

CURRICULUM VITAE DAVID BRUCE HERBST

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EDUCATION

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|------|-------|------------------------|--------------------------------------|
| 1976 | B.S. | Zoology | University of California Davis |
| 1981 | M.S. | Zoology | Oregon State University Corvallis |
| 1986 | Ph.D. | Zoology and Entomology | Oregon State University Corvallis |

ACADEMIC POSITIONS

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|-------------|--|
| 1986 - 1990 | Postdoctoral Researcher Department of Ecology and Evolutionary Biology University of California at Irvine; and Sierra Nevada Aquatic Research Laboratory |
| 1990 - 2002 | Assistant Research Biologist II - IV, Sierra Nevada Aquatic Research Laboratory and Marine Science Institute, UC Santa Barbara |
| 2002 - 2014 | Associate Research Biologist, Sierra Nevada Aquatic Research Laboratory and Marine Science Institute, UC Santa Barbara |
| 2014 - | Research Biologist, UCSB & Sierra Nevada Aquatic Research Laboratory |
| 2018 - | Research Biologist, UC Santa Cruz, Institute of Marine Sciences |

Google Scholar: total citations: 2,469 (961 past 5 yr) h-index: 30 i10-index: 50
first author of top 20 papers: 70%

Research Statement

Conduct research on the invertebrate communities of saline lakes, and the streams of California mountains including the effects of water diversions, climate change and drought, monitoring trends in the recovery of streams affected by acid mine drainage and metals toxicity, impacts of introduced species, sediment deposition, and wildfire. Documenting aquatic insect biodiversity combining identifications with DNA barcoding.

RESEARCH TOPICS

Freshwater Ecology – physiology and community ecology of aquatic insects and algae:

- Ecological research on aquatic invertebrates in streams, lakes, and springs of the Sierra Nevada and Great Basin regions for application in monitoring and biological assessment of watershed alterations including hydroclimatic change, water diversion, livestock grazing, acid mine drainage, sediment, non-native species, and restoration.
- Benthic ecology and productivity of saline lake ecosystems: distribution along salinity gradients, population production, comparative community ecology, experimental mesocosm studies of insects and algae, feeding ecology of water birds
- Comparative physiology of osmoregulation and salt tolerance in saline lake invertebrates. Ecophysiology in relation to salinity and developmental, life history, and metabolic costs of salinity adaptation.
- Biogeography of aquatic invertebrates in (1) Great Basin desert lakes and springs, (2) Sierra Nevada mountain streams, (3) central coast California streams and rivers.

Publications

2026

Bycatch in a bottle: what taxa are recoverable from metabarcoding DNA in historical invertebrate collection preservative fluid? Seresinghe, A., D. Herbst, J. Quick-Cleveland, S. Korneyev, B.K. Maples, E.S.H. Lowell, M. Mosser, R.N. Fisher, E. Palkovacs, D. Gluesenkamp, and R.S. Meyer. *Journal of Heredity*, esag001, <https://doi.org/10.1093/jhered/esag001>

2025

Ecological pathways connecting riverine drought to community change across space and time. Leathers, K., D. Herbst, M. Bogan, G. Jeliaskov, and A. Ruhi. *Ecological Monographs* 95:e70035. <https://doi.org/10.1002/ecm.70035>

Global evidence that cold rocky landforms support icy springs in warming mountains. Brighenti, S., C.I. Millar, S. Hotaling, A. Reato, T. Wiegand, M. Hiyashi, L. Carturan, M. Morriss, F. Bearzot, V. Lencioni, A. Scotti, A. Janicke, A. Fisher, S. Larsen, A. Benech, A. Gschwentner, M. Tolotti, M.C. Bruno, D.S. Finn, M. Freppaz, D. Herbst, L. Tronstad, F. Comiti, and N.Colombo. *Environmental Research Letters* 20 (2025) 104001, <https://doi.org/10.1088/1748-9326/adf07f>

