RECREATIONAL RELEASE MORTALITY IN THE CHESAPEAKE BAY

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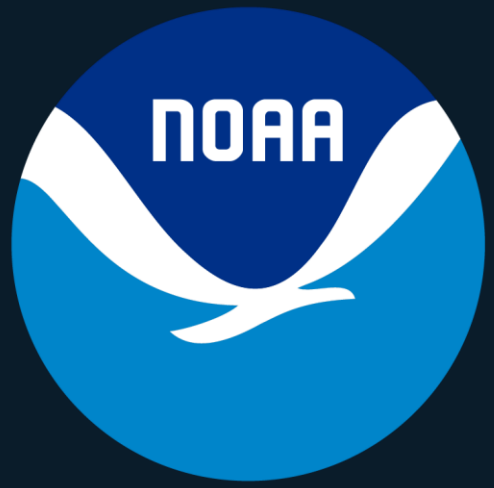
The Nature Conservancy

ACKNOWLEDGEMENTS



NOAA FISHERIES

Sea Grant
VIRGINIA

ACKNOWLEDGEMENTS

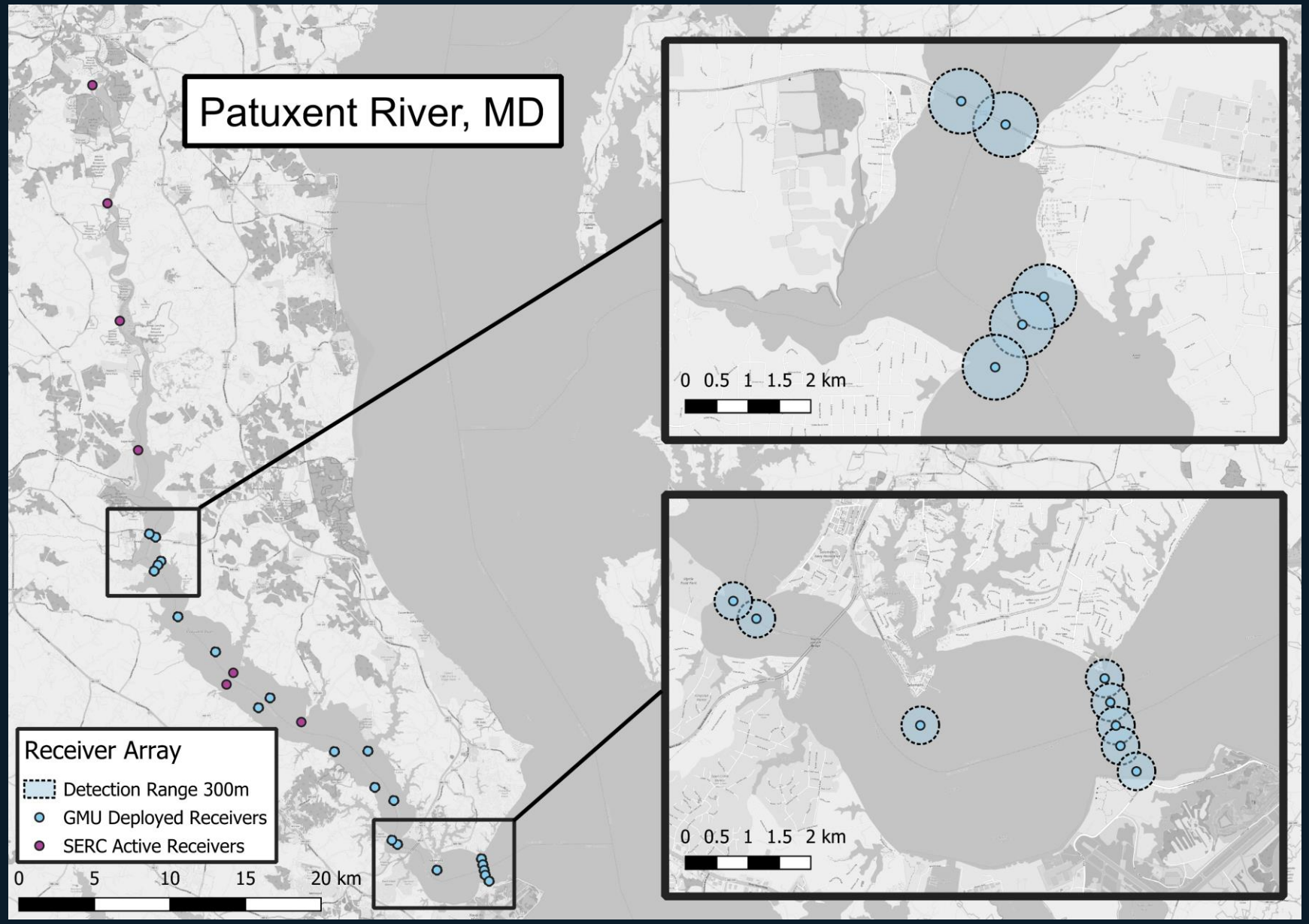
Eric Packard

Captain Dennis Fleming

RESEARCH OBJECTIVES

