

Appendix E: Power Analysis Results for the Combined Model

Caption for figures:

Power curves (top panel) show the estimated power to detect a hotspot/coldspot of various effect sizes for each sample size (number of transect segments) from 1 to 200. Red solid, dashed, and dotted lines represent the estimated power to detect a hotspot of 3, 10, and 20 times the reference mean, respectively. Blue solid, dashed, and dotted lines represent the estimated power to detect a coldspot of $\frac{1}{3}$, $\frac{1}{10}$, and $\frac{1}{20}$ times the reference mean, respectively. Blue lines that are absent indicate that the estimated power to detect a coldspot was undefined because the effect size times the reference mean was less than or equal to one. Boxplots (bottom panel) show the distribution of estimated power to detect a hotspot/coldspot of various effect sizes based on the number of transect segments surveyed within each grid cell for each spatial resolution. The number of grid cells with survey effort and the percentage of grid cells that achieve 80% power to detect a hotspot/coldspot are shown below the horizontal axis.

Citation for main document:

Leirness JB, Kinlan BP. 2018. Additional statistical analyses to support guidelines for marine avian sampling. Sterling (VA): US Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM 2018-063. iii+43 p.

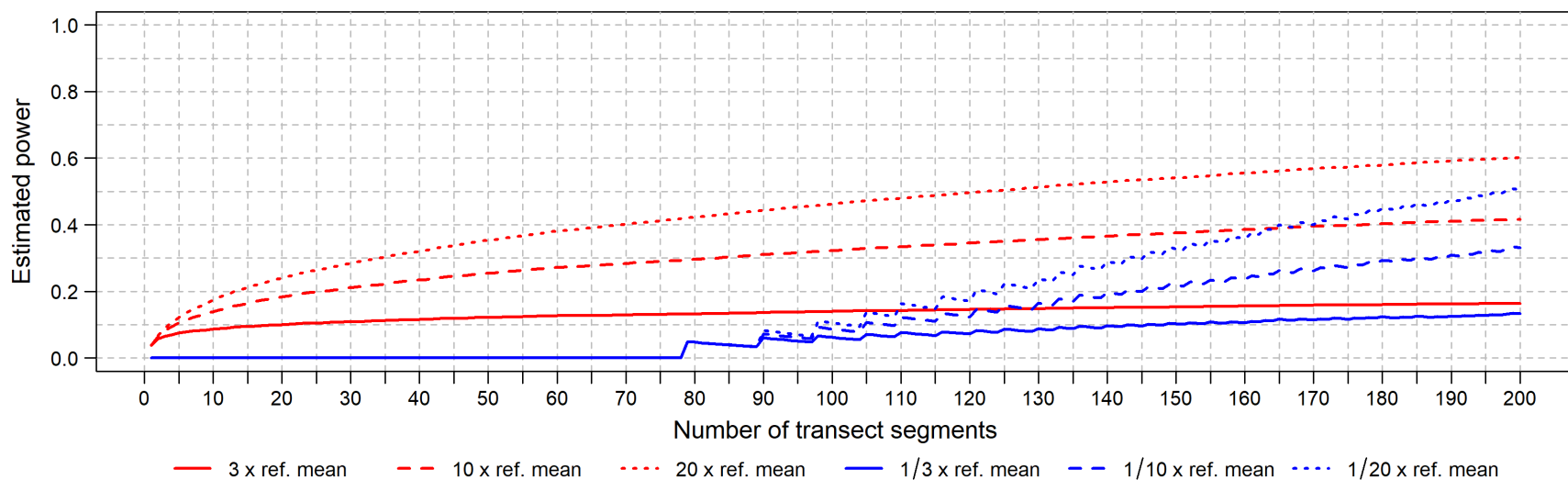
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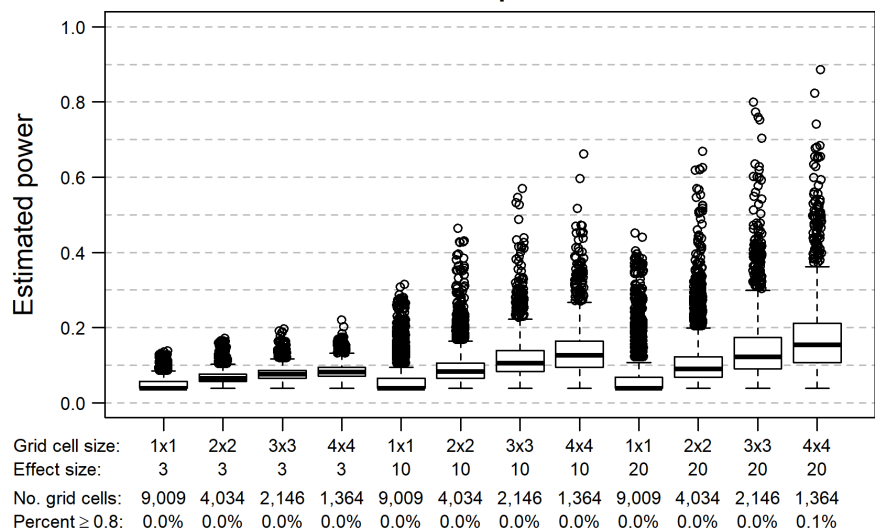
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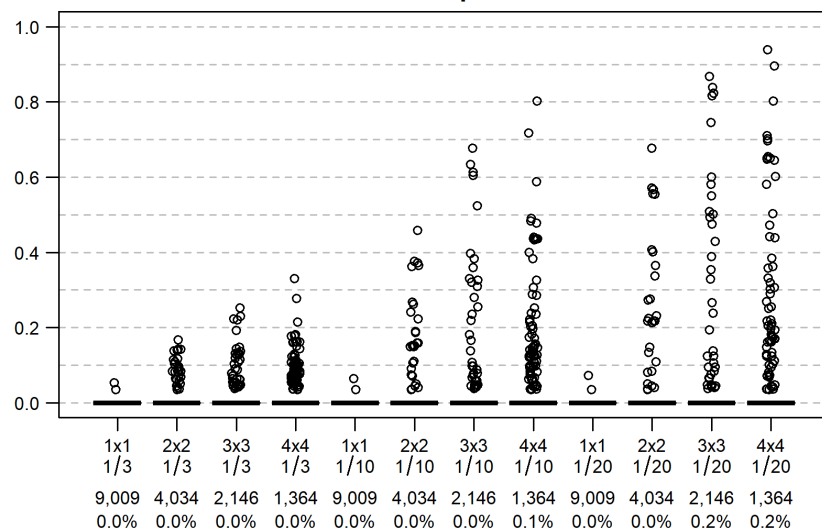
Common Eider: spring



Hotspot



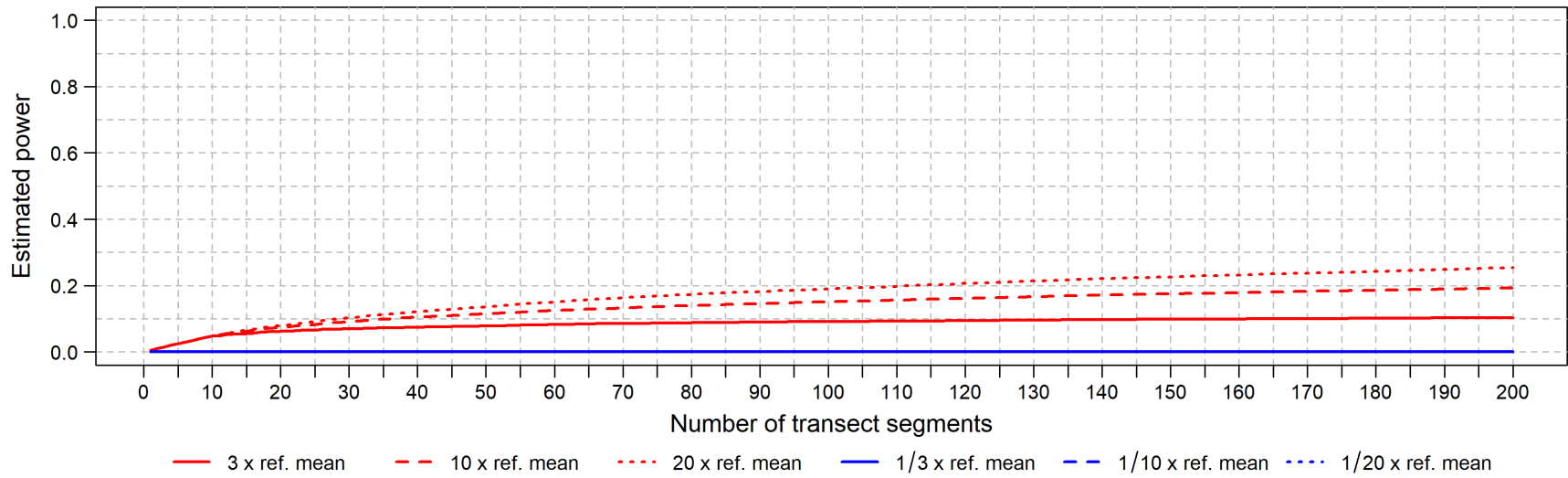
Coldspot



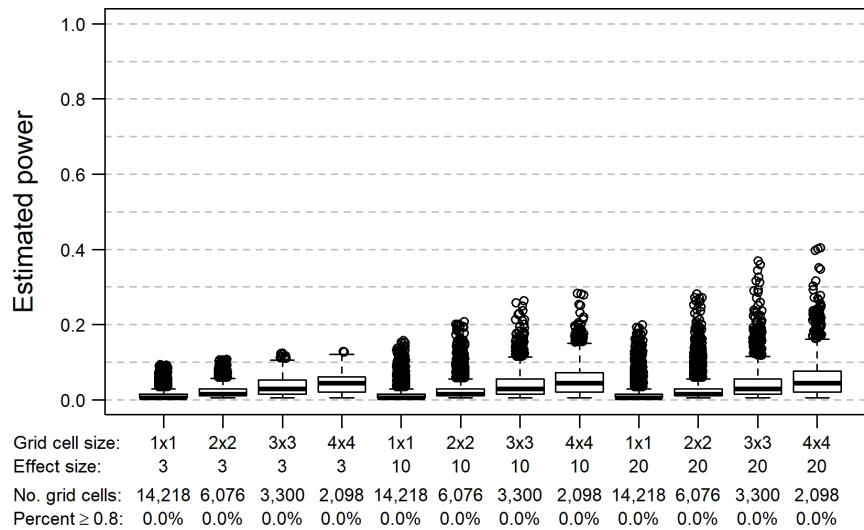
E-5

Figure E1. Power analysis results for Common Eider during spring based on the combined model (type I error rate = 0.05)

Common Eider: summer



Hotspot



Coldspot

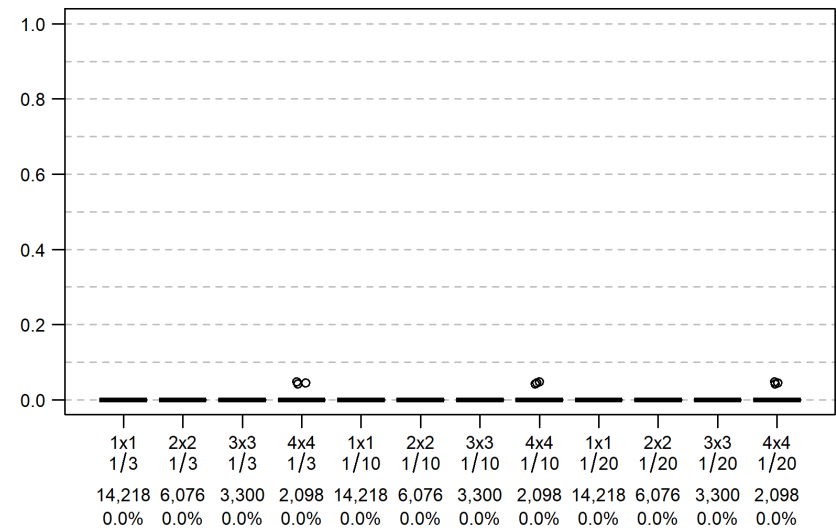
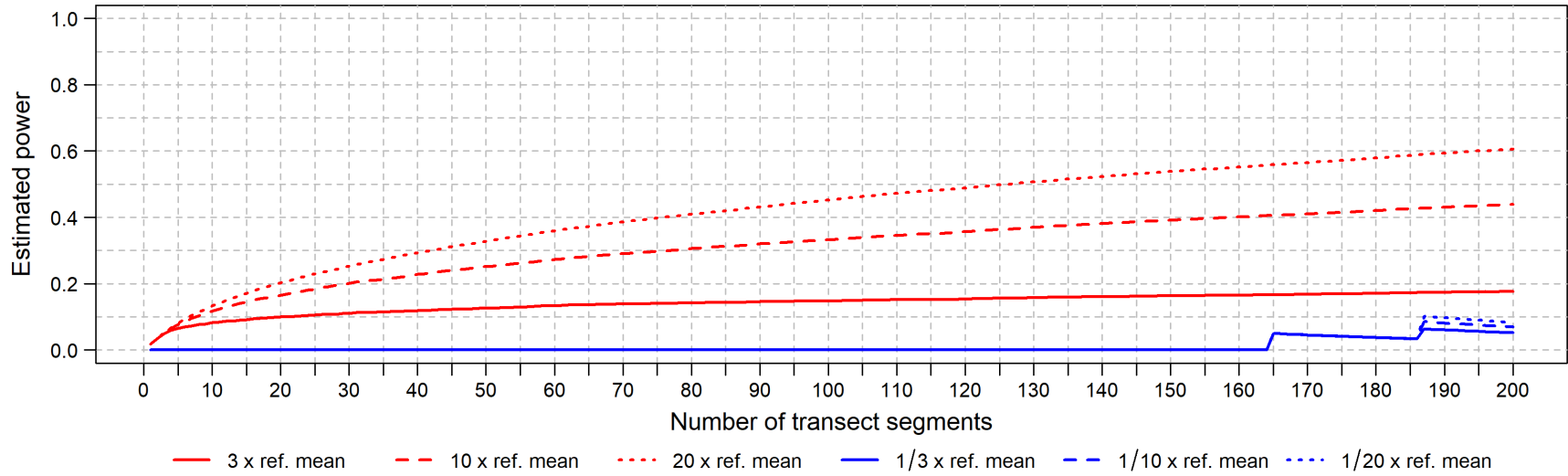
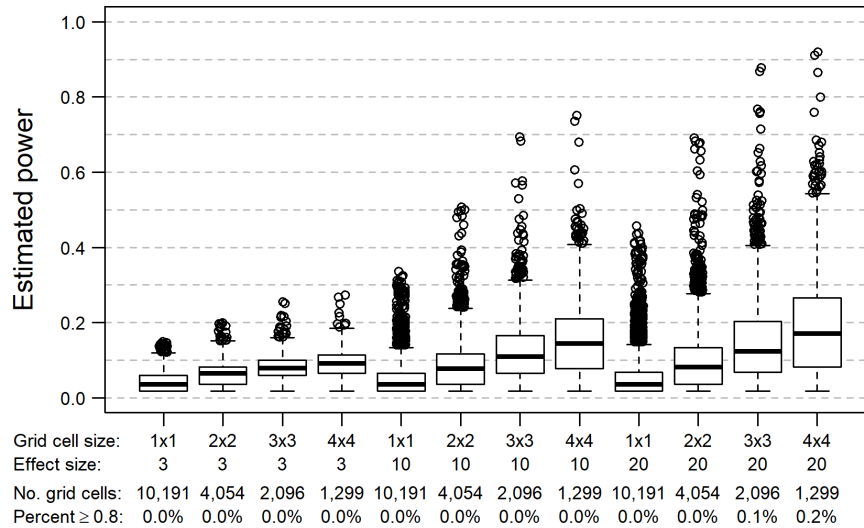