Experimentally induced low flows indicate climate change may shrink trophic niches of mountain-stream predators. Cowell, A., K. Leathers, G. de Mendoza, G. Dwyer, D.Herbst, and A. Ruhi. *Freshwater Science* 44. <https://doi.org/10.1086/737386>

2024

Climate change is poised to alter mountain stream ecosystem processes via organismal phenological shifts. Leathers, K., D. Herbst, G. de Mendoza, G. Doerschlag, and A. Ruhi. *Proceedings of the National Academy of Sciences* 121. doi.org/10.1073/pnas.2310513121

2023

Developmental and reproductive costs of osmoregulation to an insect that is a key food resource to shorebirds at salt lakes threatened by rising salinity and desiccation. D.B. Herbst. *Frontiers in Ecology and Evolution* DOI 10.3389/fevo.2023.1136966

2022

Dynamic, downstream-propagating thermal vulnerability in a mountain stream network: Implications for biodiversity in the face of climate change. Leathers, K., D Herbst, M. Safeeq, and A. Ruhi. *Limnology and Oceanography* <https://doi.org/10.1002/lno.12264>

Rethinking biodiversity patterns and processes in stream ecosystems. Green, M.D., K.E. Anderson, D.B. Herbst, M.J. Spasojevic. *Ecological Monographs* doi.org/10.1002/ecm.1520

Effects of experimental multi-season drought on abundance, richness, and beta diversity patterns in perennially flowing stream insect communities. Saffarinia, P., K.E. Anderson, and D.B. Herbst. *Hydrobiologia* 849:879-897.

2021

Wildfire and drying legacies and stream invertebrate assemblages. Cooper, S.D., K. Klose, D.B. Herbst, J. White, S.M. Drenner and E.J. Eliason. *Freshwater Science* 40:659-680.

Long-term monitoring reveals convergent patterns of recovery from mining contamination across 4 western US watersheds. Clements, W.H., D.B. Herbst, M.I. Hornberger, C.A. Mebane, and T.M. Short. *Freshwater Science* 40:407-426.

Rock glaciers and related cold rocky landforms: Overlooked climate refugia for mountain biodiversity. Brighenti, S., S. Hotaling, D.S. Finn, A.G. Fountain, M. Hayashi, D. Herbst, J.E. Saros, L.M. Tronstad, and C.I. Millar. *Global Change Biology* 27:1504-1517.

2020

Characterizing benthic macroinvertebrate and algal Biological Condition Gradient models for California wadeable streams, USA. Paul, M.J., B. Jessup, L.R. Brown, J.L. Carter, M. Cantonati, D.F. Charles, J. Gerritsen, D.B. Herbst, R. Stancheva, J. Howard, B. Isham, R. Lowe, R. Mazon, P.K. Mendez, P. Ode, A. O'Dowd, J. Olson, Y. Pan, A.C. Rehn, S. Spaulding, M. Sutula, and S. Theroux. *Ecological Indicators* 117: 106618

In-stream habitat and macroinvertebrate responses to riparian corridor length in rangeland streams. B. Stanford, K.D. Holl, D.B. Herbst and E. Zavaleta. *Restoration Ecology* 28:173-184.

2019

Drought ecohydrology alters the structure and function of benthic invertebrate communities in mountain streams. D.B. Herbst, S.D. Cooper, R.B. Medhurst, S. Wiseman, and C. Hunsaker. *Freshwater Biology* 64:886-902.

2018

A comparison of the taxonomic and trait structure of macroinvertebrates between the riffles and pools of montane headwater streams. D.B. Herbst, S.D. Cooper, R.B. Medhurst, S. Wiseman, and C. Hunsaker. *Hydrobiologia* 820:115-133.

Long-term monitoring of recovery of streams from acid mine drainage and evaluation of toxic metals threshold ranges for macroinvertebrate community re-assembly. D.B. Herbst, R.B. Medhurst, and N.J.P. Black. *Environmental Toxicology and Chemistry* 37:2575-2592.