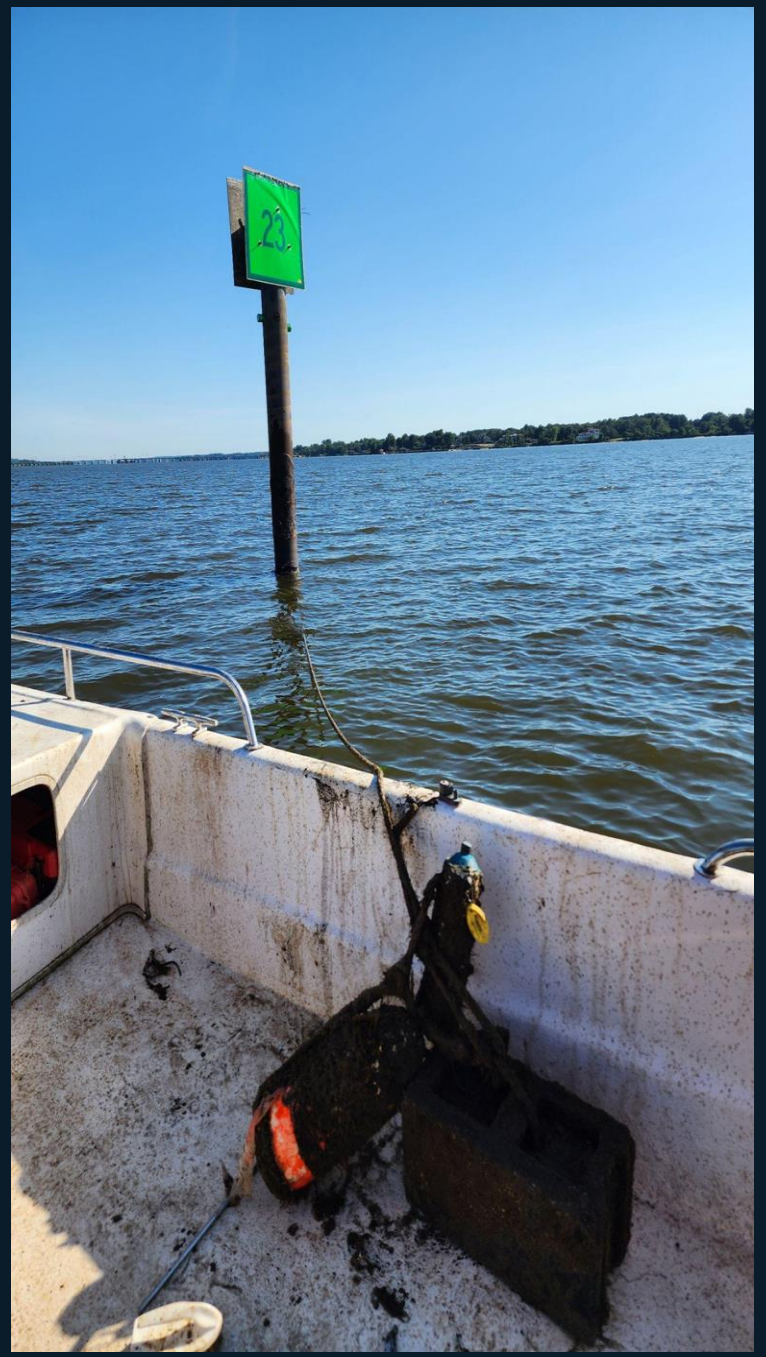
1. Estimate CRM of Chesapeake Bay Striped Bass *in situ*
2. Determine Relationship of CRM and Temperature

STUDY SITE



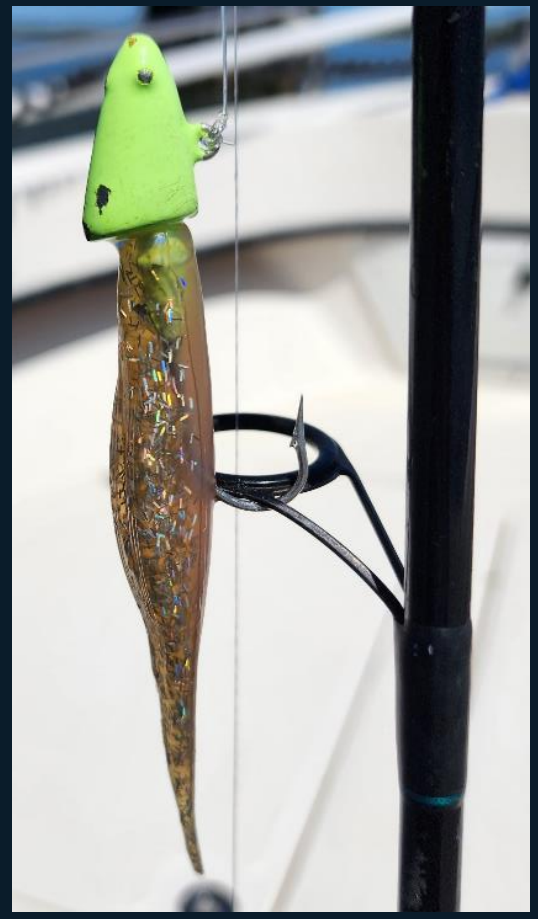
- Representative of the Chesapeake Bay
- Closed Striper Season:
  - March 1 – May 15
  - May 16 – May 31 Above TJ Bridge
  - July 16 – July 31