Figure E2. Power analysis results for Common Eider during summer based on the combined model (type I error rate = 0.05)

Common Eider: fall



Hotspot



Coldspot

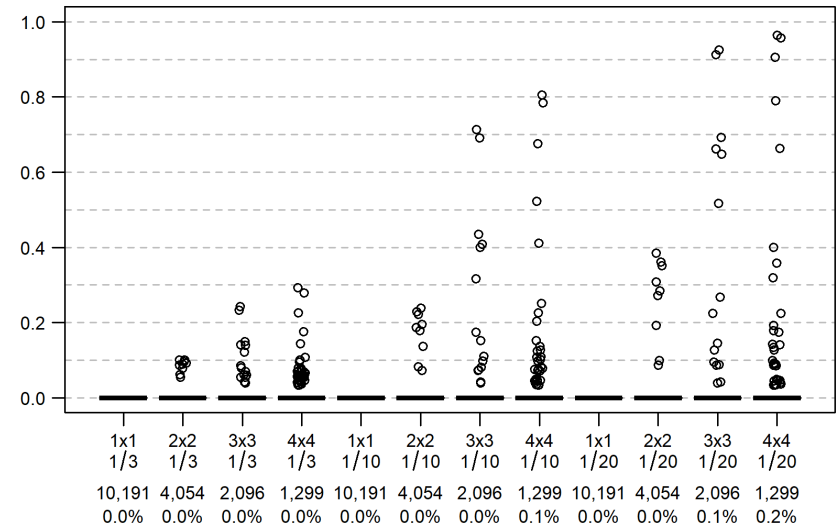
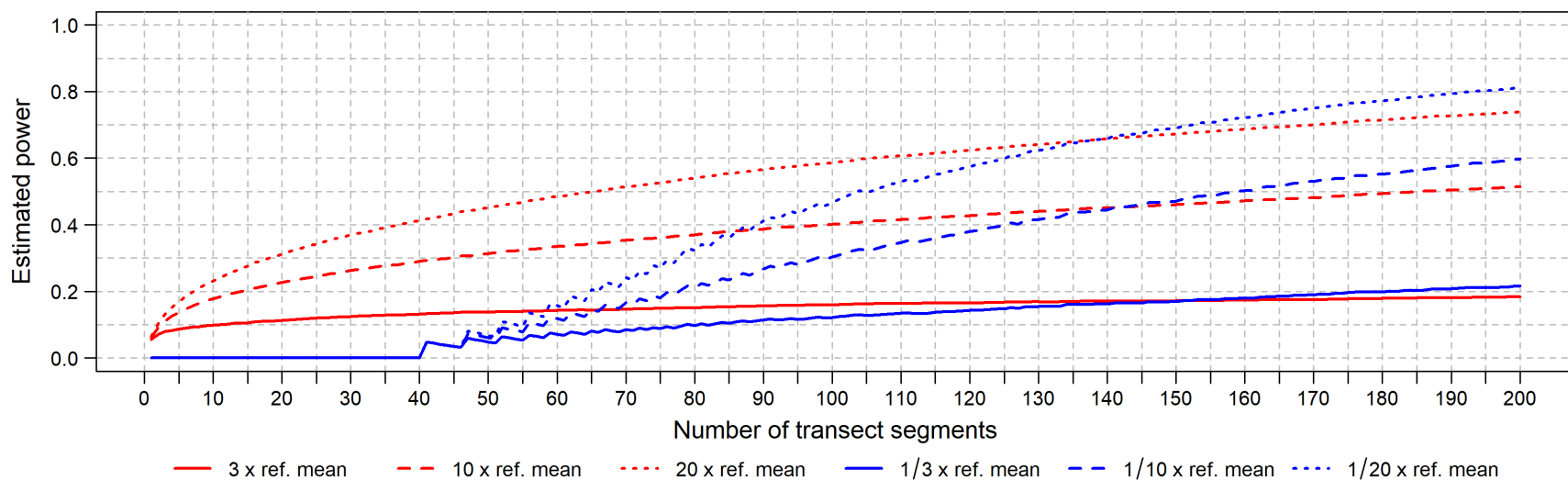
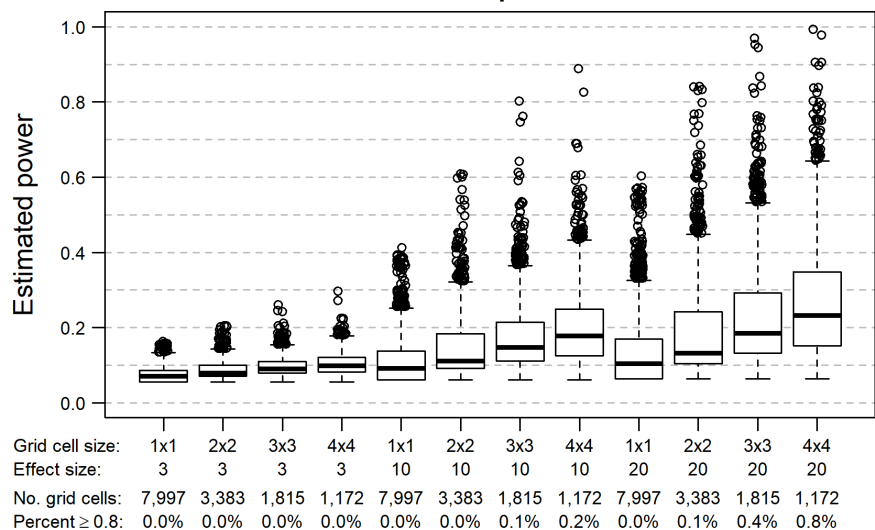


Figure E3. Power analysis results for Common Eider during fall based on the combined model (type I error rate = 0.05)

Common Eider: winter



Hotspot



Coldspot

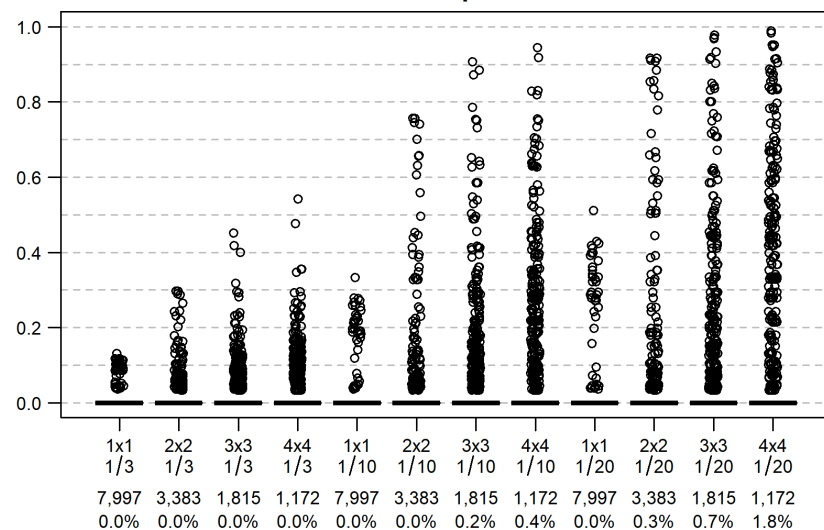
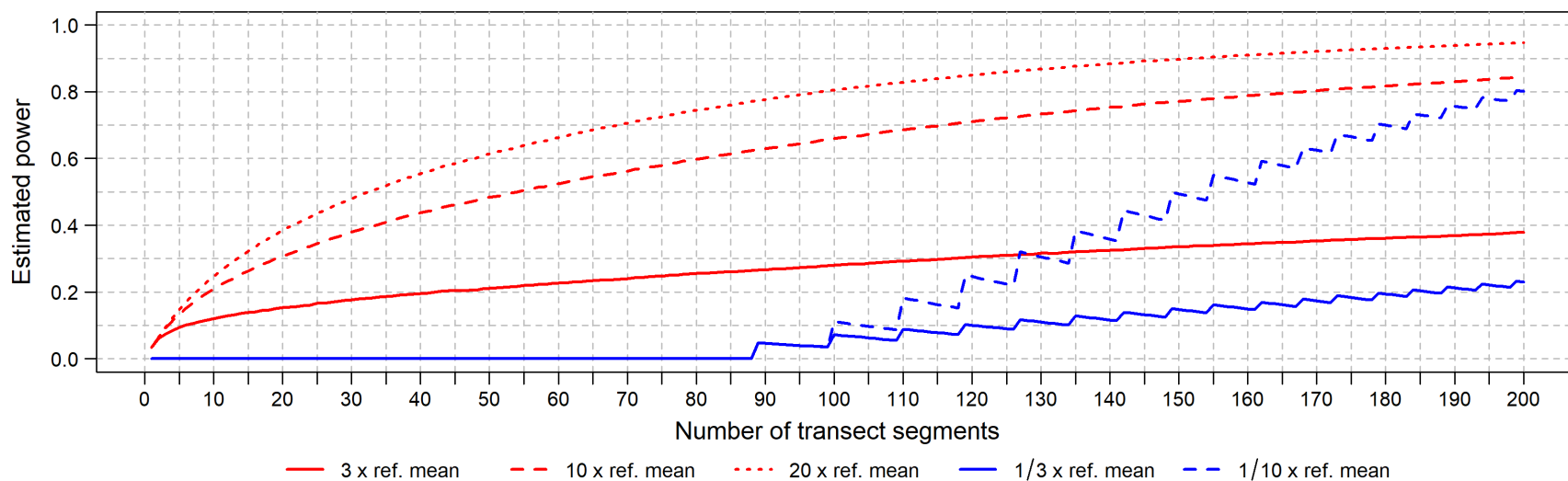
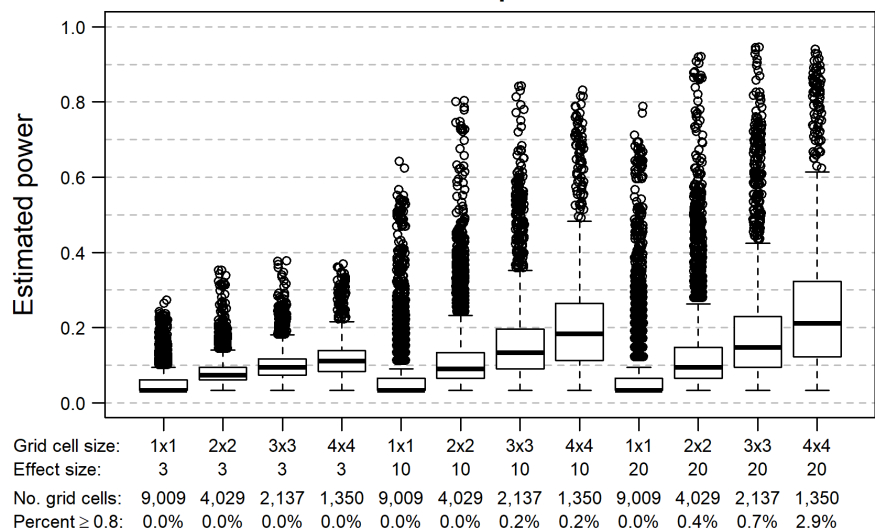


Figure E4. Power analysis results for Common Eider during winter based on the combined model (type I error rate = 0.05)

