthenticated=false



Welcome to the Climate-Aquatics Blog. For those new to the blog, previous posts with embedded graphics can be seen by clicking on the hyperlinks at the bottom or by navigating to the blog archive webpage here: (http://www.fs.fed.us/rm/boise/AWAE/projects/stream_temp/stream_temperature_climate_aquatics_blog.html). The intent of the Climate-Aquatics Blog is to provide a means for the 8,564 (& growing) field biologists, hydrologists, anglers, students, managers, and researchers currently on this mailing list across North America, South America, Europe, and Asia to more broadly and rapidly discuss topical issues associated with aquatic ecosystems and climate change. Messages periodically posted to the blog highlight new peer-reviewed research and science tools that may be useful in addressing this global phenomenon. Admittedly, many of the ideas for postings have their roots in studies my colleagues & I have been conducting in the Rocky Mountain region, but attempts will be made to present topics & tools in ways that highlight their broader, global relevance. I acknowledge that the studies, tools, and techniques highlighted in these missives are by no means the only, or perhaps even the best, science products in existence on particular topics, so the hope is that this discussion group engages others doing, or interested in, similar work and that healthy debates & information exchanges occur to facilitate the rapid dissemination of knowledge among those concerned about climate change and its effects on aquatic ecosystems.

If you know others interested in climate change and aquatic ecosystems, please forward this message to them. If you do not want to be contacted again in the future, please reply to that effect and you will be de-blogged.

Previous Blogs…

Climate-Aquatics Overviews

Blog #1: Climate-aquatics workshop science presentations available online
Blog #2: A new climate-aquatics synthesis report

Climate-Aquatics Thermal Module

Blog #3: Underwater epoxy technique for full-year stream temperature monitoring
Blog #4: A GoogleMap tool for interagency coordination of regional stream temperature monitoring
Blog #5: Massive air & stream sensor networks for ecologically relevant climate downscaling
Blog #6: Thoughts on monitoring air temperatures in complex, forested terrain
Blog #7: Downscaling of climate change effects on river network temperatures using inter-agency temperature databases with new spatial statistical stream network models
Blog #8: Thoughts on monitoring designs for temperature sensor networks across river and stream basins
Blog #9: Assessing climate sensitivity of aquatic habitats by direct measurement of stream & air temperatures
Blog #10: Long-term monitoring shows climate change effects on river & stream temperatures
Blog #11: Long-term monitoring shows climate change effects on lake temperatures
Blog #12: Climate trends & climate cycles & weather weirdness
Blog #13: Tools for visualizing local historical climate trends
Blog #14: Leveraging short-term stream temperature records to describe long-term trends
Blog #15: Wildfire & riparian vegetation change as the wildcards in climate warming of streams
Blog #23: New studies describe historic & future rates of warming in Northwest US streams
Blog #24: NoRRTN: An inexpensive regional river temperature monitoring network
Blog #25: NorWeST: A massive regional stream temperature database
Blog #26: Mapping thermal heterogeneity & climate in riverine environments
Blog #40: Crowd-sourcing a BIG DATA regional stream temperature model

Climate-Aquatics Hydrology Module

Blog #16: Shrinking snowpacks across the western US associated with climate change
Blog #17: Advances in stream flow runoff and changing flood risks across the western US
Blog #18: Climate change & observed trends toward lower summer flows in the northwest US
Blog #19: Groundwater mediation of stream flow responses to climate change
Blog #20: GIS tools for mapping flow responses of western U.S. streams to climate change
Blog #21: More discharge data to address more hydroclimate questions
Blog #22: Climate change effects on sediment delivery to stream channels

Climate-Aquatics Cool Stuff Module
Blog #27: Part 1, Spatial statistical models for stream networks: context & conceptual foundations
Blog #28: Part 2, Spatial statistical models for stream networks: applications and inference
Blog #29: Part 3, Spatial statistical models for stream networks: freeware tools for model implementation
Blog #30: Recording and mapping Earth's stream biodiversity from genetic samples of critters
Blog #53: DNA Barcoding & Fish Biodiversity Mapping

Climate-Aquatics Biology Module
Blog #31: Global trends in species shifts caused by climate change
Blog #32: Empirical evidence of fish phenology shifts related to climate change
Blog #33: Part 1, Fish distribution shifts from climate change: Predicted patterns
Blog #34: Part 2, Fish distribution shifts from climate change: Empirical evidence for range contractions
Blog #35: Part 3, Fish distribution shifts from climate change: Empirical evidence for range expansions
Blog #36: The "velocity" of climate change in rivers & streams
Blog #37: Part 1, Monitoring to detect climate effects on fish distributions: Sampling design and length of time
Blog #38: Part 2, Monitoring to detect climate effects on fish distributions: Resurveys of historical stream transects
Blog #39: Part 3, Monitoring to detect climate effects on fish distributions: BIG DATA regional resurveys
Blog #41: Part 1, Mechanisms of change in fish populations: Patterns in common trend monitoring data
Blog #42: BREAKING ALERT! New study confirms broad-scale fish distribution shifts associated with climate change
Blog #56: New studies provide additional evidence for climate-induced fish distribution shifts
Blog #43: Part 2, Mechanisms of change in fish populations: Floods and streambed scour during incubation & emergence
Blog #44: Part 3, Mechanisms of change in fish populations: Lower summer flows & drought effects on growth & survival
Blog #45: Part 4, Mechanisms of change in fish populations: Temperature effects on growth & survival
Blog #46: Part 5, Mechanisms of change in fish populations: Exceedance of thermal thresholds
Blog #47: Part 6, Mechanisms of change in fish populations: Interacting effects of flow and temperature
Blog #48: Part 7, Mechanisms of change in fish populations: Changing food resources
Blog #49: Part 8, Mechanisms of change in fish populations: Non-native species invasions
Blog #50: Part 9, Mechanisms of change in fish populations: Evolutionary responses
Blog #51: Part 10, Mechanisms of change in fish populations: Extinction
Blog #52: Review & Key Knowable Unknowns

Climate-Aquatics Management Module
Blog #54: Part 1, Managing with climate change: Goal setting & decision support tools for climate-smart prioritization
Blog #55: Part 2, Managing with climate change: Streams in channels & fish in streams
Blog #57: Identifying & protecting climate refuge lakes for coldwater fishes

Blog #58: Part 3, Managing with climate change: Maintaining & improving riparian vegetation & stream shade
Blog #59: Part 4, Managing with climate change: Keeping water on the landscape for fish (beaverin' up the bottoms)
Blog #60: Bonus Blog: New report describes data collection protocols for continuous monitoring of temperature & flow in wadeable streams

Future topics…
Climate-Aquatics End Game