8

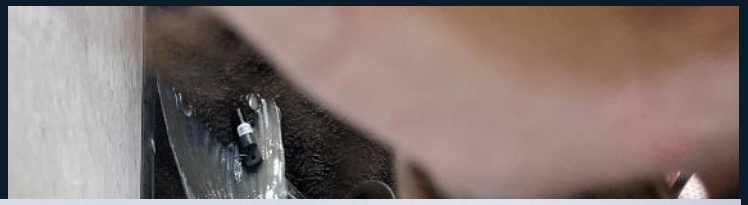

23

METHODS – COLLECTION

- Light Tackle/Artificial Lures



METHODS – TAGGING

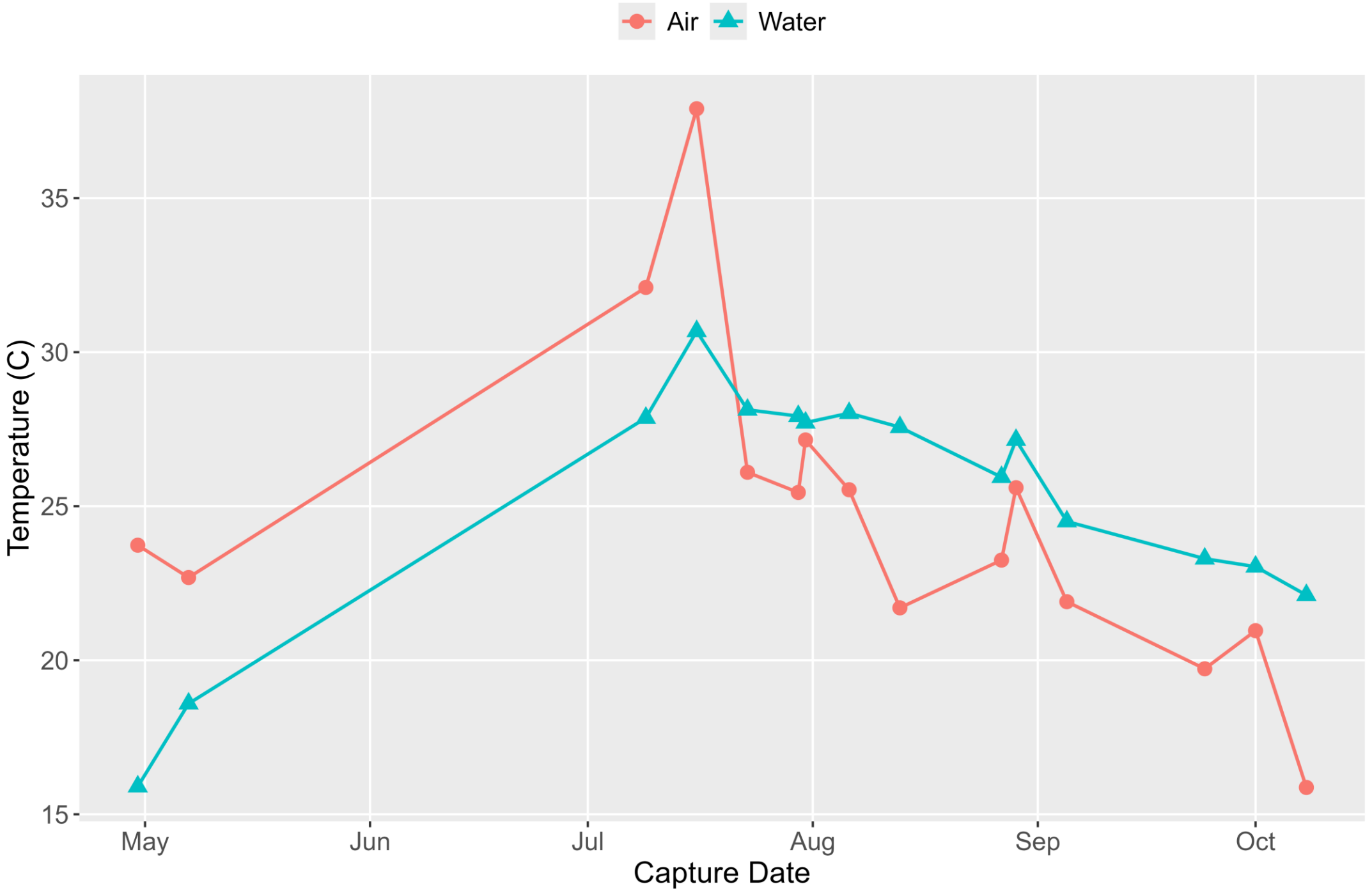


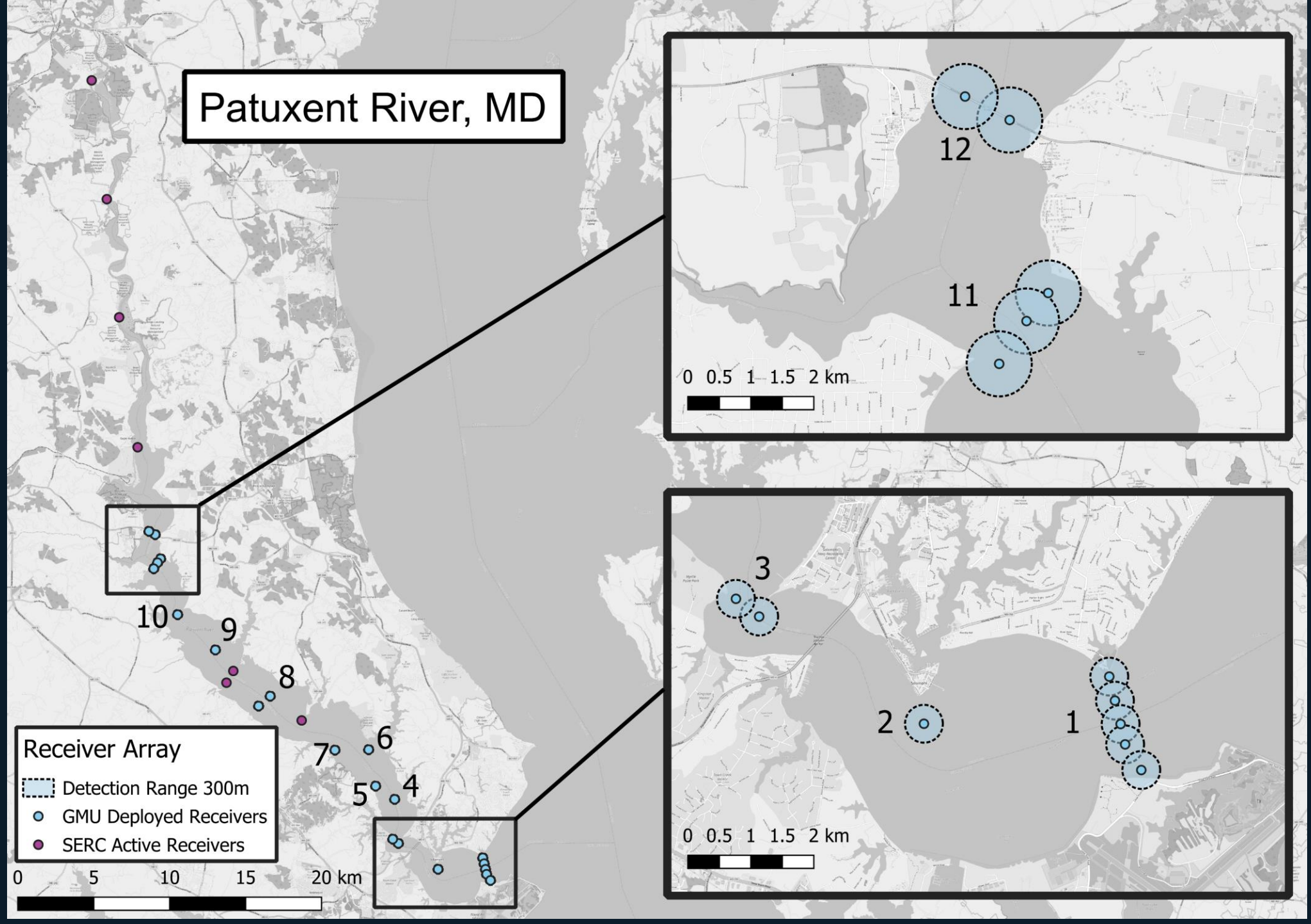