Surf Scoter: spring



Hotspot



Coldspot

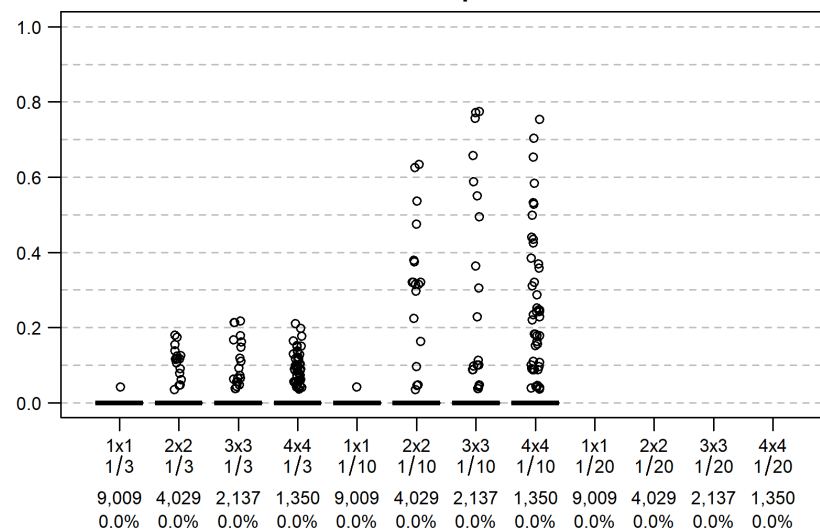
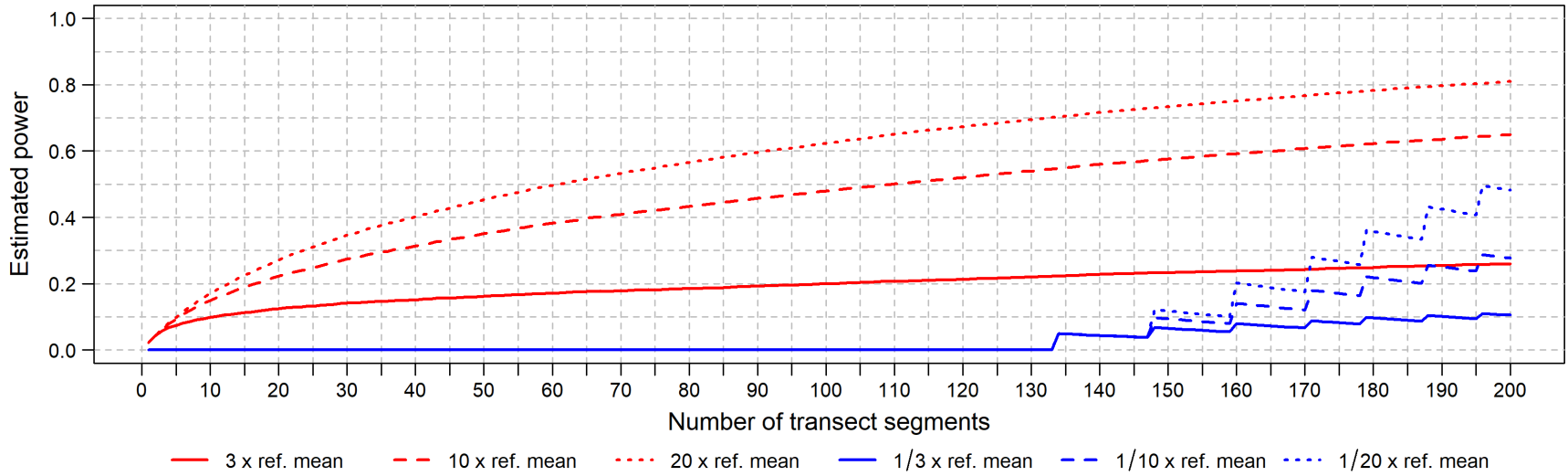
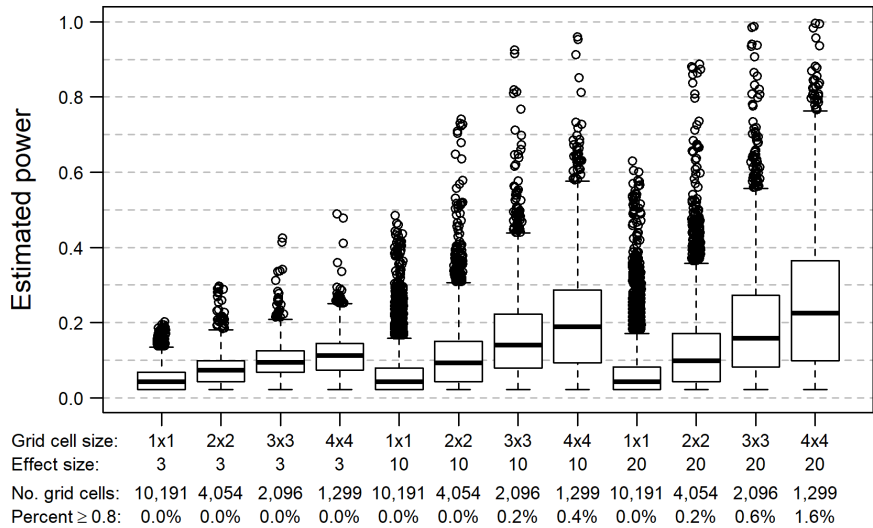


Figure E5. Power analysis results for Surf Scoter during spring based on the combined model (type I error rate = 0.05)

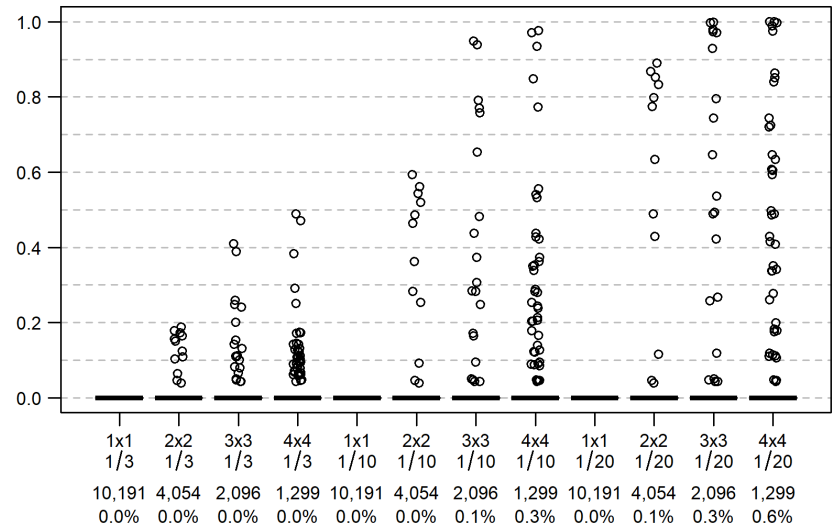
Surf Scoter: fall



Hotspot



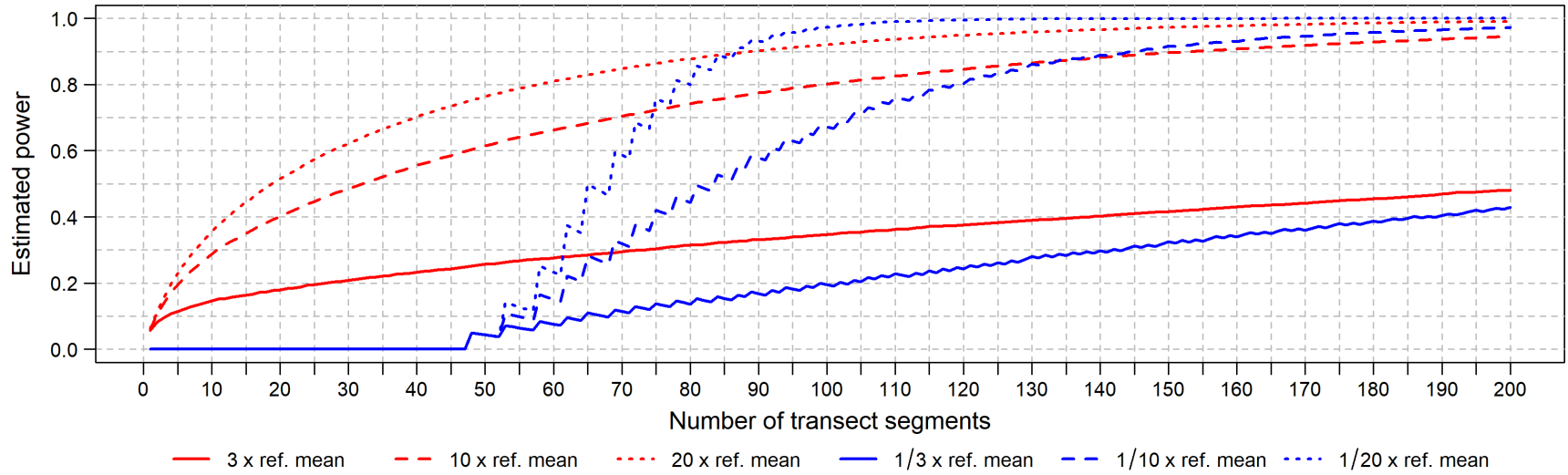
Coldspot



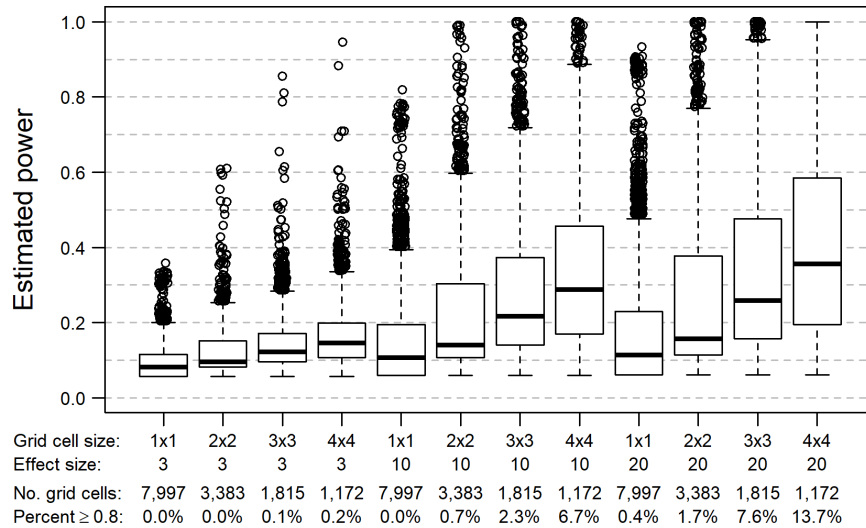
E-10

Figure E6. Power analysis results for Surf Scoter during fall based on the combined model (type I error rate = 0.05)

Surf Scoter: winter



Hotspot



Coldspot

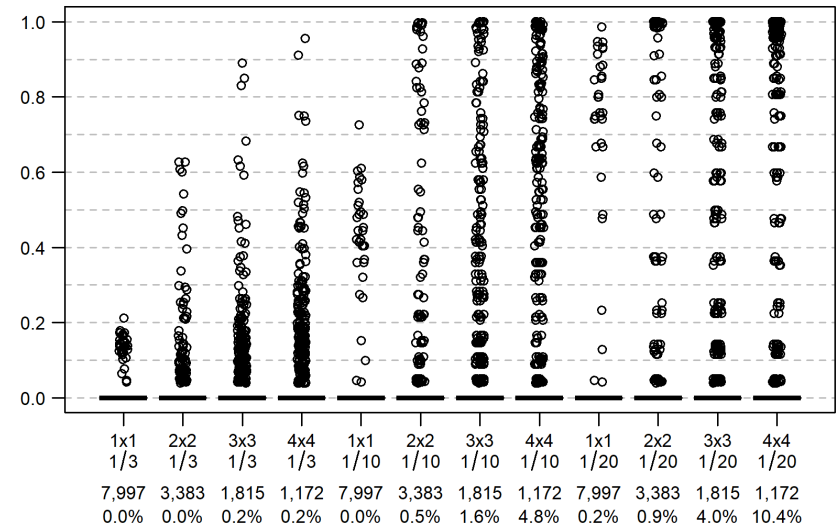
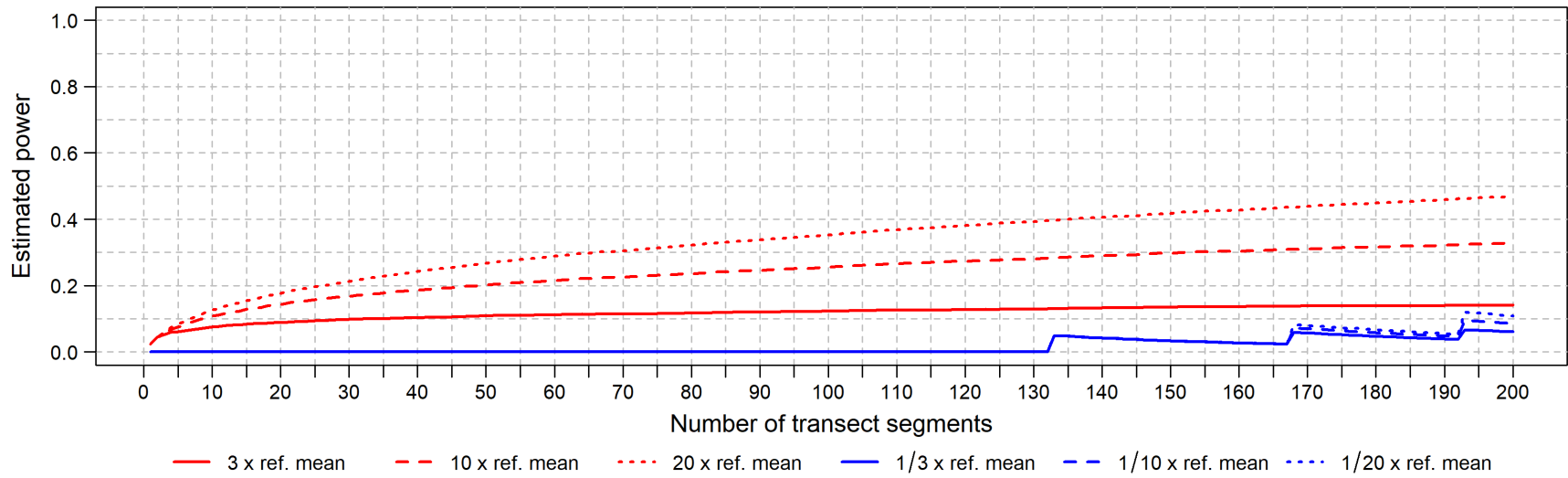
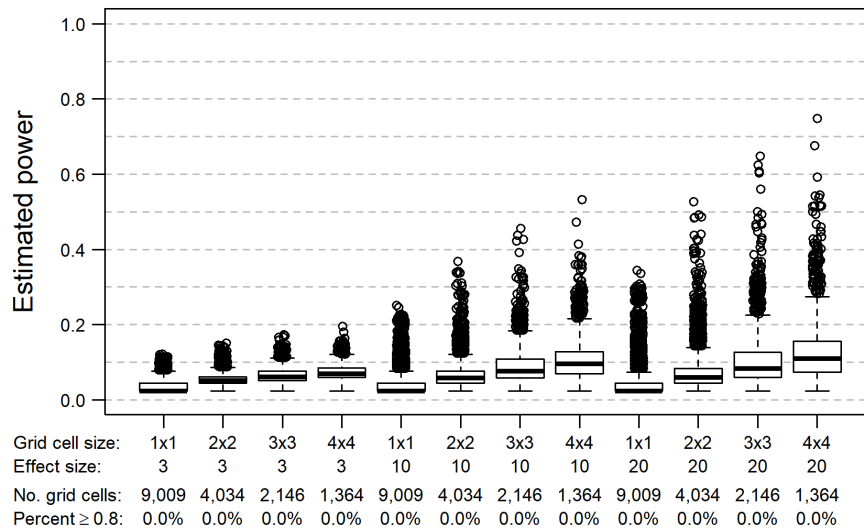


Figure E7. Power analysis results for Surf Scoter during winter based on the combined model (type I error rate = 0.05)

