

Emergence Patterns of Giant Salmon Flies and Consequences for Birds in the Salmon River Drainage of Idaho

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Background

- Giant salmon flies, *Pteronarcys californica* are large, riverine insects found throughout the Great Basin and Pacific Northwest area (including Idaho). [1]
- They spend the first 2-4 years as larvae, before emerging as winged adults and the timing of emergence is thought to be linked to temperature. The timing of their emergence is lacking research in wilderness areas. Adult emergence events are highly synchronous. [2]
- It is also thought that other wildlife (specifically birds) utilize the increase in biomass during emergence events, though not much research has been conducted.

Methods

- Peak emergence was determined to be on the day when the most exuvia (the shed exoskeleton of adults) and live adults were counted. [3]
- Data for two confluences were recorded, 1000 meters above and below the confluences, counting exuvia randomly for 25 meters within every 200 meters.



Pteronarcys californica

- Bird point counts were done for 10 minutes every 200 meters above and below the confluence, as well as transect counts between.

Results

Figure 1 outlines the confluences where data was collected in the Salmon river drainage. The dates represent the time of peak emergence and the relative temperatures of the tributaries.

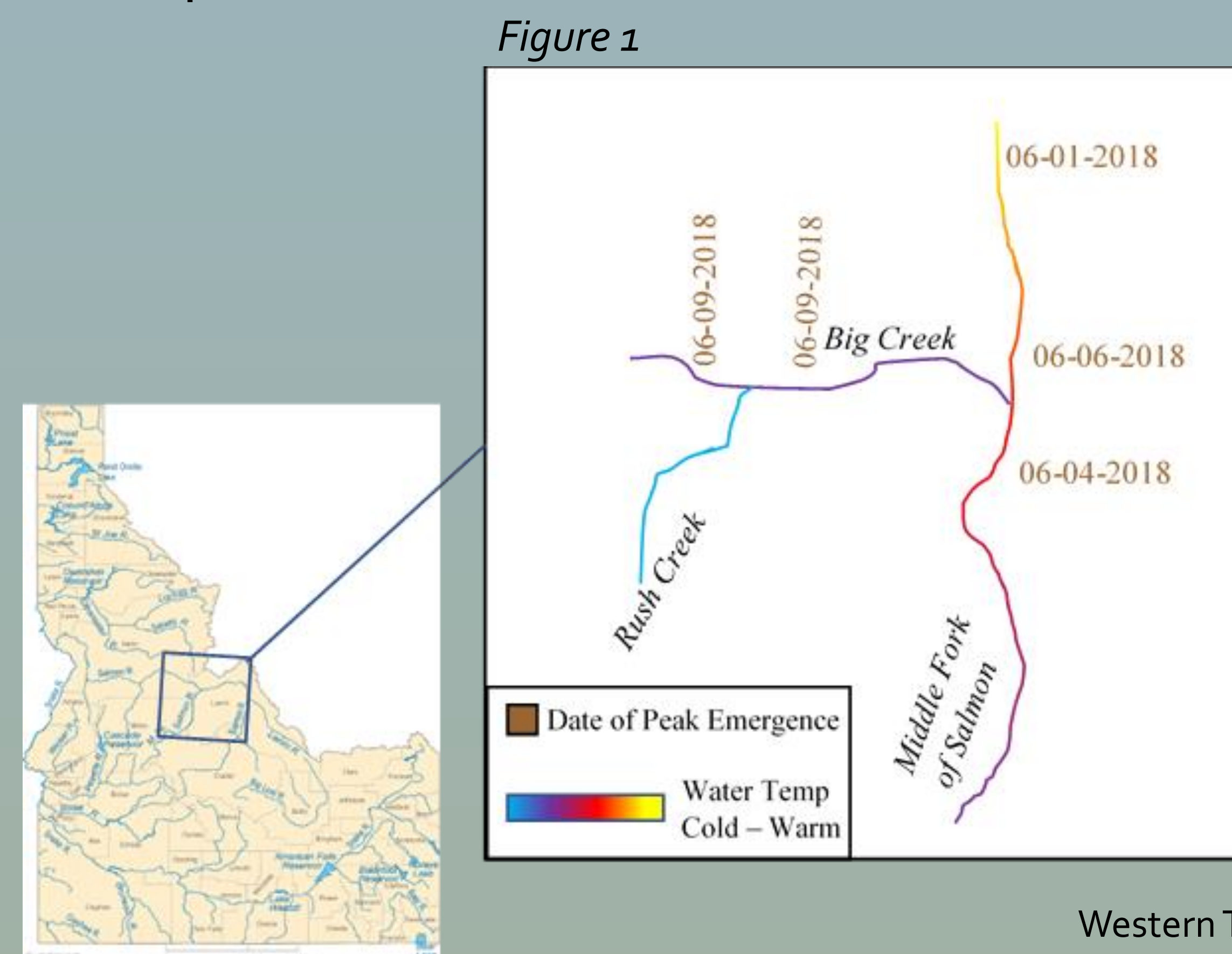


Figure 2



Figure 2 shows the average number of birds observed during the presence and absence of giant salmon flies.

Western Tanager
(*Piranga ludoviciana*)



Bullock's Orioles
(*Icterus bullockii*)



Lewis's Woodpecker
(*Melanerpes lewis*)



Pictures from <https://www.audubon.org/field-guide/bird>

Methods



Confluence of Rush Creek with Big Creek



Confluence of Big Creek with Middle Fork Salmon River

Discussion

- Overall there is a large scale pattern of downstream to upstream emergence.
- At a finer scale, there were disruptions in the continuity of the emergence pattern that could be caused by the confluence of colder tributaries
- There was an increase in the average number of birds is seen when giant salmon flies are present compared to when giant salmon flies are absent
- Western Tanagers, Lewis's Woodpeckers, Bullock's Orioles, and Dippers were among the birds we observed feeding on giant salmon flies.



Acknowledgments & References

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- [1] Kauwe, J. S., Shiozawa, D. K., & Evans, R. P. (2004). Phylogeographic and nested clade analysis of the stonefly *Pteronarcys californica* (Plecoptera: Pteronarcyidae) in the western USA. *Journal of the North American Benthological Society*, 23(4), 824-838. Second reference in Calibri, 32 points, with reverse indent: alphabetical or numerical order.
- [2] Townsend, G. D., & Pritchard, G. (1998). Larval growth and development of the stonefly *Pteronarcys californica* (Insecta: Plecoptera) in the Crowsnest River, Alberta. *Canadian journal of zoology*, 76(12), 2274-2280.
- [3] Walters, D. M., Wesner, J. S., Zuellig, R. E., Kowalski, D. A., & Kondratieff, M. C. (2018). Holy flux: spatial and temporal variation in massive pulses of emerging insect biomass from western US rivers. *Ecology*, 99(1), 238-240.