MACHO BULLZ
PRODUCTIONS

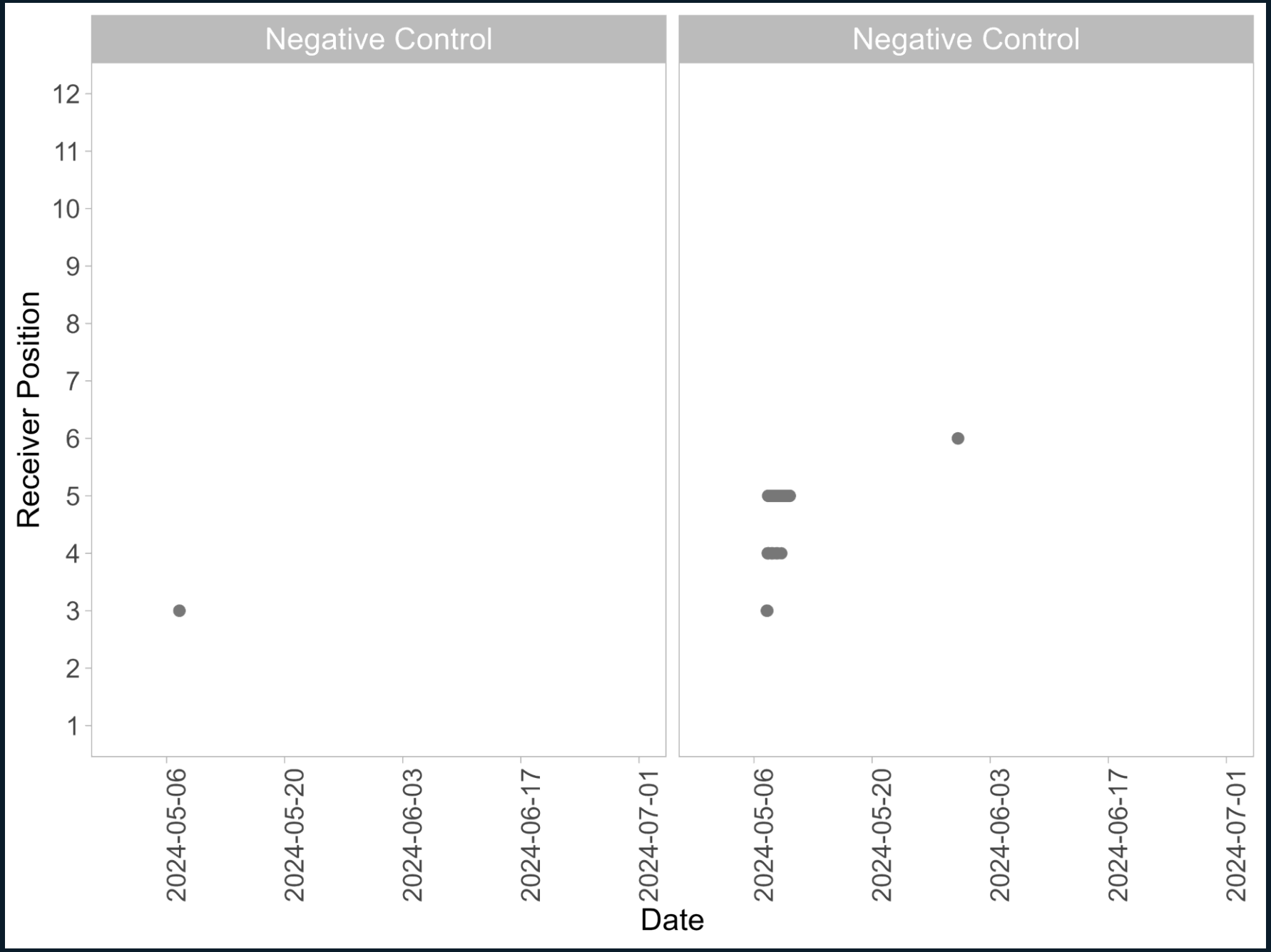
METHODS

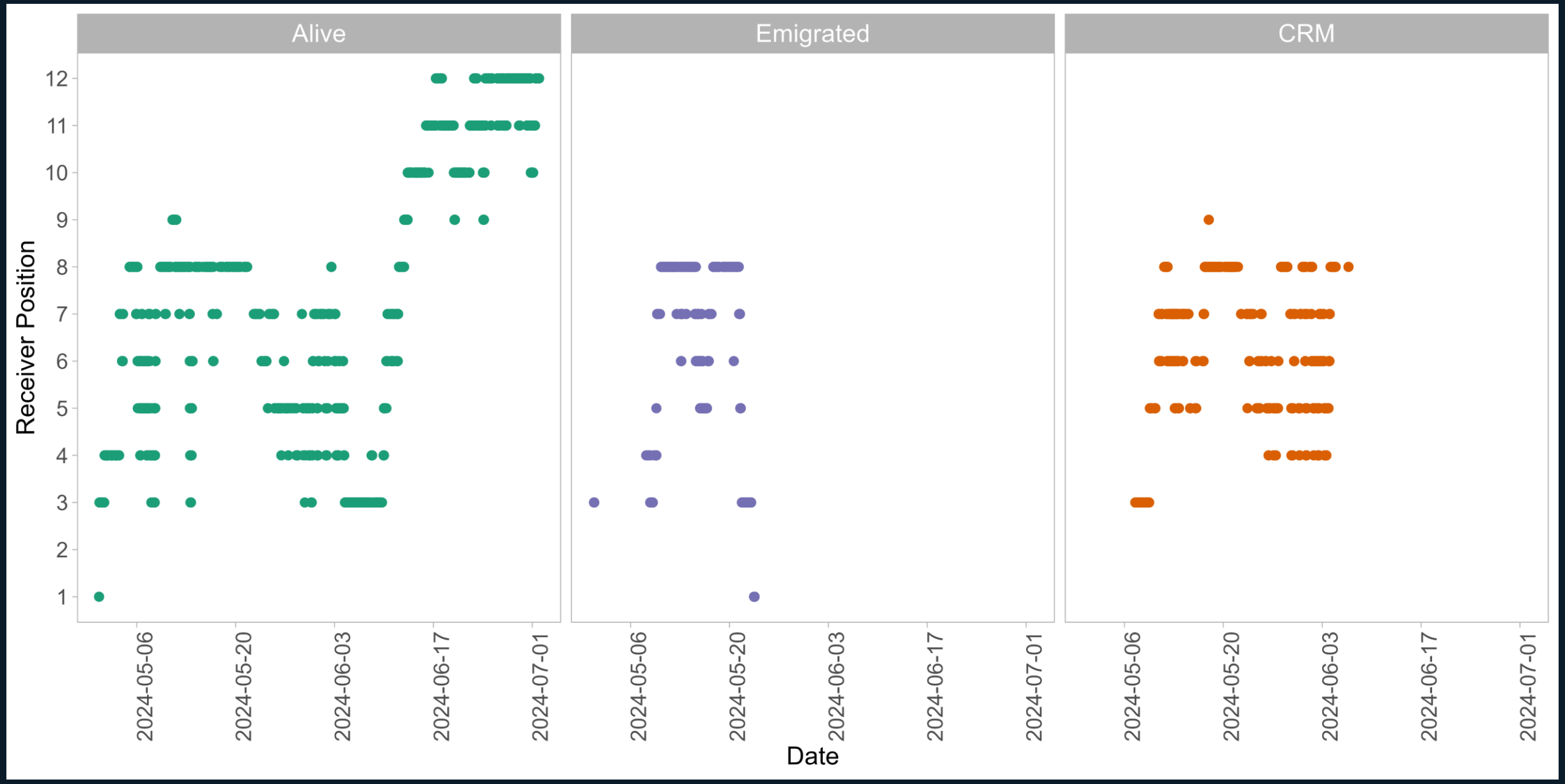
1. Collected like recreational fisherman
2. External tag, V9 transmitters
3. Monitor for 8 weeks

