A geostatistical state-space model of abundance for stream networks

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**Abstract**

**Introduction**

Importance of accounting for spatial autocorrelation

* Residual autocorrelation violates regression model assumptions and leads to bias
* Improve precision of estimates
* Improve estimates in unsurveyed locations
* Ask questions relating to spatial structuring of populations (give example)

Existing spatial models in dendritic networks

Limitations of current methods (we include detection process at the same time)

* “Current methods only account for spatial dependency in stream data, but there is clearly a temporal-dynamic structure that should be incorporated simultaneously using spatio-temporal analytic methods” (ref: Peterson et al. 2013 Ecology Letters)
* Current stream models include mixed models, spatial GLM, and block kriging (and can be fit in SSN – Ver Hoef et al.), but do not account for imperfect detection (ref: Peterson et al. 2013 Ecology Letters)
* Due to estimating the covariance structures, there are currently computational challenges with analyzing large networks (ref: Peterson et al. 2013 eco letters) – we don’t solve this

Spatial Structure in Stream Fish Data

Brook Trout

Objectives

**Methods**

**Results**

Semivariograms and Torgegrams

* Of modeled abundance
* Of residuals

**Discussion**

**Acknowledgments**

**Literature Cited**