White-winged Scoter: spring



Hotspot



Coldspot

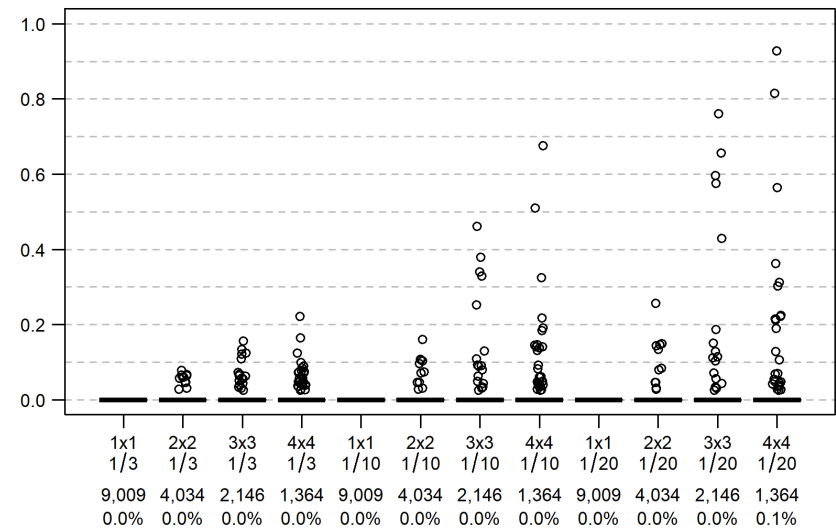
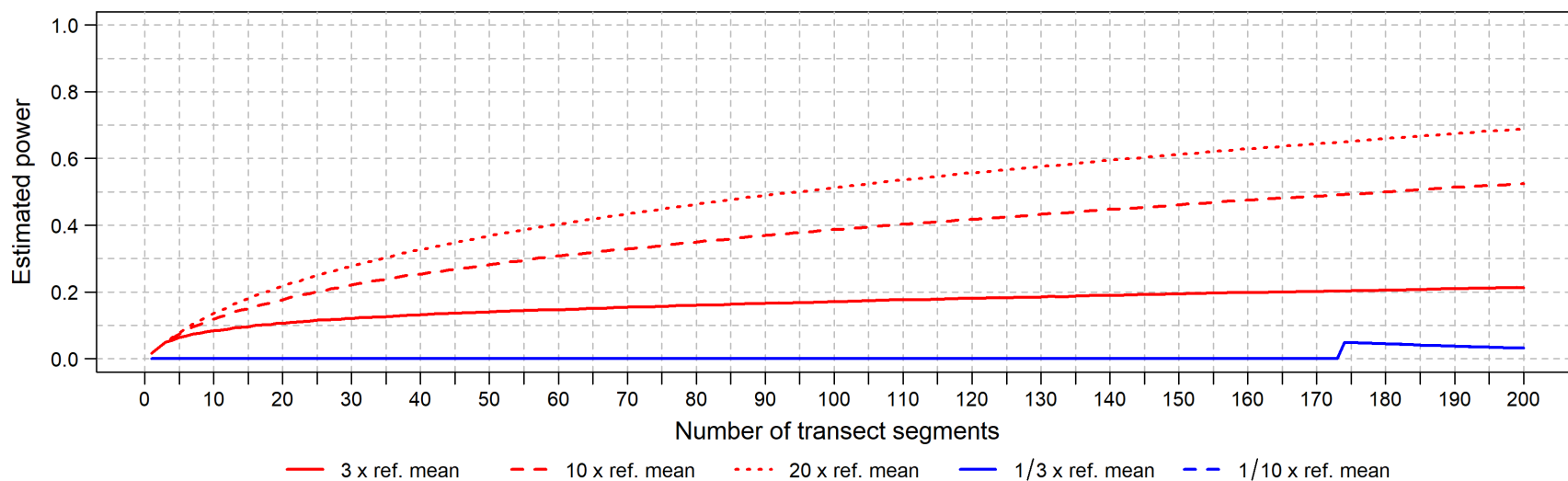
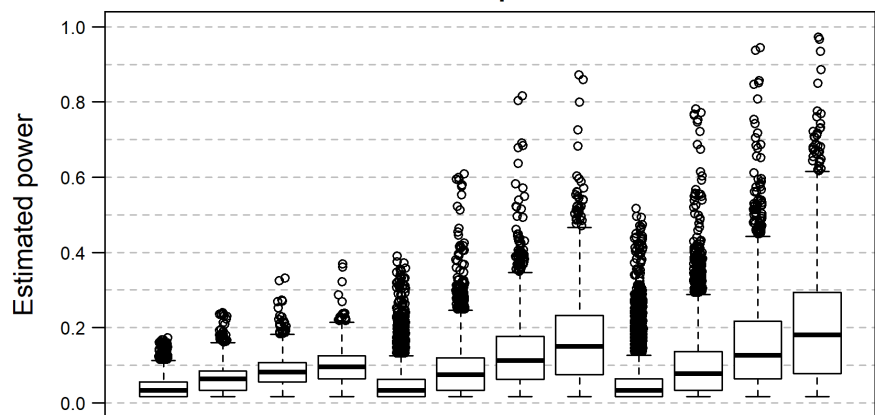


Figure E8. Power analysis results for White-winged Scoter during spring based on the combined model (type I error rate = 0.05)

White-winged Scoter: fall

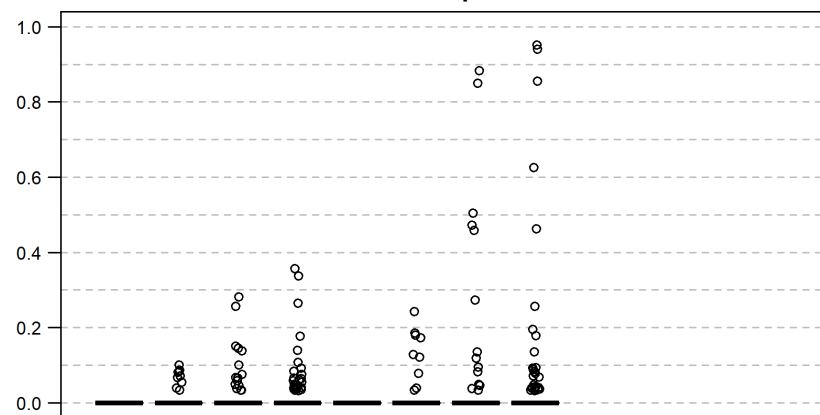


Hotspot



Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	3	3	3	3	10	10	10	10	20	20	20	20
No. grid cells:	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299
Percent ≥ 0.8 :	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.0%	0.0%	0.3%	0.4%

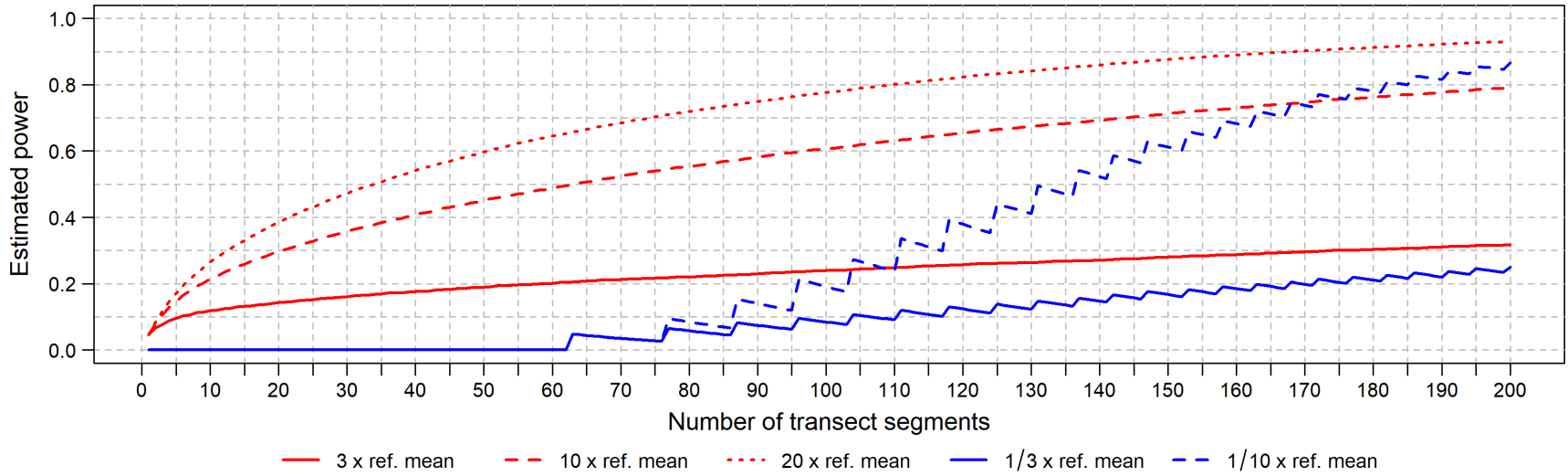
Coldspot



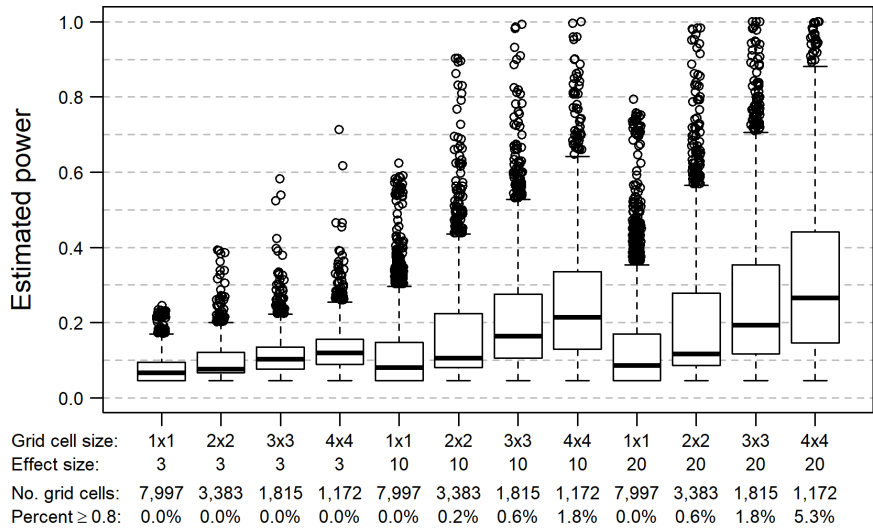
Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	1/3	1/3	1/3	1/3	1/10	1/10	1/10	1/10	1/20	1/20	1/20	1/20
No. grid cells:	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299
Percent ≥ 0.8 :	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%

Figure E9. Power analysis results for White-winged Scoter during fall based on the combined model (type I error rate = 0.05)

White-winged Scoter: winter



Hotspot



Coldspot

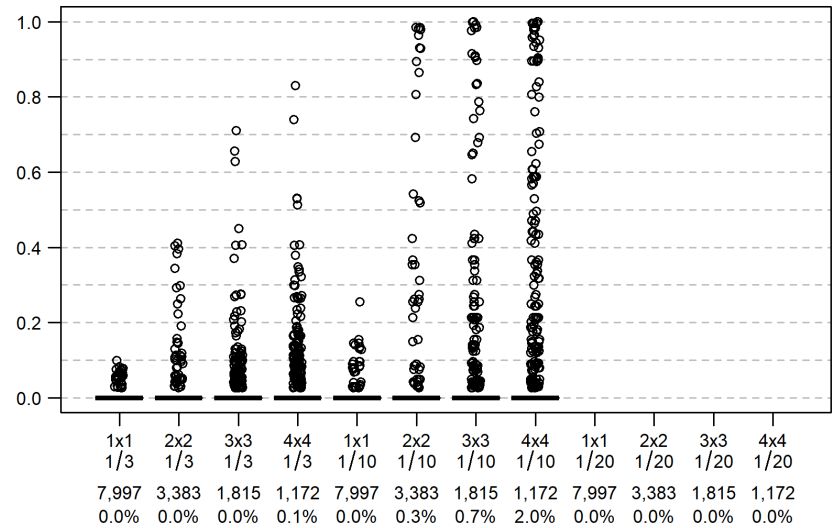
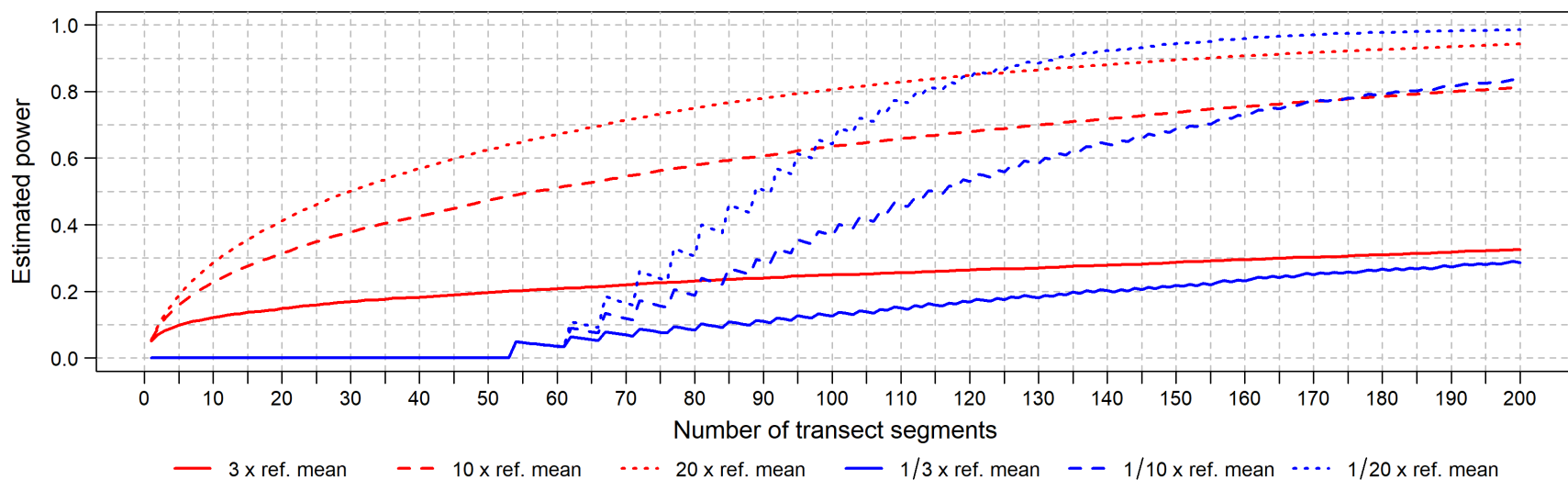


Figure E10. Power analysis results for White-winged Scoter during winter based on the combined model (type I error rate = 0.05)