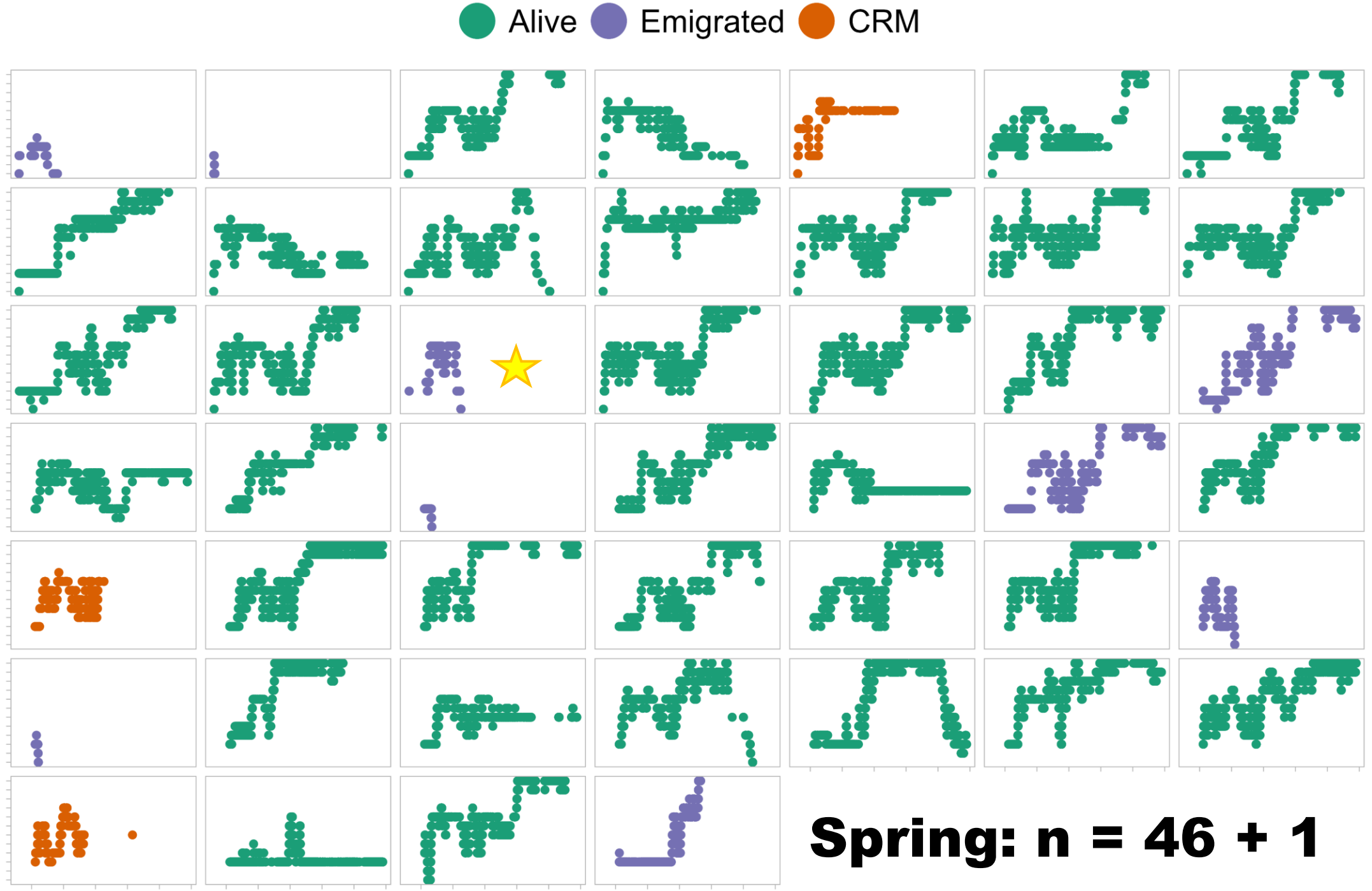
- Spring (April/May) → 47 fish
- Summer (July/August) → 28 fish
- Fall (September/October) → 22 fish

