

Freshwater Science BRIDGES

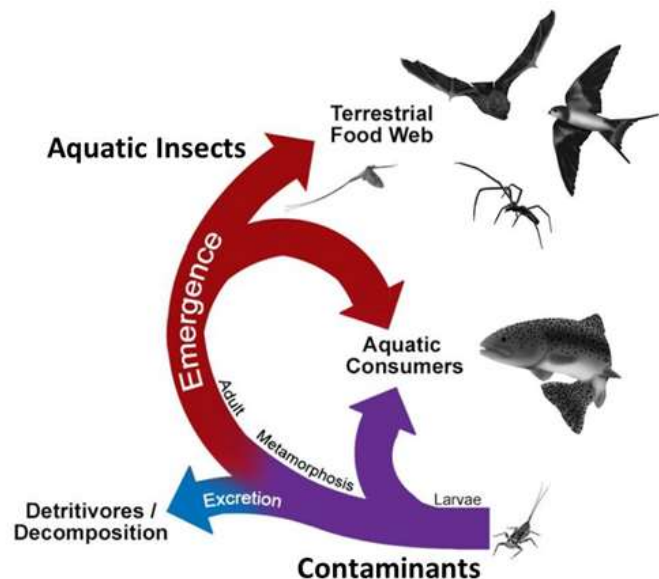
Volume 38 • Issue 4 • 917-954
December 2019 Fact Sheet



Applying the Ecology of Aquatic-Terrestrial Linkages to Freshwater and Riparian Management

The four papers in this BRIDGES cluster apply models and case studies to illustrate the effects of global stressors on aquatic-terrestrial linkages and emphasize how to incorporate these principles into decision making. Key points include:

- Insects with complex life histories form strong links between aquatic and terrestrial ecosystems. Stressors such as contaminants, predation and land use vary in their effects on these linkages according to properties of the stressor and of the ecosystem ([Kraus 2019a](#)).
- Loss of adult aquatic insect emergence and adult insect-mediated contaminant flux to terrestrial ecosystems increases with increased stress to aquatic ecosystems ([Wesner 2019](#), [Kraus 2019b](#)) and are greater than predicted from larval responses alone ([Wesner 2019](#)). Altered terrestrial-aquatic linkages can lead to lower prey availability and increased contaminant exposure for terrestrial insectivores ([Kraus 2019b](#)) as well as destabilization of aquatic and terrestrial ecosystems ([Sullivan and Manning 2019](#)).
- Models provide contaminant ([Kraus 2019b](#)), life stage ([Wesner 2019](#)) and network ([Sullivan and Manning 2019](#)) specific predictions to inform biomonitoring and management efforts.
- Aquatic-terrestrial linkages encourage collaboration among diverse stakeholders and provide freshwater ecologists a platform for communicating results to riparian managers ([Muehlbauer et al. 2019](#), [Sullivan and Manning 2019](#)). Co-management of freshwater and riparian ecosystems greatly improves potential for restoration of both aquatic and terrestrial species and ecosystem processes ([Muehlbauer et al. 2019](#)).



Stressors such as chemical contaminants can disrupt aquatic-terrestrial linkages with consequences for both aquatic and riparian insectivores (Figure modified from Kraus et al. 2014b. Drawings by Jeremy Monroe at Freshwaters Illustrated).

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