California Climate Assessment Report, 4th edition: Central Coast Report: Rivers, Streams and Riparian Areas, pp 47-50. 2018. Herbst, D.B. California Natural Resources Agency publication. <http://www.climateassessment.ca.gov/regions/docs/20180827-CentralCoast.pdf>

2016

Evaluating the adequacy of a reference-site pool for ecological assessments in environmentally complex regions. P.R. Ode, A.C. Rehn, R.D. Mazon, K.C. Schiff, E.D. Stein, J.T. May, L.R. Brown, D.B. Herbst, D. Gillett, K. Lunde, and C.P. Hawkins. *Freshwater Science* 35:237-248.

Bioassessment in complex environments: designing an index for consistent meaning in different settings. R.D. Mazon, A.C. Rehn, P.R. Ode, M. Engeln, K.C. Schiff, E.D. Stein, D.J. Gillett, D.B. Herbst, and C.P. Hawkins. *Freshwater Science* 35:249-271.

2014

Anthropogenic land-use signals propagate through stream food webs in a California, USA, watershed. Moore, J.W. T.D. Lambert, W.N. Heady, S.E. Honig, A.K. Osterback, C.C. Phillis, A.L. Quiros, N.A. Retford, D.B. Herbst. *Limnologia* 46:124-130

Walker Lake – terminal lake at the brink. Herbst, D.B., R.B. Medhurst, I.D. Bell, G. Chisholm. *LakeLine* 34(4):11-14

Mono Lake – streams taken and given back, but still waiting. Herbst, D.B. *LakeLine* 34(4):21-24

Owens Lake – from dustbowl to mosaic of salt water habitats. Herbst, D.B. and M. Prather. *LakeLine* 34(4):34-38

2013

Defining salinity limits on the survival and growth of benthic insects as conservation management targets for saline Walker Lake, Nevada, USA. Herbst, D.B., S.W. Roberts and R.B. Medhurst. *Journal of Insect Conservation* 17:877-883.

Substratum associations and depth distribution of benthic invertebrates in saline Walker Lake, Nevada. Herbst, D.B., R.B. Medhurst, S.W. Roberts and R. Jellison. *Hydrobiologia* 700:61-72

2012

Effects of livestock exclusion on in-stream habitat and benthic invertebrate assemblages in montane streams. Herbst, D.B., M.T. Bogan, S.K. Roll and H.D. Safford. *Freshwater Biology* 57:204-217

Short-term changes in-stream macroinvertebrate communities following a severe fire in the Lake Tahoe basin, California. Oliver, A.A., M.T. Bogan, D.B. Herbst, and R.A. Dahlgren. *Hydrobiologia* 694:117-130.

Stream community and ecosystem responses to the boom and bust of an invading snail. Moore, J.W., D.B. Herbst, W.M. Heady and S.M. Carlson. *Biological Invasions* 14:2435-2446.

2010

Before and after the deluge: rain-on-snow flooding effects on aquatic invertebrate communities of small streams in the Sierra Nevada, California. Herbst, D.B. and S.D. Cooper. *Journal of the North American Benthological Society* 29:1354-1366.

2009

Responses of aquatic macroinvertebrates to stream channel reconstruction in a degraded rangeland creek in the Sierra Nevada Herbst, D.B and J.M. Kane. *Ecological Restoration* 27:76-88.

2008

Low specific conductivity limits growth and survival of the New Zealand Mud Snail from the Upper Owens River, California. Herbst, D.B., M.T. Bogan and R.A. Lusardi. *Western North American Naturalist* 68:324-333.

The influence of introduced trout on native aquatic invertebrate communities in a paired watershed study of streams in Yosemite National Park. Herbst, D.B., E.L. Silldorff and S.D. Cooper. *Freshwater Biology* 54:1324-1342.

2006

Comparisons of the performance of different bioassessment methods: similar evaluations of biotic integrity from separate programs and procedures. Herbst, D.B and E.L. Silldorff. *Journal of the North American Benthological Society* 25:513-530.