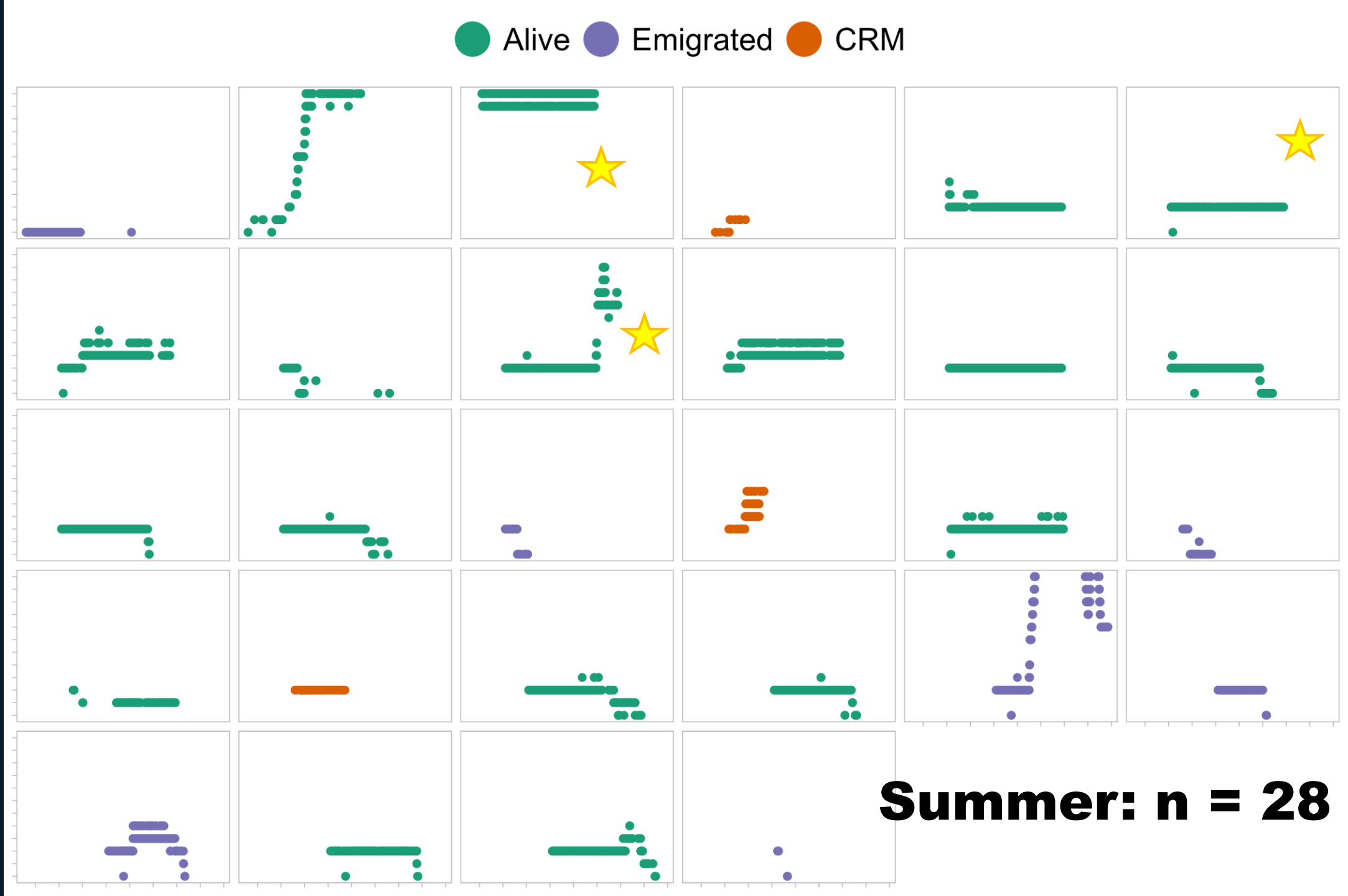

Air
Water
35
30
25
20
15
Temperature (C)
May
Jun
Jul
Aug
Sep
Oct
Capture Date

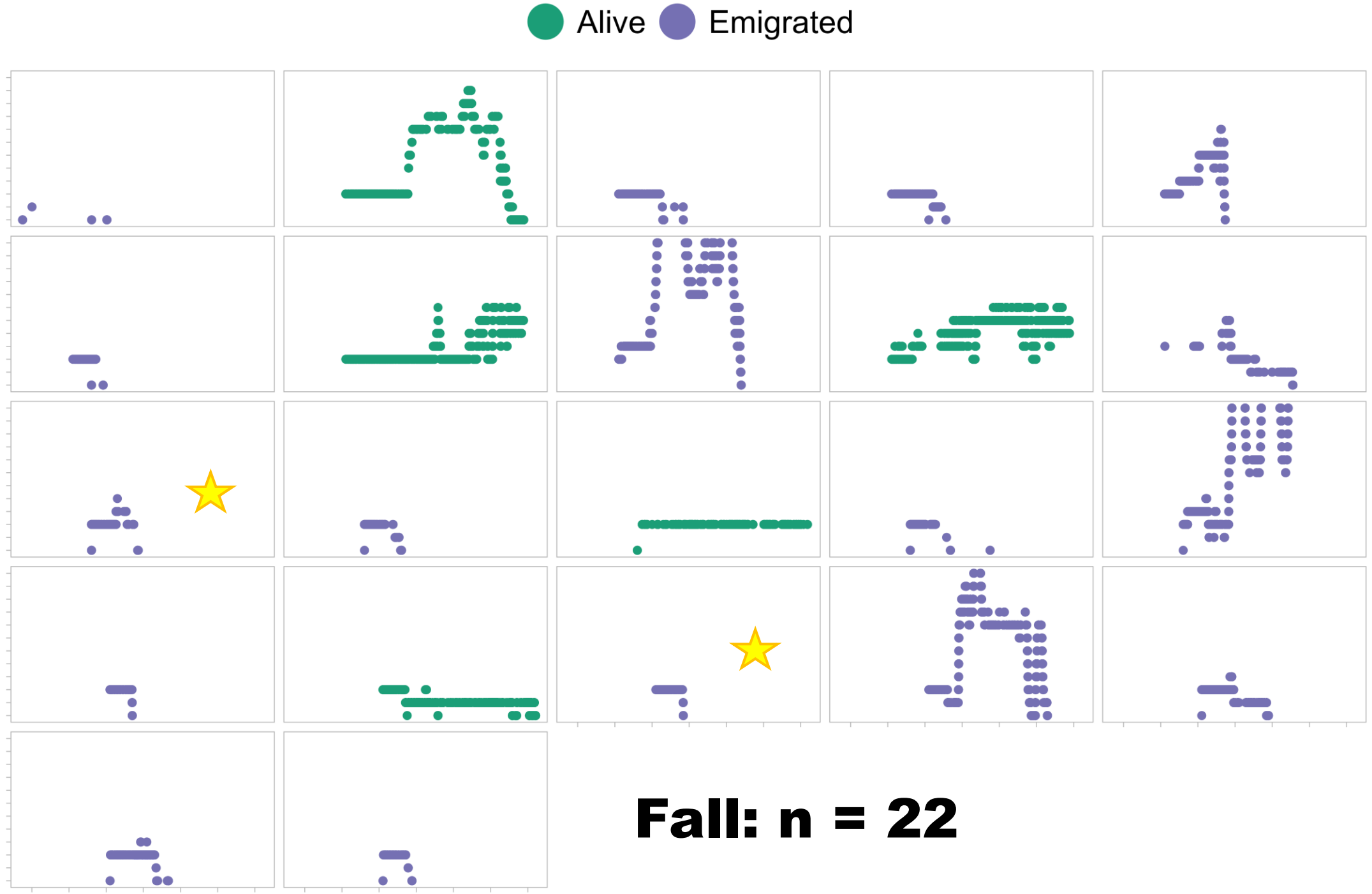

Patuxent River, MD
12
11
0 0.5 1 1.5 2 km
3
2
1
0 0.5 1 1.5 2 km
10
9
8
7
6
5
4
Receiver Array
Detection Range 300m
GMU Deployed Receivers
SERC Active Receivers
0 5 10 15 20 km


Negative Control
Negative Control
Receiver Position
12
11
10
9
8
7
6
5
4
3
2
1
2024-05-06
2024-05-20
2024-06-03
2024-06-17
2024-07-01
2024-05-06
2024-05-20
2024-06-03
2024-06-17
2024-07-01
Date


Alive
Emigrated
CRM
Receiver Position
12
11
10
9
8
7
6
5
4
3
2
1
2024-05-06
2024-05-20
2024-06-03
2024-06-17
2024-07-01
Date


