Margenau, L. L. S., M. J. Cherry, K. V. Miller, E. P. Garrison, and R. B. Chandler. Monitoring partially-marked populations with camera and telemetry data. Ecological Applications. *In Review*.

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sim Folder

We provide the R code for a simulation study comparing the two-stage SMR model and joint SMR model. Model code for simulating data, model implementation, and model comparison are provided.

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File list

```
sim_data.R
fit_case1_joint.R
fit_case1_two-stage.R
process-sims.R
gsmr-stage1.jag
gsmr-stage2.jag
gsmr.jag
sim-N-n.pdf
sim-lam0sig.pdf
sim-betas.pdf
sim-Nt.pdf
```

Description

`sim_data.R` – Use in conjunction with `trap_locations.csv`. Simulate 100 SMR datasets for one study location (North Addition Lands Unit) over 20 primary sampling occasions (fortnights) with 14-day secondary sampling occasions. Capture histories for marked and unmarked individuals and telemetry locations are simulated within the sim.gsmr function

`fit_case1_joint.R` – Run the simulated SMR datasets in parallell using the joint SMR model

`fit_case1_two-stage.R` - Run the simulated SMR datasets in parallell through the two-stage SMR model. Stage one (marked model) is implemented first with posterior detection parameter means used in the second stage (unmarked model) as prior distributions.

`process-sims.R` – Comparison of the two-stage SMR and the joint SMR model simulation estimation results.

`gsmr-stage1.jag` – JAGS code for implementing stage 1 (marked) of the two-stage SMR model.

`gsmr-stage2.jag` – JAGS code for implementing stage 2 (unmarked) of the two-stage SMR model incorporating autoregressive term on density

`gsmr.jag` - JAGS code for implementing a joint SMR model which models the marked and unmarked camera data jointly and incorporates a single marking process.

`sim-N-n.pdf` - Figure S1. Population size (N) and the number of marked individuals over time

`sim-lam0sig.pdf` - Figure S2. Results from the 100 simulated datasets used to compare posterior means for the encounter rate parameters (λ_0 and σ) for the joint model and the two-stage model.

`sim-betas.pdf` - Figure S3. Results from the 100 simulated datasets used to compare posterior means for the density trend parameters (β_0 and β_1) for the joint model and the two-stage model.

`sim-Nt.pdf` - Figure S4. Results from the 100 simulated datasets used to compare posterior means for abundance over time (N_t) for the joint model and the two-stage model.