Salinity controls on trophic interactions among invertebrates and algae of solar evaporations ponds in the Mojave desert in relation to shorebird foraging and selenium risk. Herbst, D.B. *Wetlands* 26:475-485.

2005

Using aquatic invertebrate biological assessments to support water resource decisions in the Sierra Nevada: establishing reference conditions for streams and measuring ecological responses to management actions. Herbst, D.B. USDA Forest Service General Technical Report PSW-GTR-193.

2001

Gradients of salinity stress, environmental stability and water chemistry as a templet for defining habitat types and physiological strategies in inland salt waters. Herbst, D.B. *Hydrobiologia* 466:209-219.

The California Streamside Biosurvey. Herbst, D.B., A.Y. Feng, and D.E. Gregorio. State Water Resources Control Board publication, Sacramento. 21 pp.

1999

Biogeography and physiological adaptations of the brine fly genus *Ephydra* (Diptera: Ephydriidae) in saline waters of the Great Basin. Herbst, D.B. Great Basin Naturalist 59:127-135.

1998

Experimental mesocosm studies of salinity effects on the benthic algal community of a saline lake. Herbst, D.B. and D.W. Blinn. Journal of Phycology 34:772-778.

Potential salinity limitations on nitrogen fixation in sediments from Mono Lake, California. Herbst, D.B. International Journal of Salt Lake Research 7:261-274.

1995

Invertebrates in salt lakes of the Bolivian Altiplano. Williams, W.D., T.R. Carrick, I.A.E. Bayly, J. Green & D.B. Herbst. International Journal of Saline Lake Research 4:65-77.

1994

Growth and survival of larvae of *Ephydra hians* Say (Diptera: Ephydriidae) on unialgal diets. Bradley, T.J. and D.B. Herbst. Environmental Entomology 23:276-281.

Growth of the filamentous green alga *Ctenocladus circinnatus* (Chaetophorales, Chlorophyceae) in relation to environmental salinity. Herbst, D.B. and R.W. Castenholz. Journal of Phycology 30:588-593.

1993

A population model for the alkali fly at Mono Lake: depth distribution and changing habitat availability. Herbst, D.B. and T.J. Bradley. Hydrobiologia 267:191-201.

1992

Changing lake level and salinity at Mono Lake: habitat conservation problems for the benthic alkali fly. Herbst, D.B. In: The History of Water. White Mountain Research Station symposium vol. 4. pp. 198-210. University of California, Los Angeles.

Taxonomy and distribution of benthic diatoms from Mono Lake, California, U.S.A. Kociolek, J.P. and D.B. Herbst. Transactions American Microscopical Society 111:338-355.

1990

Distribution and abundance of the alkali fly (*Ephydra hians* Say) at Mono Lake, California (USA) in relation to physical habitat. Herbst, D.B. Hydrobiologia 197:193-205.

1989

A Malpighian tubule lime gland in an insect inhabiting alkaline salt lakes. Herbst, D.B. and T.J. Bradley. Journal of Experimental Biology 145:63-78.

Salinity and nutrient limitations on the growth of benthic algae from two alkaline salt lakes of the Western Great Basin (USA). Herbst, D.B. and T.J. Bradley. Journal of Phycology 25:673-678.

1988

Osmoregulation in an alkaline salt lake insect, *Ephydra (Hydropyrus) hians* Say (Diptera: Ephydriidae) in relation to water chemistry. Herbst, D.B., F.P. Conte and V.J. Brookes. Journal of Insect Physiology 34:903-909.

Osmoregulation in dolichopodid larve (*Hydroporus plumbeus*) from a saline lake. Herbst, D.B. and T.J. Bradley. Journal of Insect Physiology 34:369-372.

Comparative population ecology of *Ephydra hians* Say (Diptera: Ephydriidae) at Mono Lake (California) and Abert Lake (Oregon). Herbst, D.B. Hydrobiologia 158:145-166.