Alive
Emigrated
CRM
Spring: n = 46 + 1

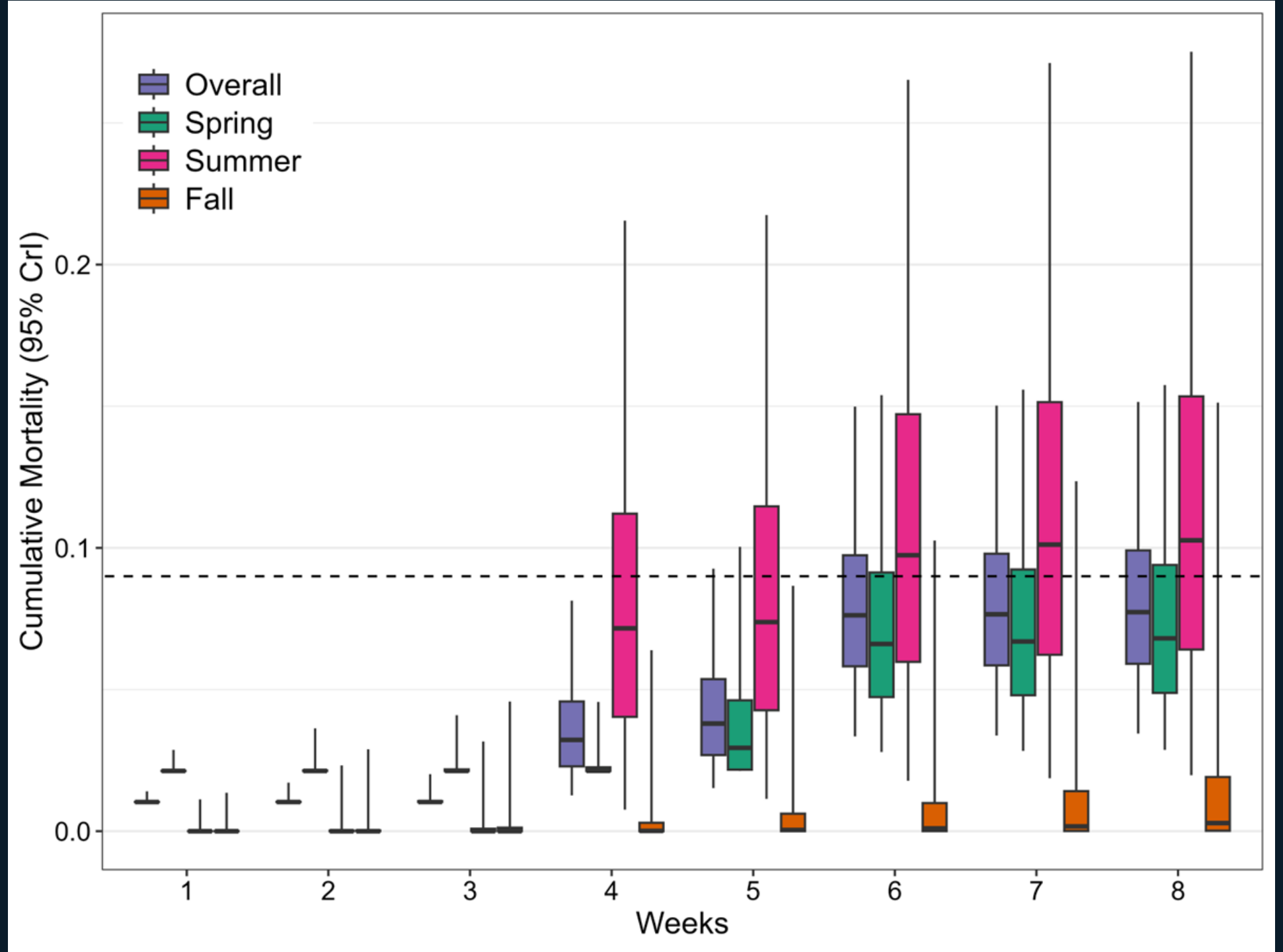

Alive
Emigrated
CRM
Summer: n = 28


Alive
Emigrated
Fall: n = 22

ANALYSIS – BAYESIAN MULTISTATE MODEL

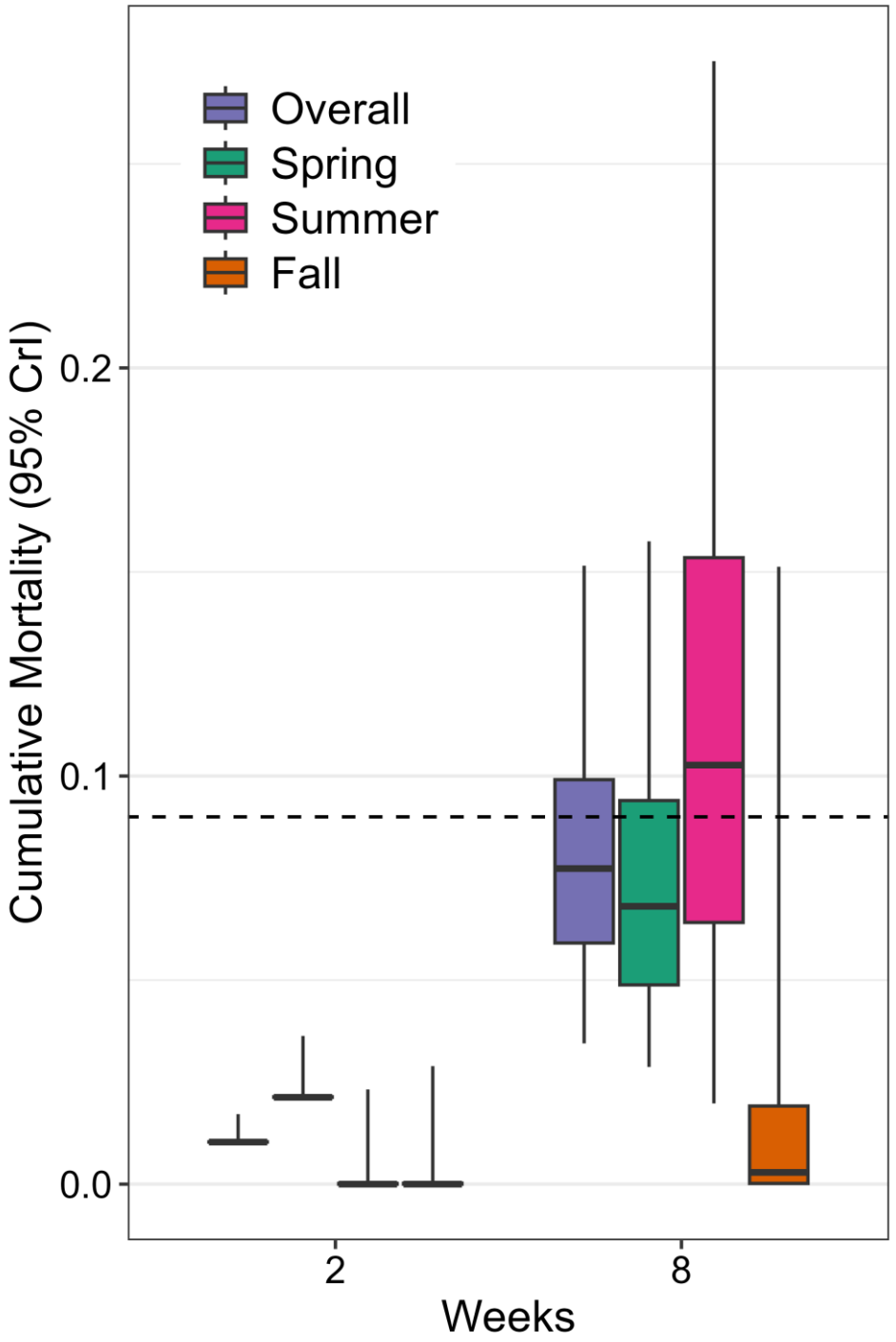
- 3 Observations: Alive (1); Emigrated (2); Unobserved (3)
- 3 States: Alive (1); Emigrated (2); Dead (3)
- Time bin: Weeks

- Estimates state transition and detection probabilities
- Transition from 1 to 3 = Catch and Release Mortality (Z)


Overall
Spring
Summer
Fall
Cumulative Mortality (95% CrI)
0.0
0.1
0.2
1
2
3
4
5
6
7
8
Weeks

ANALYSIS – COX PROPORTIONAL HAZARDS

- Did any covariates increase mortality risk?
  - Temperature, length, release condition, lure, angler experience, etc.
- No significant covariates



- Long term CRM: 7.73% (3.45 – 15.15%)
- Temperature: Summer highest CRM, no statistical significance
- Next steps: Mortality as a function of weekly water temp
- BREP 25 (hopefully): Continue to evaluate temperature and interaction with gear (light tackle vs. trolling)

QUESTIONS?