Long-tailed Duck: spring



E-15

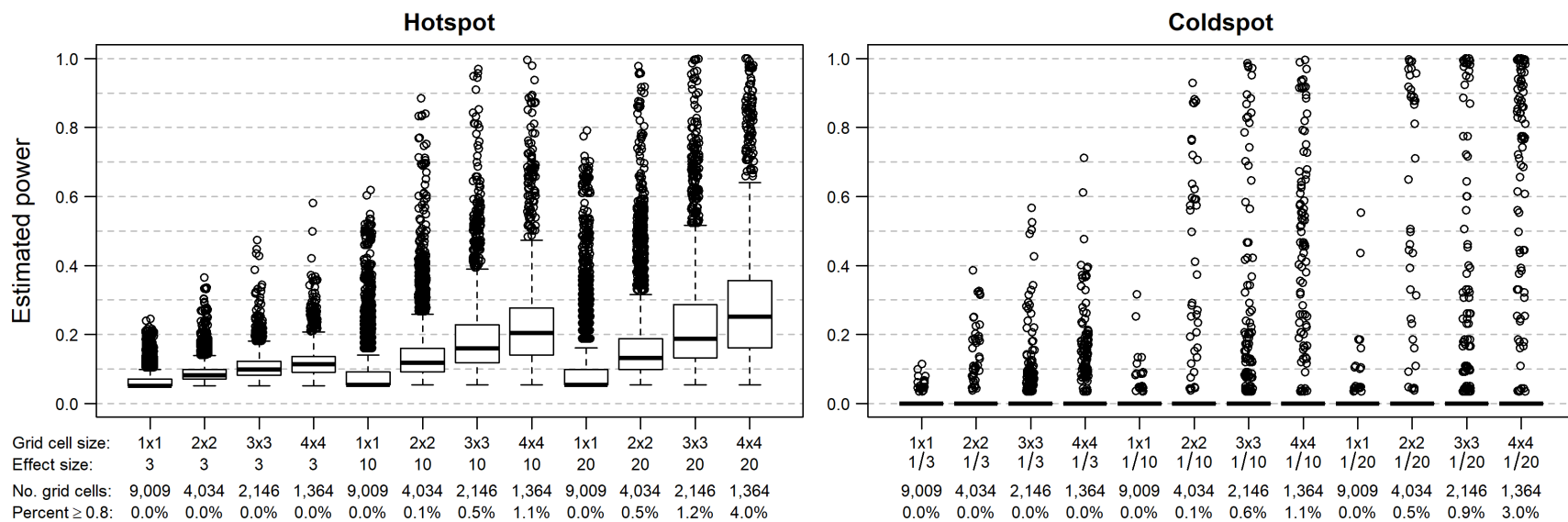
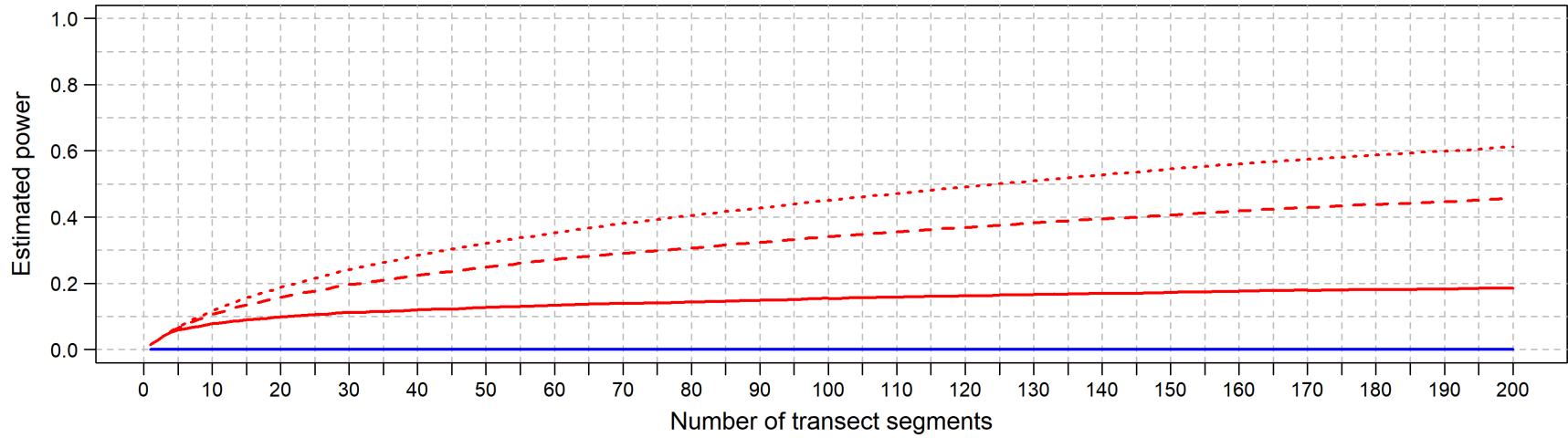


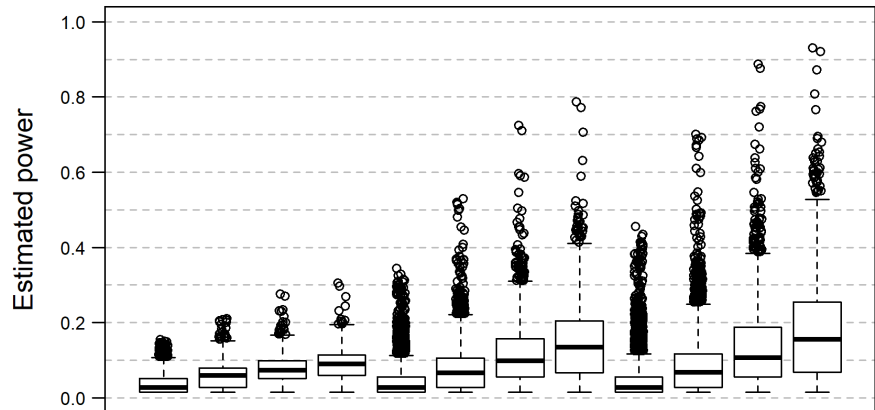
Figure E11. Power analysis results for Long-tailed Duck during spring based on the combined model (type I error rate = 0.05)

Long-tailed Duck: fall



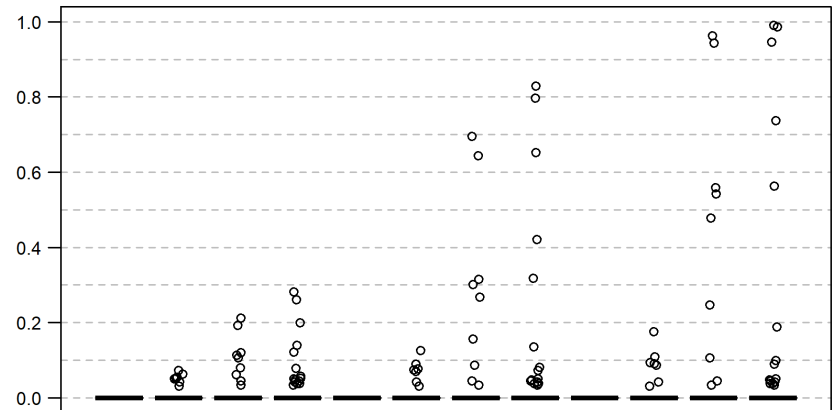
— 3 x ref. mean
 - - - 10 x ref. mean
 . . . 20 x ref. mean
— 1/3 x ref. mean
- - - 1/10 x ref. mean
. . . 1/20 x ref. mean

Hotspot



Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	3	3	3	3	10	10	10	10	20	20	20	20
No. grid cells:	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299
Percent ≥ 0.8 :	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.3%

Coldspot

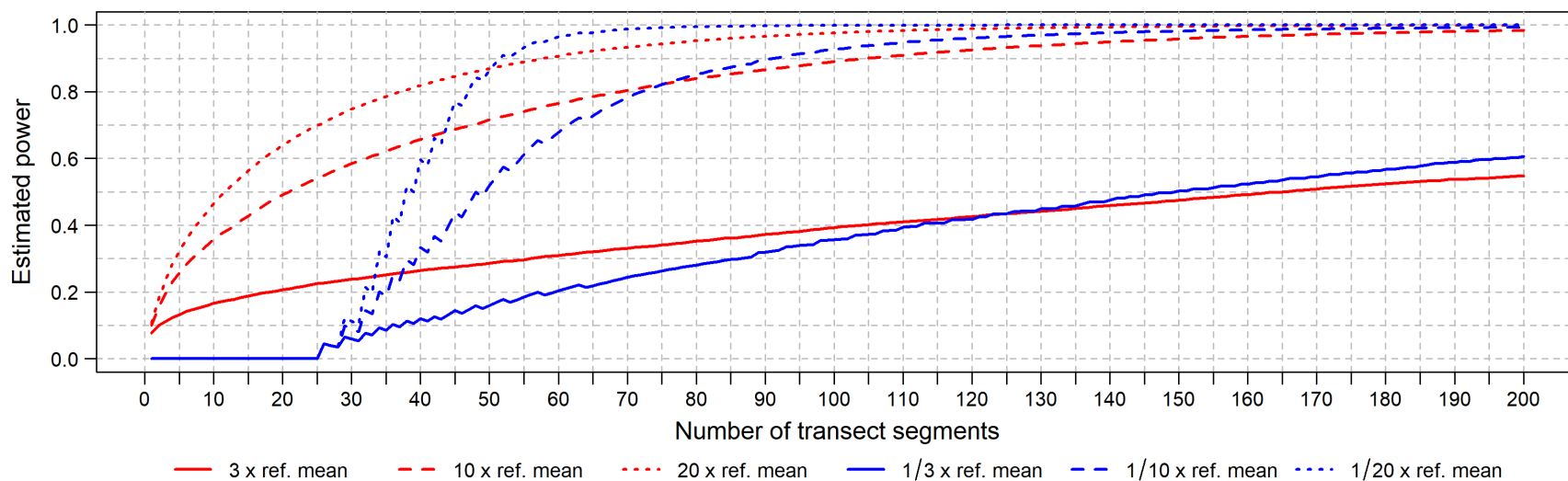


Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	1/3	1/3	1/3	1/3	1/10	1/10	1/10	1/10	1/20	1/20	1/20	1/20
No. grid cells:	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299
Percent ≥ 0.8 :	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.2%

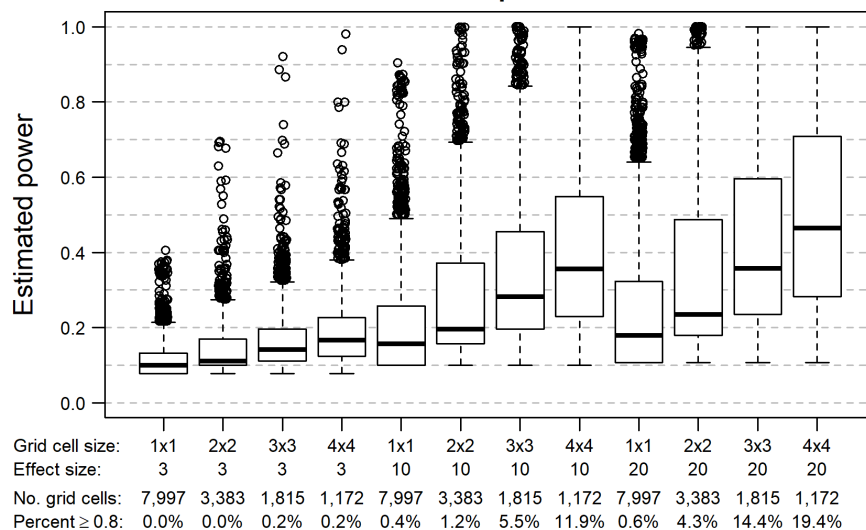
E-16

Figure E12. Power analysis results for Long-tailed Duck during fall based on the combined model (type I error rate = 0.05)

Long-tailed Duck: winter



Hotspot



Coldspot

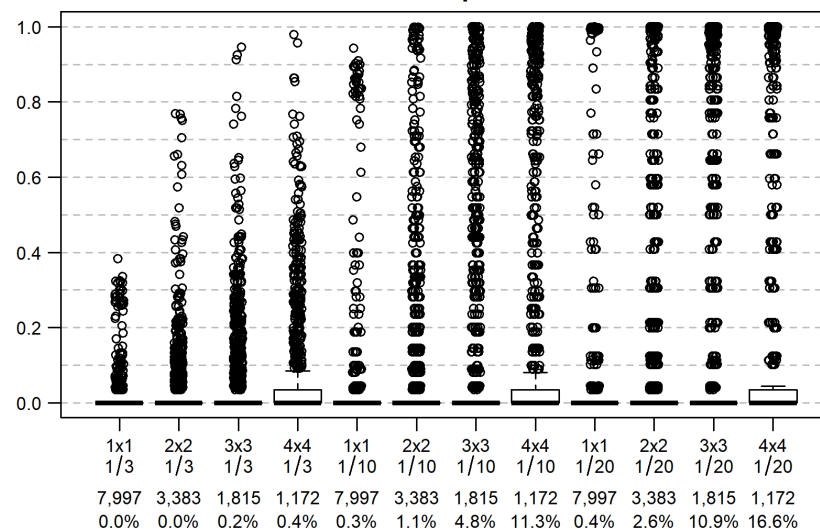
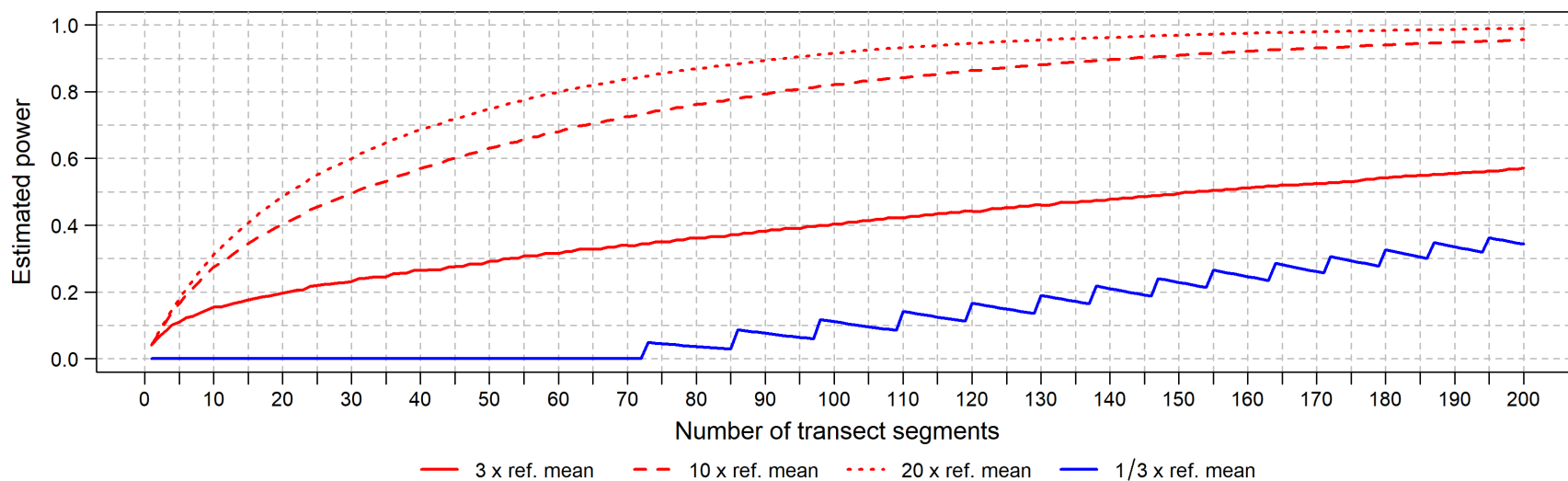