Technical Reports (over 50, selected reports here)

2017 and more recent

A Monitoring Network for Detecting Climate Change Effects on the Ecology of Sierra Nevada Streams – Project Update: Drought observations of changing habitat and benthic invertebrate communities from the Sierra Nevada sentinel stream network. Herbst, D.B. Investigator Annual Report to the National Park Service.

Aquatic invertebrate bioassessment monitoring of acid mine drainage impacts in the Leviathan Creek watershed (Alpine County, California) [annual update **2023** for the project period]. Herbst, D.B. Reports to USEPA, and the Lahontan Regional Water Quality Control Board.

2016

Benthic Invertebrate and Deposited Sediment TMDL Guidance for the Pajaro River Watershed. Herbst, D.B. R.B. Medhurst, and I.D. Bell. Technical Report of the California Surface Water Ambient Monitoring Program (SWAMP-MR-RB3-2016-001).

2013

Walker Lake Ecological Monitoring of the Status and Trends of the Benthic Ecosystem: Invertebrate Populations, Algae, Lake Level, Salinity and Waterbird Surveys
Herbst, D.B., R.B. Medhurst, and I.D. Bell. Report to the US Fish and Wildlife Service.

Benthic Macroinvertebrate Responses to Sediment Deposition as Criteria for Evaluating and Monitoring the Extent of Habitat Degradation on the Middle Truckee River, California.
Herbst, D.B., R.B. Medhurst, I.D. Bell. Report to Truckee River Watershed Council.

2011

Comparison of Sediment Load Models in Predicting Sediment Deposition Patterns in Streams of the Sierra Nevada and Central Coast of California. Herbst, D.B. Report to State Water Resources Control Board, and EPA TMDL program.

Development of Sediment TMDL Guidance Indicators: Relation of roads and land use disturbances at different spatial scales to the depositional environment of streams in the Sierra Nevada and Central Coast of California. Herbst, D.B. Report to State Water Resources Control Board, and EPA TMDL program.

Development of biological criteria for sediment TMDLs: the relation of sediment deposition to benthic invertebrate communities of streams exposed to varied land use disturbances in the Sierra Nevada and Coast Range mountains of California. Herbst, D.B. Report to State Water Resources Control Board, and EPA TMDL program.

Benthic Biological Community Responses to Sediment Loading in Experimental Stream Mesocosm Channels. Herbst, D.B. Report to State Water Resources Control Board, and EPA TMDL program.

Project Summary Report: Sediment TMDL Guidance for Central Coast Region of California and the San Lorenzo River: Physical Habitat and Biological Criteria for Deposited Sediments in Streams. Herbst, D.B. Report to Central Coast Regional Water Quality Control Board, and State Water Resources Control Board.

Sediment Deposition Relations to Watershed Land Use and Sediment Load Models Using a Reference Stream Approach to Develop Sediment TMDL Numeric Targets for the San Lorenzo River and Central Coast California Streams. Herbst, D.B. Report to Central Coast Regional Water Quality Control Board, and State Water Resources Control Board.

2010

Stream macroinvertebrate diversity in the Kings River Experimental Watershed – interannual variation and baseline monitoring. Herbst, D.B. and S.D. Cooper. Report to PSW Research Station, USFS.

Walker Lake benthic invertebrate population ecology and effects of salinity on survival and growth of common aquatic insects. Herbst, D.B. Report to US Fish and Wildlife Service.

2009

Development of a benthic macroinvertebrate Index of Biological Integrity (IBI) for stream assessments in the Eastern Sierra Nevada of California. Herbst, D.B. and E.L. Silldorff. Report to the Lahontan Regional Water Quality Control Board

Evaluating recovery of stream invertebrate communities following removal of introduced trout in the Upper Kern River Region of Sequoia National Park: baseline biological stream surveys. Herbst, D.B. Report to the National Park Service.

