

-----Readme file -----

## NYCounterPOPd Version 2

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### Software Information

#### *Overview of the NYCounterPOPd Version 2 Software Application*

The NYCounterPOPdV2 software is an interactive application used to explore the differences in population dynamics in the presence and absence of lead (Pb) in bald eagles in New York state between 1990 and 2018. Comparisons include: (1) current (Pb) scenarios (“Actual”), (2) hypothetical (counter factual) scenarios with the removal of lead poisoning (“Pb-reduced”), and (3) hypothetical (counter factual) scenarios with the removal of Pb exposure (“Pb-free”). Comparative properties include the life tables, predicted annual abundances (January – December), predicted bi-annual abundances (January – June and July – December), predicted bi-annual hatchling abundances, predicted bi-annual immature and non-breeder adult abundances, predicted bi-annual breeder abundances, predicted abundances during the breeding periods (January – June), predicted abundances during the non-breeding periods (July – December), migration and dispersal values, lambda values, survival rates, stable stage distributions, reproductive values, elasticities, cumulative growth rates, stochastic growth rates, transient growth rates, reactivity, maximum amplifications, and maximum attenuations (Caswell 2001).

The summarized data appears for immediate use in this packet. The raw data may be obtained by contacting the Wildlife Health Unit at the New York State Department of Environmental Conservation [wildlife@dec.ny.gov or (518) 478-2203].

### *Interactive NYCounterPOPd Version 2 Software User Tutorial*

**Step 1:** Download the “NYCounterPOPdV2 for Female Bald Eagles” folder.

**Step 2:** Open R and set the working directory to the location of the NYCounterPOPdV2 for Female Bald Eagles folder.

**Step 3:** Install the appropriate R packages. To install a particular version of an R package, run the code:

```
library(devtools)
devtools::install_version("package name", version = "#.#.#").
```

**Step 4:** Open the “NY\_Algorithm\_Factual\_Pb.R” script.

**Step 5:** Click “Run All”.

**Step 6:** Wait until this script gets done running. ***Beware, the runtime of the unmodified algorithm is a minimum of 6 hours, so ensure your computer is plugged in, will not go to sleep, and turn off your screen to save the backlight from burnout.*** The algorithm will run and automatically save new .txt files into the working directory. Do not modify file names.

**Step 7:** Open the “NY\_Algorithm\_Counter\_Factual\_Pb\_Exposure.R” script.

**Step 8:** Click “Run All”.

**Step 9:** Wait until this script gets done running. ***Beware, the runtime of the unmodified algorithm is a minimum of an additional 6 hours, so ensure your computer is plugged in, will not go to sleep, and turn off your screen to save the backlight from burnout.*** The algorithm will run and automatically save new .txt files into the working directory. Do not modify file names.

**Step 10:** Open the “NY\_Algorithm\_Counter\_Factual\_Pb\_Poisoning.R” script.

**Step 11:** Click “Run All”.

**Step 12:** Wait until this script gets done running. ***Beware, the runtime of the unmodified algorithm is a minimum of an additional 6 hours, so ensure your computer is plugged in, will not go to sleep, and turn off your screen to save the backlight from burnout.*** The algorithm will run and automatically save new .txt files into the working directory. Do not modify file names.

**Step 13:** Open the “NY\_FemaleCounterPOPdV2.R” script.

**Step 14:** Click “Run All”.

**Step 15:** Interact with the interactive app by navigating down the menu on the left.

**Step 16:** When you are done with the app, close it.

**Step 17:** Repeat the steps with the NYCounterPOPdV2 for Male Bald Eagles.

## Technical details

This software was written under R version 4.0.2 (2020-06-22) --"Taking Off Again" Copyright (C) 2020 The R Foundation for Statistical Computing Platform: x86\_64-w64-mingw32/x64 (64-bit) and requires R packages: “devtools” (Version 2.3.2), “shinydashboard” (Version 0.7.1), “shiny” (Version 1.3.2), “shinyBS” (Version 0.61), “popdemo” (Version 1.3-0), “FSA” (Version 0.8.25) and “shinycssloaders” (Version 1.14”).

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## Citations

### *Initial Versions and Foundational Software*

This code is the second version of software originally created by Connelly et al. (2020; <https://doi.org/10.7298/rsse-e634>) and is based on code produced by Hanley et al. (2019; <https://doi.org/10.7298/0v1k-wq39>), Hanley et al. (2019; <https://doi.org/10.7298/q4m1-se95>) and Hanley et al. (2019; <https://doi.org/10.7298/a416-v747>).

### *Citation for Re-Use of This Software*

Hanley, B.J., Them, C.E., Connelly, P.J., Hynes, K.P., Bunting, E.M., & Schuler, K.L. 2022. NYCounterPOPd Version 2 [Software]. Cornell University Library eCommons Repository. doi: <https://doi.org/10.7298/rsse-e634.2>

## Software Version History

See also change log in v1 software (<https://doi.org/10.7298/rsse-e634>) for additional change history.

Changes Since the Original Version incorporated in V2 of software (released 2022-09-28):

1. Renamed “TIMESERIES\_NY\_COUNTERFACTUAL\_PAIN\_A” to “TIMESERIES\_NY\_COUNTER\_FACTUAL\_PB\_POISONING\_FEMALES” and “TIMESERIES\_NY\_COUNTER\_FACTUAL\_PB\_POISONING\_MALES.”
2. Renamed “TIMESERIES\_NY\_COUNTERFACTUAL\_PAIN\_C” to “TIMESERIES\_NY\_COUNTER\_FACTUAL\_PB\_EXPOSURE\_FEMALES” and “TIMESERIES\_NY\_COUNTER\_FACTUAL\_PB\_EXPOSURE\_MALES.”
3. Renamed “NY\_Algorithm Hypothetical Trajectory C” to “NY\_Algorithm\_Counter\_Factual\_Pb\_Exposure.”
4. Renamed “NY\_Algorithm Hypothetical Trajectory A” to “NY\_Algorithm\_Counter\_Factual\_Pb\_Poisoning.”
5. Renamed “NY\_Algorithm” to “NY\_Algorithm\_Factual\_Pb.”
6. Changed “Exper.I” to “Pb-reduced.”
7. Changed “Exper.II” to “Pb-free.”
8. Removed the need to start the application by clicking a button on the home page.
9. Removed the interpretation boxes.
10. Replaced the timers with spinners.
11. Removed Loss of Genetic Diversity Tab Panel.
12. Removed Damping Ratio Tab Panel.
13. Removed Inertial Tab Panel.
14. Removed Effective Population Size Tab Panel.
15. Removed Sensitivities Tab Panel.
16. Removed the redundant Veterinary and Demographic headers.
17. Removed the histograms from each tab.
18. Formatted each tab to contain boxes.
19. Removed redundant headers.
20. Added versioning information.
21. Removed the Trajectories tab.
22. Changed Stage I to Fledgling Eagle.
23. Changed Stage II to Non-Reproducing Eagles.
24. Changed Stage III to Reproducing Eagles.
25. Removed the Introduction Tab.
26. Removed the Validation Packet.
27. Timeseries and results have been altered.