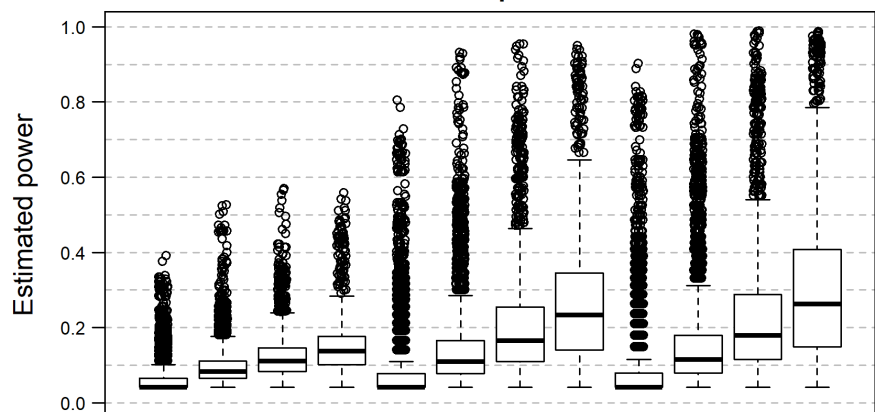
Figure E13. Power analysis results for Long-tailed Duck during winter based on the combined model (type I error rate = 0.05)

Razorbill: spring



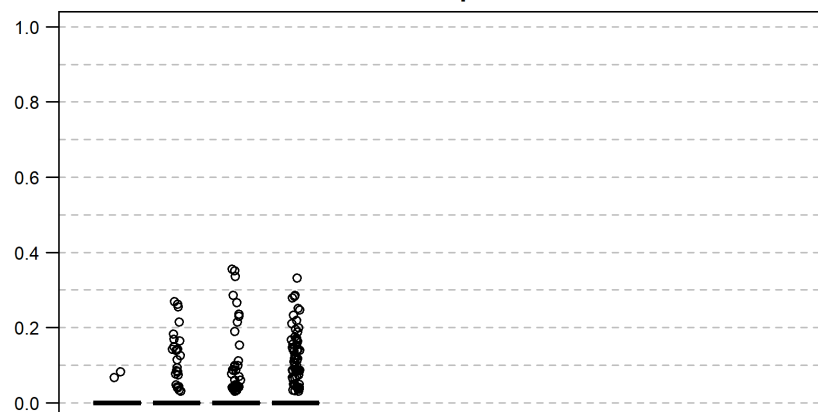
— 3 x ref. mean - - 10 x ref. mean ··· 20 x ref. mean — 1/3 x ref. mean

Hotspot



Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	3	3	3	3	10	10	10	10	20	20	20	20
No. grid cells:	9,009	4,029	2,137	1,350	9,009	4,029	2,137	1,350	9,009	4,029	2,137	1,350
Percent ≥ 0.8 :	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.9%	3.3%	0.1%	0.7%	3.4%	5.2%

Coldspot

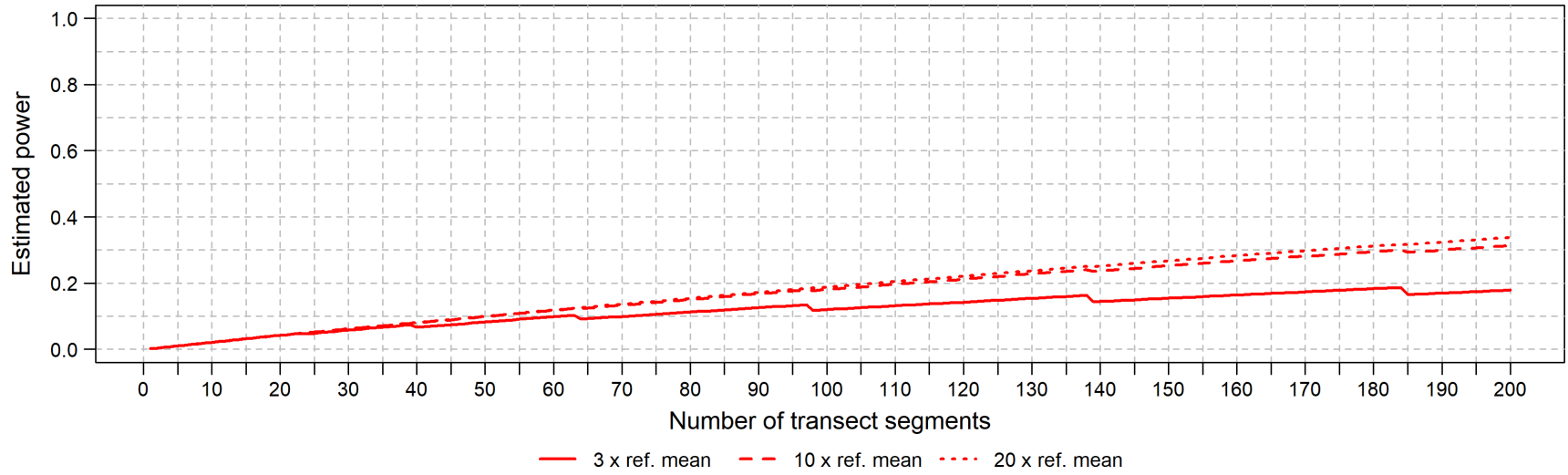


Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	1/3	1/3	1/3	1/3	1/10	1/10	1/10	1/10	1/20	1/20	1/20	1/20
No. grid cells:	9,009	4,029	2,137	1,350	9,009	4,029	2,137	1,350	9,009	4,029	2,137	1,350
Percent ≥ 0.8 :	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

E-18

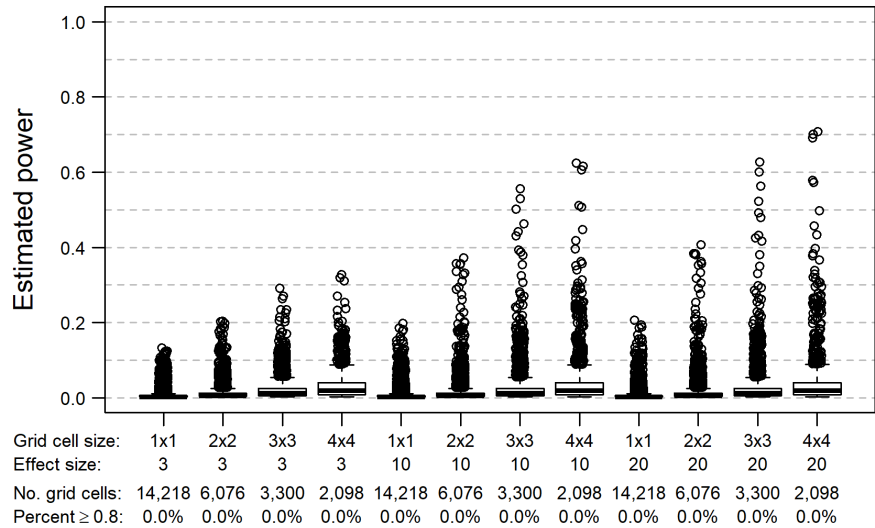
Figure E14. Power analysis results for Razorbill during spring based on the combined model (type I error rate = 0.05)

Razorbill: summer



E-19

Hotspot



Coldspot

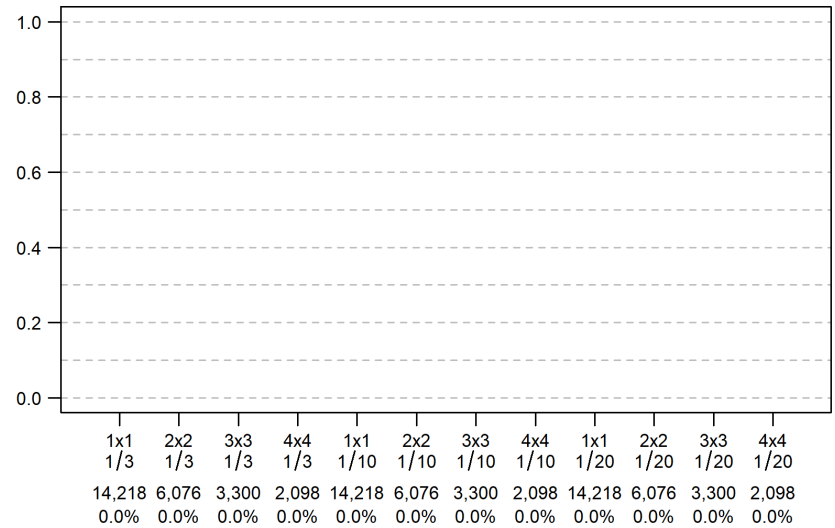
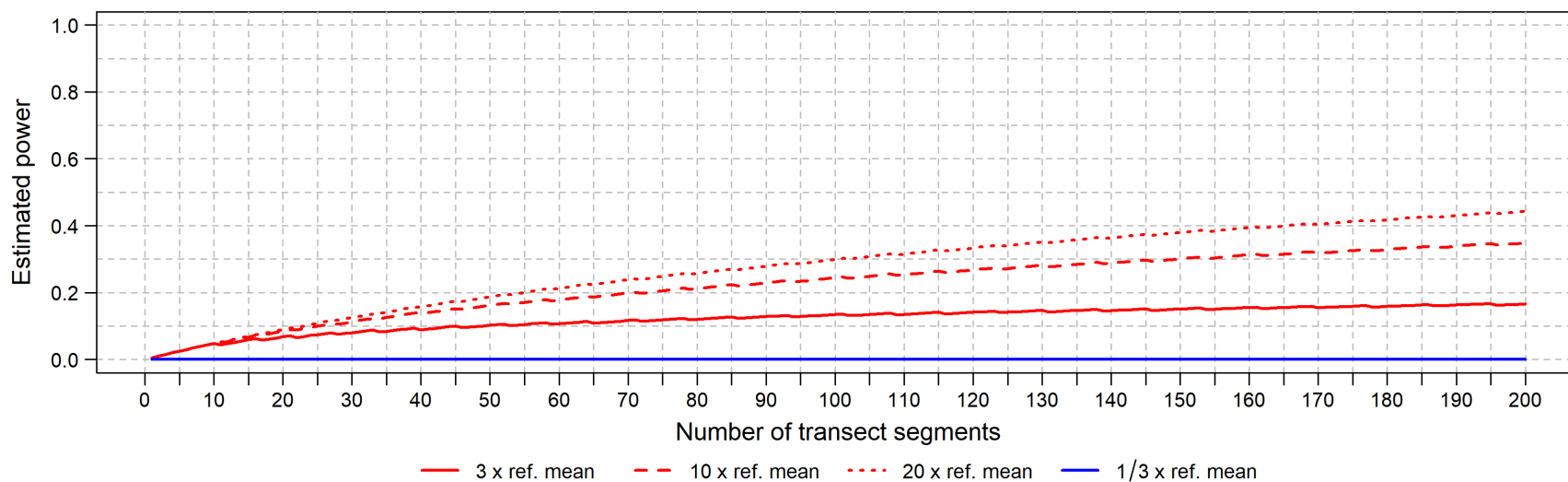
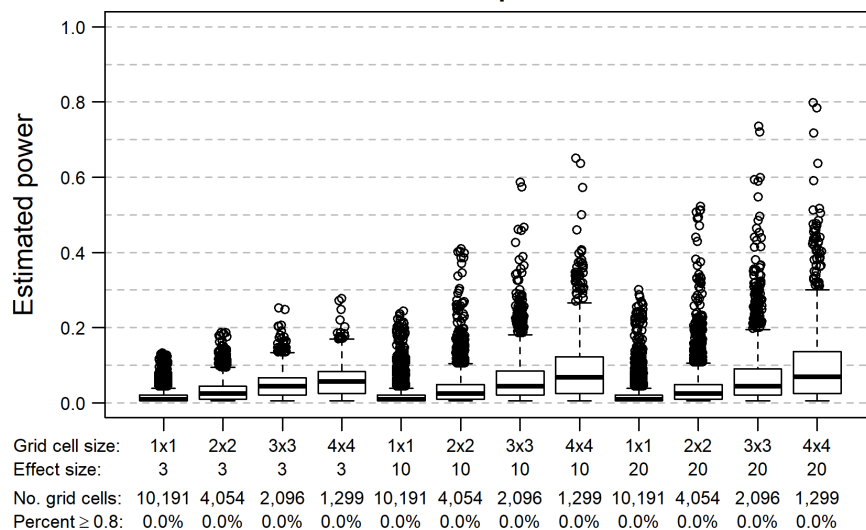


Figure E15. Power analysis results for Razorbill during summer based on the combined model (type I error rate = 0.05)

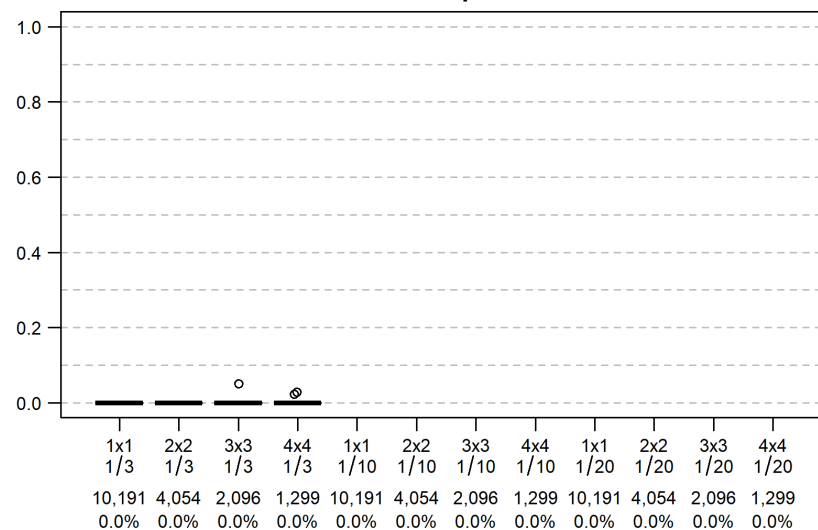
Razorbill: fall



Hotspot



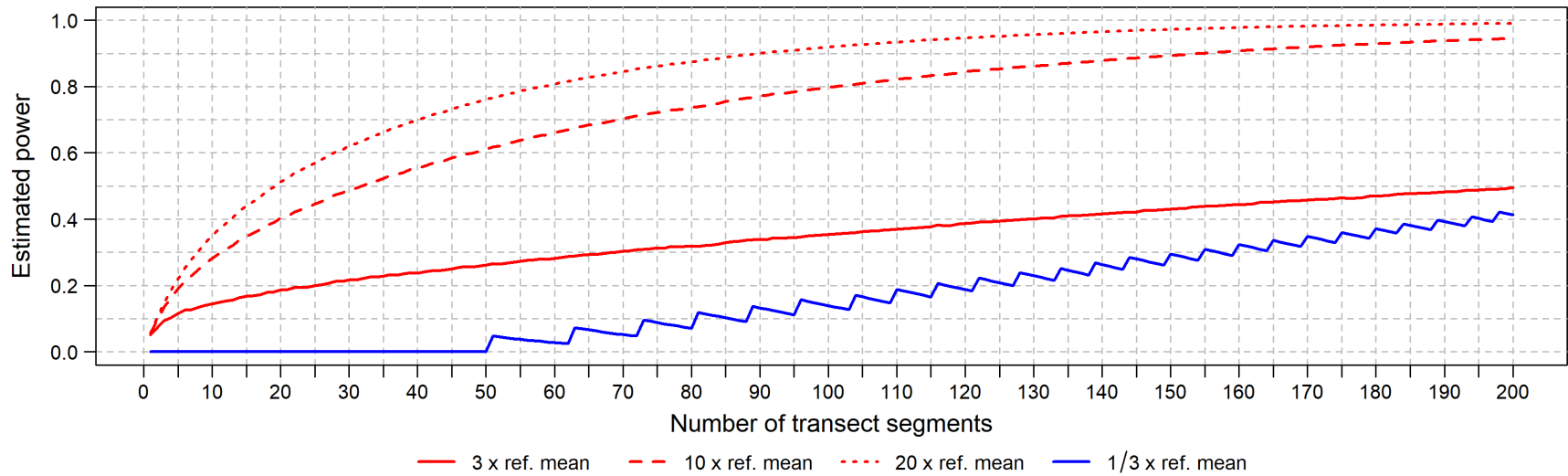
Coldspot



E-20

Figure E16. Power analysis results for Razorbill during fall based on the combined model (type I error rate = 0.05)