Summary of Research & Consulting Services

National Park Service

- Biodiversity of stream invertebrate communities in relationship to the presence or absence of exotic trout introduced in Yosemite NP (2000-02) [funded by The Nature Conservancy]
- Influence of flow diversions on the viability of endemic aquatic invertebrate populations in thermal spring systems in Death Valley NP (1998-02)
- Invertebrate community ecology of Devils Hole spring pool, Death Valley NP (1998-02)
- Restoration of high-elevation stream communities in Sequoia and Kings Canyon National Park following removal of exotic trout (2003-2007; 2011-12)

US Forest Service, Region 5

- Sentinel stream monitoring network for detecting climate change effects in the Sierra Nevada (covering 24 streams across the entire Sierra, on USFS and NPS lands) (2010-ongoing)

U.S. Forest Service; Inyo, Toiyabe-Humboldt NF, and Pacific-SW Research Station

- Bagley Valley stream restoration monitoring (pre- / post- channel reconfiguration, 1999-02)
- West Walker River watershed livestock grazing management monitoring (1999-2004)
- Kings River experimental watershed evaluation of timber harvest practices through aquatic invertebrate monitoring (1999-ongoing)

U.S. Fish and Wildlife Service

- Aquatic habitat inventories; invertebrate biogeography on National Wildlife Refuges in Nevada: Moapa NWR, Ruby Lake NWR, Sheldon NWR; Ash Meadows NWR (1996-02)
- Changing ecosystem of Walker Lake, Nevada, in response to declining lake level and rising salinities – aquatic invertebrate population dynamics and physiology (2008-ongoing)
- Restoration of springs by enclosure fencing on the Sheldon Wildlife Refuge (2008-2010)

US Environmental Protection Agency

- Evaluation of the cumulative impacts of livestock grazing on stream ecosystems (1996-99)
- Biomonitoring of recovery and remediation of acid mine drainage, Leviathan Mine Superfund site (Alpine Co., CA). (1995-ongoing)

State Water Board and Regional Water Quality Control Boards (Lahontan & Coast)

- Development of biological criteria for water quality standards in streams (1999-2011)
- Identification of biological water quality targets for streams exposed to slope development on Squaw Creek (CA) (guidance for TMDL-total maximum daily load, 2000-02)
- Setting a biological restoration baseline for the Upper Truckee River (1999-2002)
- Identification of biological water quality targets for streams exposed to sediment loads from land surface disturbance erosion in the Sierra Nevada and Central Coast (CA) (2006-11)

Great Basin Unified Air Pollution Control District

- Survey of aquatic environments and evaluation of the potential for irrigation flooding in the restoration of aquatic habitat on the dry playa of Owens Lake (1995-2002)

Lake Tahoe Regional Planning Agency

- Meta-analysis of bioassessment data from Lake Tahoe Basin for evaluation of local reach-scale and watershed-scale effects of disturbance on stream biological integrity (2004-06)

California Department of Fish and Game

- Sediment impacts on the East Walker River (1992)
- Livestock grazing impacts and recovery in the Golden Trout Wilderness (2004-2006)
- Habitat suitability for exotic trout removal (Cottonwood Lakes) (2009)

City of South Lake Tahoe

- Restoration monitoring of Trout Creek erosion control and channel restoration (1999-2007)

Bureau of Land Management

- Evaluation of OHV disturbance and aquatic habitat inventory of Surprise Canyon, Panamint Mountains (CA) (2003-2005)
- Biomonitoring in the Bodie Hills, and eastern Sierra, CA (2008-2010)
- Assessment of post-fire biological condition of streams in the Owens Valley exposed to wildfire in 2007

Recent Project Grants (Administration through Marine Science Institute UCSB, and the Institute of Marine Sciences UC Santa Cruz)