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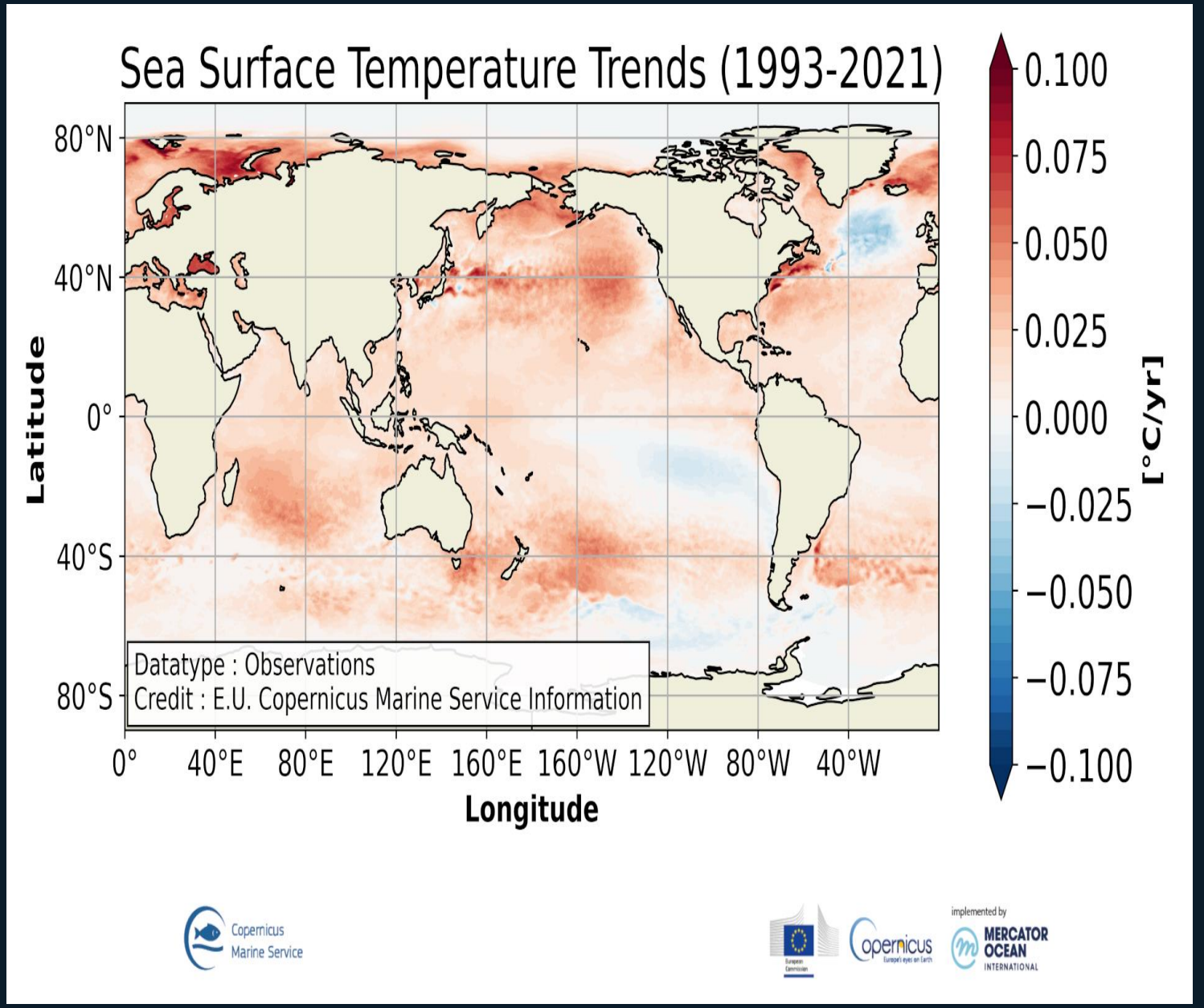
Season	Short term CRM (2 weeks)	Long term CRM (8 weeks)
Overall	1.031% (1.031-1.715%)	7.733% (3.449-15.154%)
Spring	2.128% (2.128-3.632%)	6.808% (2.871-15.751%)
Summer	<0.001% (<0.001%-2.322%)	10.269% (1.978-27.517%)
Fall	<0.001% (<0.001-2.892%)	0.288% (<0.001-15.129%)

REFERENCES

1. Atlantic Striped Bass. Atlantic States Marine Fisheries Commission. [Accessed 2025 Jan 20]. https://www.asmfc.org/species/atlantic-striped-bass.
2. Diodati PJ, R. Anne Richards. 1996 Mar 1. Mortality of Striped Bass Hooked and Released in Salt Water. doi:https://doi.org/10.1577/1548-8659(1996)125%3C0300:mosbha%3E2.3.co;2.
3. Global Ocean Sea Surface Temperature trend map from Observations Reprocessing. 2019. Copernicuseu. doi:https://doi.org/10.48670/moi-00243. [accessed 2025 Feb 7]. https://data.marine.copernicus.eu/product/GLOBAL_OMI_TEMPSAL_sst_trend/description.
4. Groner ML, Hoenig JM, Pradel R, Choquet R, Vogelbein WK, Gauthier DT, Friedrichs MAM. 2018. Dermal mycobacteriosis and warming sea surface tempertures are associated with elevated mortality of stribed bass in Chesapeake Bay. Ecology and Evolution. 8(18): 9384 – 9397. doi:https://doi.org/10.1002/ece3.4462.

BACKGROUND

- Recreational & Commercial Fishery
  - Overfished
- Catch and Release Mortality (CRM)
  - ~50% Total Removals 2018-2021
- Fixed 9% CRM Estimate
  - Data currently inadequate for an updated model
  - Few *in situ* studies
- Rising temperatures



ASFMC 2025; Copernicus EU 2025; Diodati & Richards 1996; Groner et. al. 2018