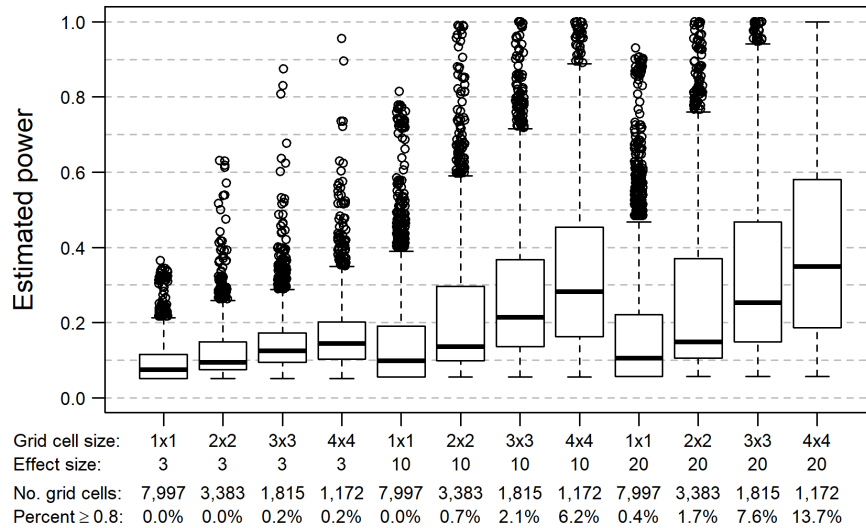
Razorbill: winter



— 3 x ref. mean - - 10 x ref. mean ··· 20 x ref. mean — 1/3 x ref. mean

E-21

Hotspot



Coldspot

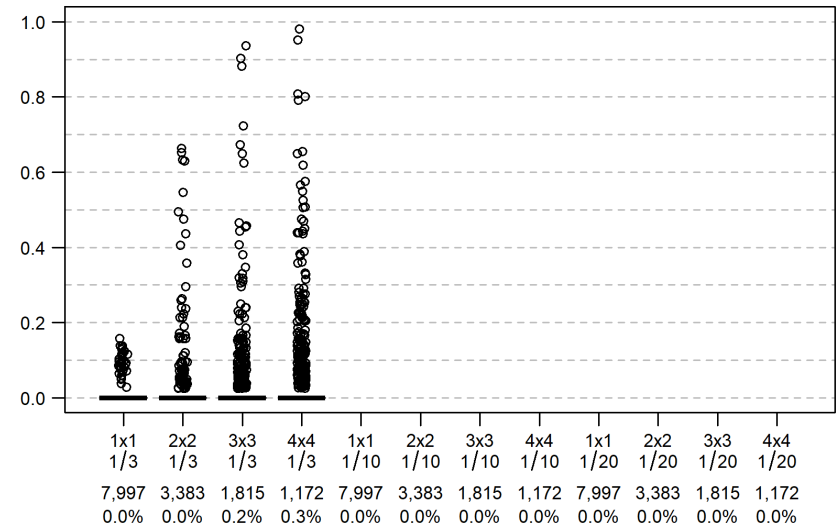
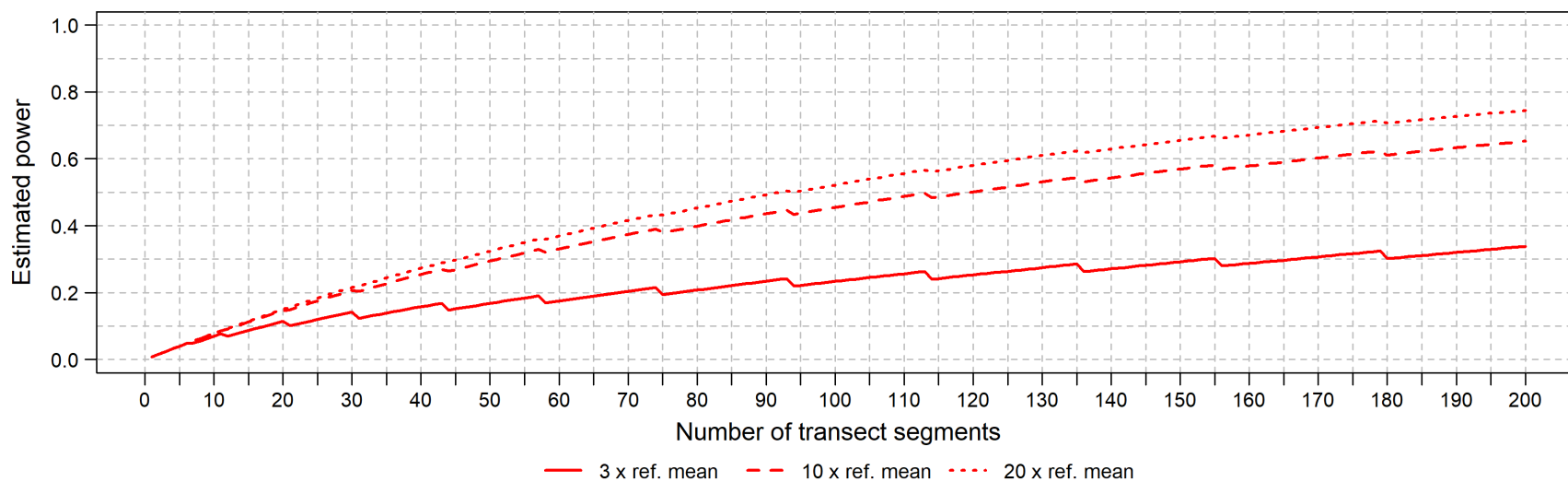


Figure E17. Power analysis results for Razorbill during winter based on the combined model (type I error rate = 0.05)

Atlantic Puffin: spring



E-22

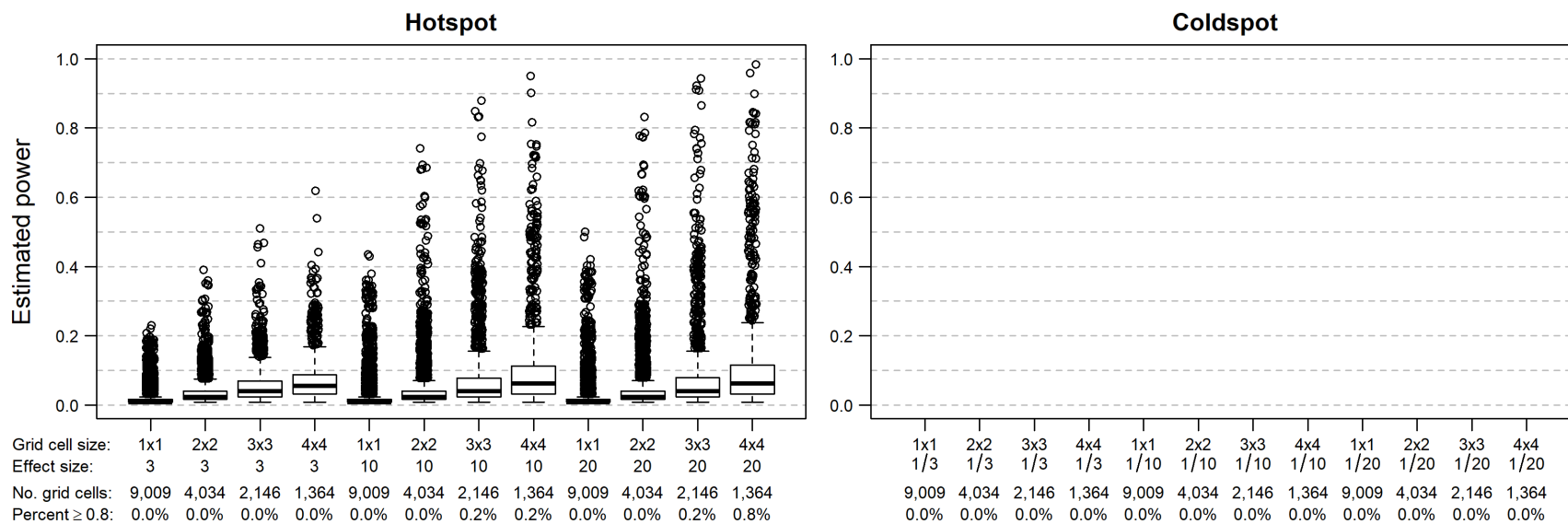
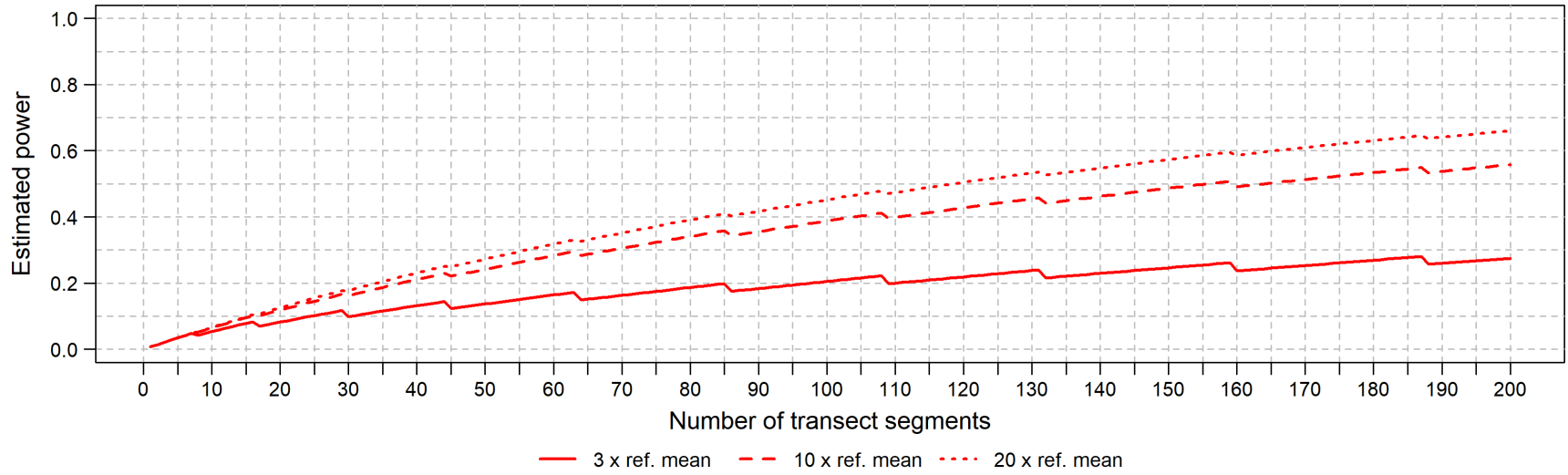


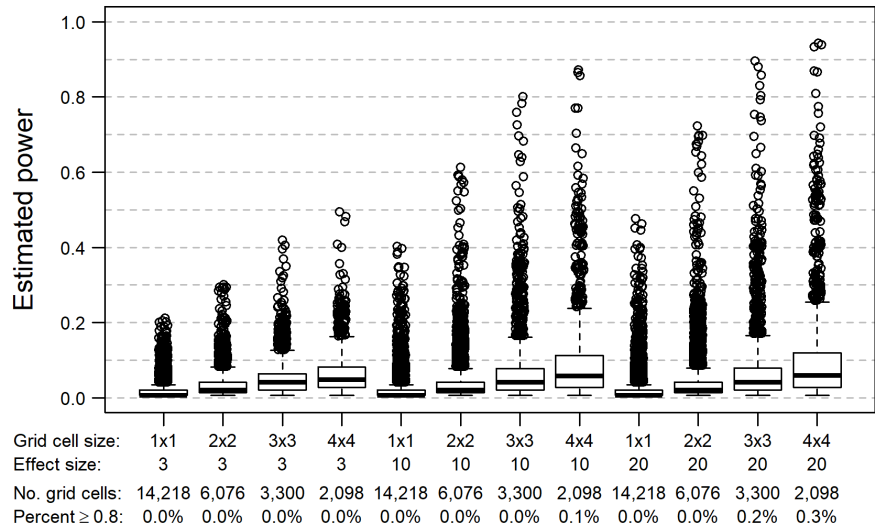
Figure E18. Power analysis results for Atlantic Puffin during spring based on the combined model (type I error rate = 0.05)