- California Institute for Biodiversity 2023-2024 (\$68K):
- Leviathan mine biomonitoring to detect acid mine drainage impacts and recovery – Atlantic Richfield, USEPA, and Army Corps of Engineers (~\$100K annual)
- Meadow restoration monitoring on the Kern Plateau, southern Sierra Nevada – California Trout (\$25K)
- Wildfire impacts on coastal stream ecosystems – US Forest Service, Los Padres National Forest (\$25K)
- Sediment deposition limitations on aquatic life of the Pajaro River - Cal EPA and Central Coast Regional Water Quality Control Board (\$150K)
- Watershed-scale experiment to evaluate the effects of forest management practices of selective logging and prescribed fire in the Kings River Experimental Watershed (\$200K)
- Monitoring of sentinel aquatic management indicators to detect the hydrologic effects of climate change in Sierra Nevada streams – US Forest Service Region 5 (\$200K)
- Responses of Lahontan cutthroat trout prey items to salinity and lake level change at Walker Lake, Nevada – US Fish and Wildlife Service (\$300K)
- Monitoring spring ecosystem recovery responses to feral horse exclosures on the Sheldon Wildlife Refuge – US Fish and Wildlife Service (\$75K)
- Inventory surveys of springs and streams in the Bodie Hills – BLM (\$50K)
- Evaluating the recovery of high Sierra stream invertebrate communities following removal of introduced trout – National Park Service (\$45K)
- Data transfer and taxonomic quality control for stream biomonitoring to CA-SWAMP database (\$30K)
- Development of biological targets for sediment TMDL on the middle Truckee River – Truckee River Watershed council (\$88K)

Monitoring networks for collaborations:

Sierra Nevada Sentinel Stream Network – designed and implemented monitoring strategy for detecting influence of hydroclimatic change on mountain stream ecosystems
Website: <http://herbstlab.msi.ucsb.edu/research.html#climatechange>

Summary of News In the Media

- **Riffle-Pool stream ecology:** A comparison of the taxonomic and trait structure of macroinvertebrates between the riffles and pools of montane headwater streams. 2018. **D.B. Herbst**, S.D. Cooper, R.B. Medhurst, S. Wiseman, and C. Hunsaker. *Hydrobiologia* 820:115-133.
 - * UCSB online magazine **The Current**:
<http://www.news.ucsb.edu/2018/019125/learning-little-monsters>
 - *UCSB Daily Nexus newspaper:
Here is the link to the article: <http://dailynexus.com/2018-08-09/going-with-the-flow/>
 - ***Science and Technology Research News** news outlet:
<https://www.scienceandtechnologyresearchnews.com/learning-from-little-monsters/>
 - ***ScienceDaily** news outlet:
<https://www.sciencedaily.com/releases/2018/07/180719142125.htm>
 - ***PHYS.ORG** news outlet:
<https://phys.org/news/2018-07-monsters.html>
 - ***Dispatches** news brief in *Frontiers in Ecology and the Environment* (Ecological Society of America)
“Where the bottom-feeders live”
<https://esajournals.onlinelibrary.wiley.com/doi/10.1002/fec.1940>
 - ***Environmental Monitor**, online magazine (article w photos)
<https://www.fondriest.com/news/no-stone-untuned-little-worlds-inside-stream-riffles-and-pools.htm>
 - ***Estuary Pearls** - newsletter of the San Francisco Estuary Partnership <https://www.sfestuary.org/estuary-news-pearls-pools-and-riffles/>
 - ***Mountain Views**, publication of the consortium for integrated climate research in western mountains
https://www.fs.fed.us/psw/cirmount/publications/pdf/Mtn_Views_dec_18.pdf
- **Long-term monitoring of acid mine drainage clean-up:** Long-term monitoring of recovery of streams from acid mine drainage and evaluation of toxic metals threshold ranges for macroinvertebrate community re-assembly. 2018. **D.B. Herbst**, R.B. Medhurst, and N.J.P. Black. *Environmental Toxicology and Chemistry* 37:2575-2592.
 - * UCSB online magazine **The Current**:
<http://www.news.ucsb.edu/2018/019238/damage-undone>
 - ***Futurity** online research news magazine
<https://www.futurity.org/stream-restoration-mining-damage-1907292/>
 - ***Environmental Monitor**, online magazine (w/ photos)
<https://www.fondriest.com/news/insects-show-the-healing-of-toxic-metal-mining-scars.htm>
- **California Climate Assessment Report, 4th edition:** Central Coast Report: River, Streams and Riparian Areas, pp 47-50. 2018. **Herbst, D.B.** California Natural Resources Agency publication. <http://www.climateassessment.ca.gov/regions/docs/20180827-CentralCoast.pdf>
- *In UC Santa Cruz News Center release - <https://news.ucsc.edu/2018/08/langridge-climate.html>
- **Drought and climate change in headwater mountain streams:** Drought ecohydrology alters the structure and function of benthic invertebrate communities in mountain streams. 2019. **D.B. Herbst**, S.D. Cooper, R.B. Medhurst, S. Wiseman, and C. Hunsaker. *Freshwater Biology* 64:886-902
 - *UC Santa Cruz News
<https://news.ucsc.edu/2019/03/sierra-streams.html>
 - ***UC Santa Barbara online news magazine The Current**

<https://www.news.ucsb.edu/2019/019395/drought-sierra-streams>

***PHYS-ORG news:**

<https://phys.org/news/2019-03-climate-drought-threaten-small-mountain.html#iCp>

***FISHBIO Online Newsletter**

<https://fishbio.com/news/climate-change-drought-threaten-small-mountain-streams-sierra-nevada>

***UC Natural Reserve System New Release**

<https://ucnrs.org/drought-in-sierra-streams/>

***Mavens Notebook news**

<https://mavensnotebook.com/2019/03/28/science-news-a-honking-fluttering-spectacle-climate-change-drought-threatens-small-sierra-streams-counting-juvenile-salmon-and-lizards-and-more/>

***YubaNet.com regional news outlet**

<https://yubanet.com/regional/climate-change-and-drought-threaten-small-mountain-streams-in-the-sierra-nevada/>

***Technology.org news outlet**

<https://www.technology.org/2019/03/27/drought-in-sierra-streams/>

***Sierra Sun Times**

<https://goldrushcam.com/sierrasuntimes/index.php/news/local-news/17971-uc-santa-cruz-research-biologist-reports-finds-climate-change-and-drought-threaten-small-mountain-streams-in-the-sierra-nevada>

***Water Education Foundation Blog**

<https://www.watereducation.org/aquafornia-news/blog-climate-change-and-drought-threaten-small-mountain-streams-sierra-nevada>

***LongRoom News**

<https://www.longroom.com/discussion/1417659/climate-change-and-drought-threaten-small-mountain-streams-in-the-sierra-nevada>

***Futurity** online research news magazine

<https://www.futurity.org/sierra-nevada-streams-2030612/>

***FISHBIO online newsletter feature article:**

<https://fishbio.com/field-notes/the-fish-report/invertebrates-altitude-effects-drought-mountain-streams>

- *Freshwater Science* Feature Article **Long-term monitoring reveals convergent patterns of recovery from mining contamination across 4 western US watersheds**. 2021. Clements et al.

***UCSB Currents News:** <https://www.news.ucsb.edu/2021/020319/mapping-successful-recovery>

- *Frontiers in Ecology and Evolution* article in 2023 regarding importance of understand brine fly physiology to conservation targets for salinity of Mono Lake. **Developmental and reproductive costs of osmoregulation to an insect that is a key food resource to shorebirds at salt lakes threatened by rising salinity and desiccation**. 2023. D.B. Herbst. *Frontiers in Ecology and Evolution* DOI 10.3389/fevo.2023.1136966

***UCSB Currents News:** <https://news.ucsb.edu/2023/020893/small-insect-big-impact>

and on KCBX radio, Santa Barbara:

<https://www.kcbx.org/environment-and-energy/2023-05-31/ucsb-research-shows-brine-flies-in-decline-at-mono-lake-threatening-shorebirds-food-source>