Atlantic Puffin: summer



E-23

Hotspot



Coldspot

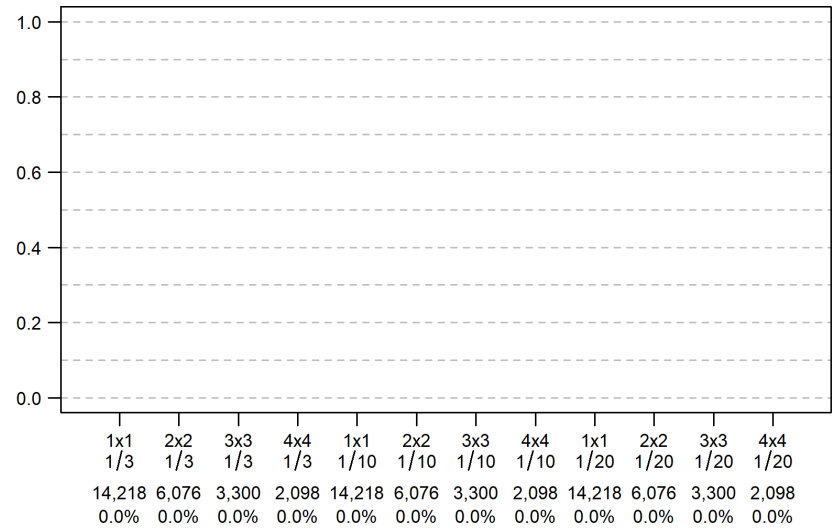
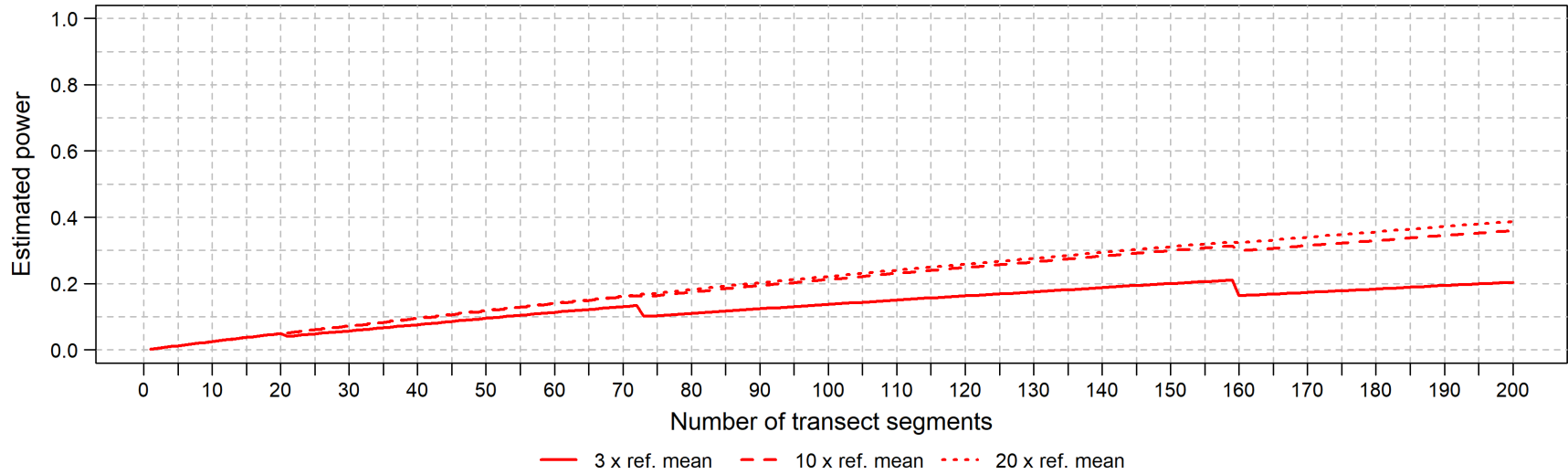


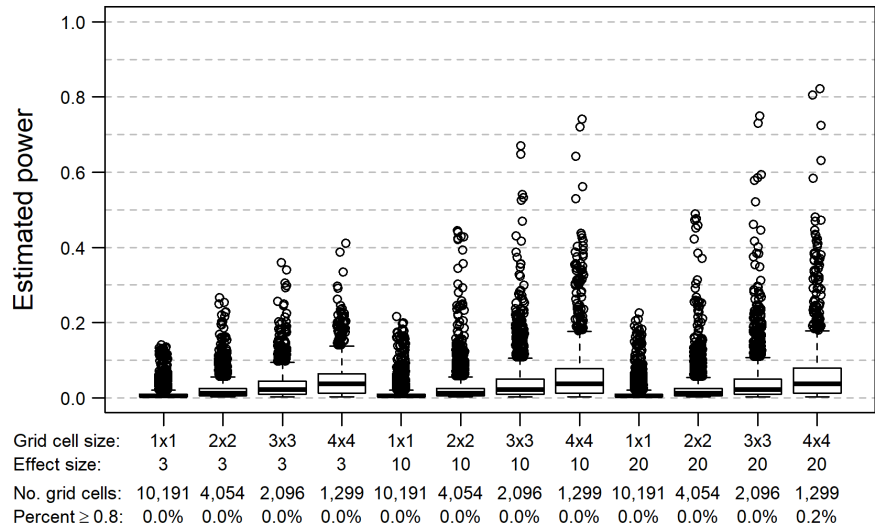
Figure E19. Power analysis results for Atlantic Puffin during summer based on the combined model (type I error rate = 0.05)

Atlantic Puffin: fall



E-24

Hotspot



Coldspot

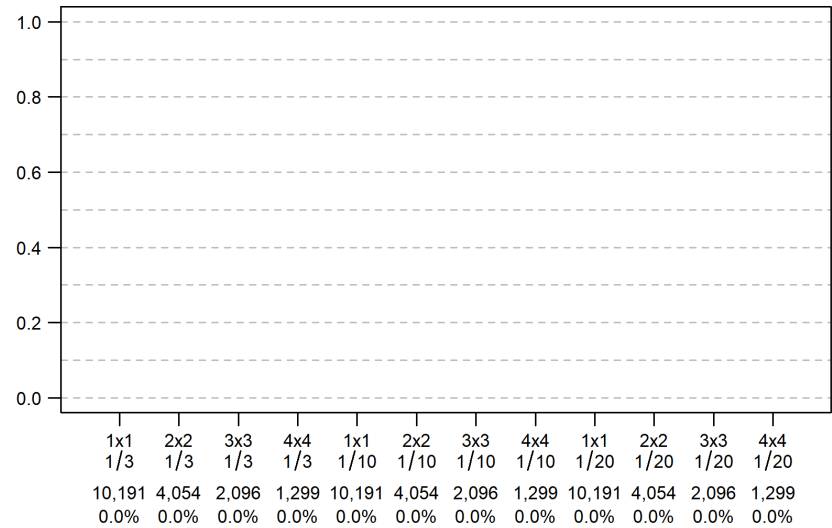
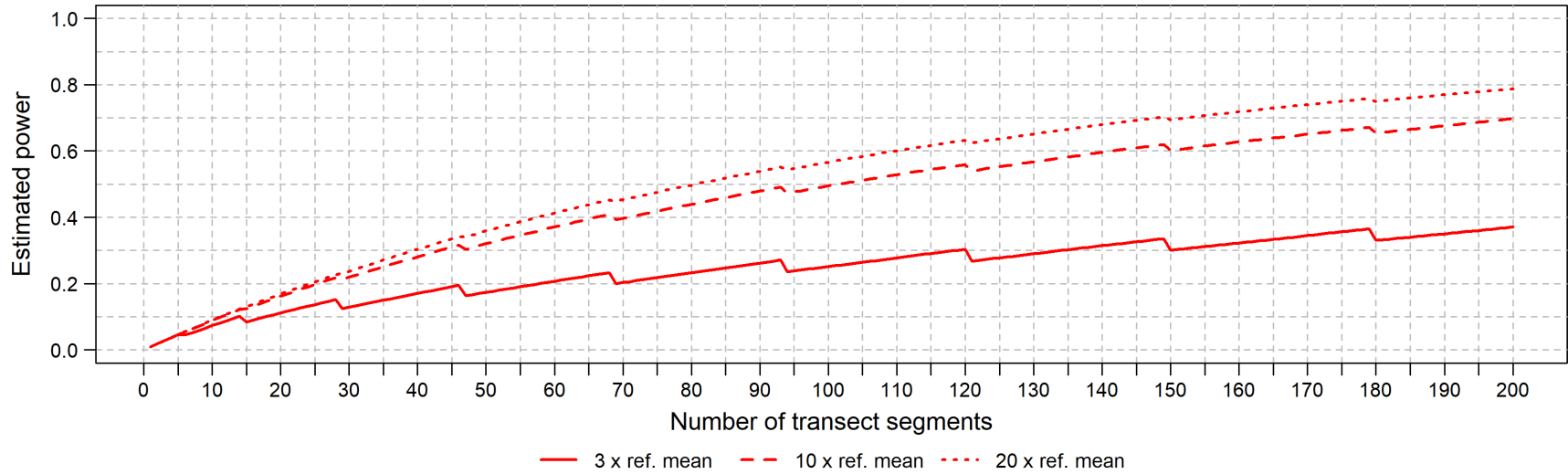


Figure E20. Power analysis results for Atlantic Puffin during fall based on the combined model (type I error rate = 0.05)

Atlantic Puffin: winter



E-25

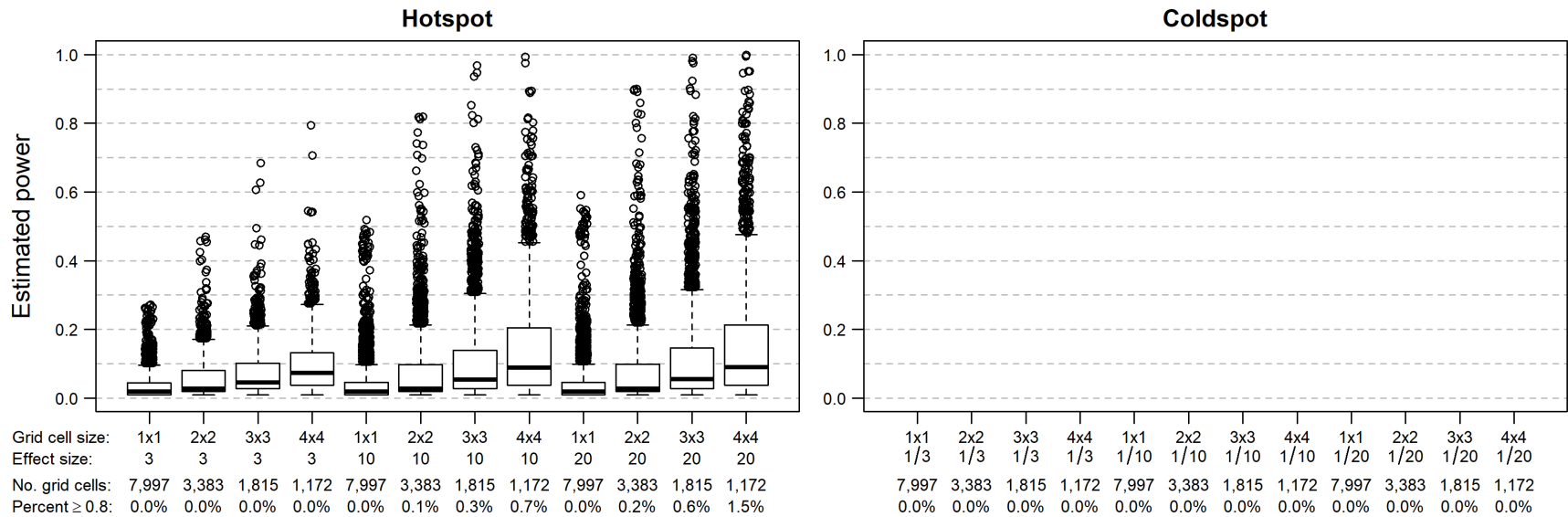
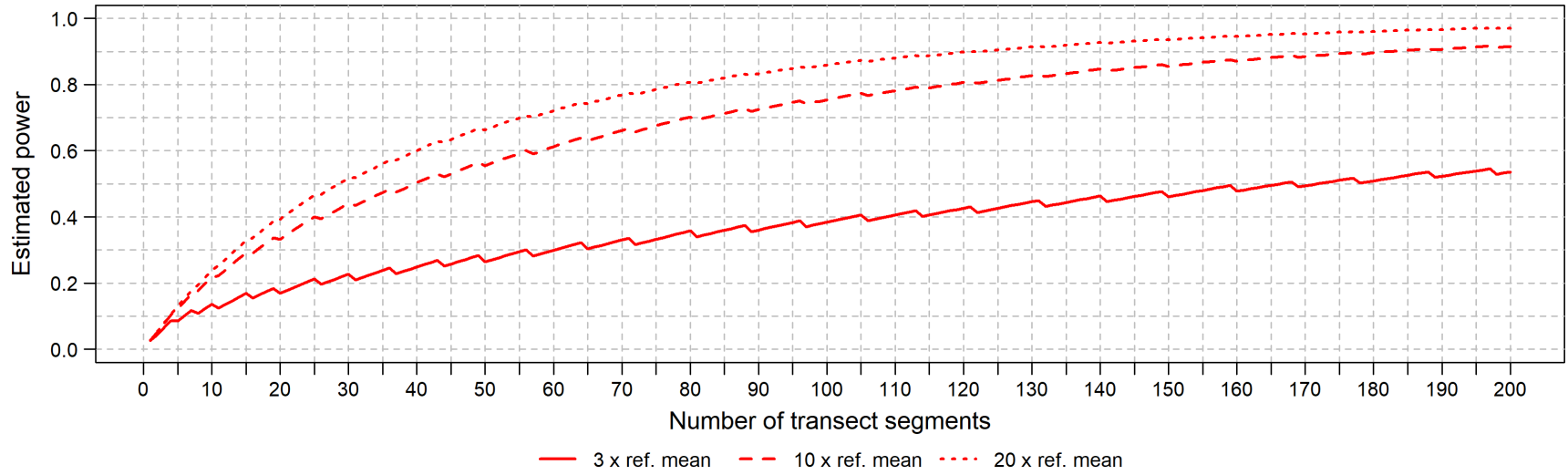


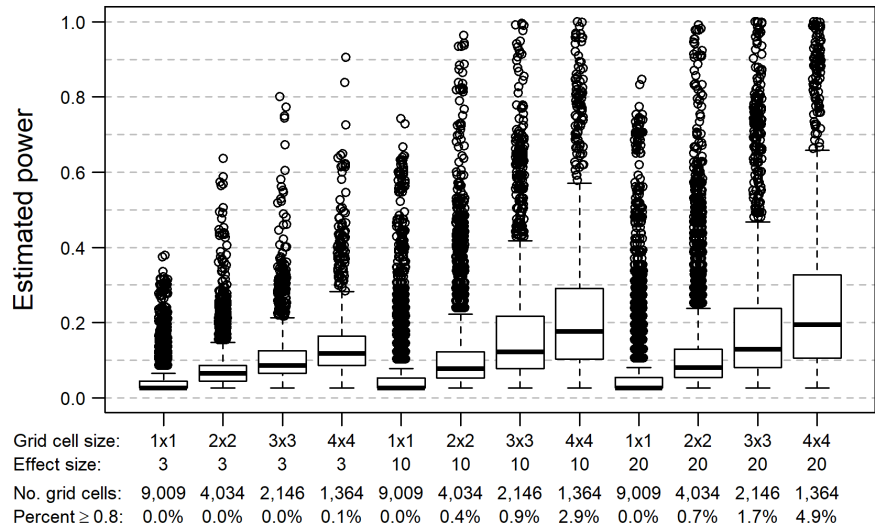
Figure E21. Power analysis results for Atlantic Puffin during winter based on the combined model (type I error rate = 0.05)

Laughing Gull: spring



E-26

Hotspot



Coldspot

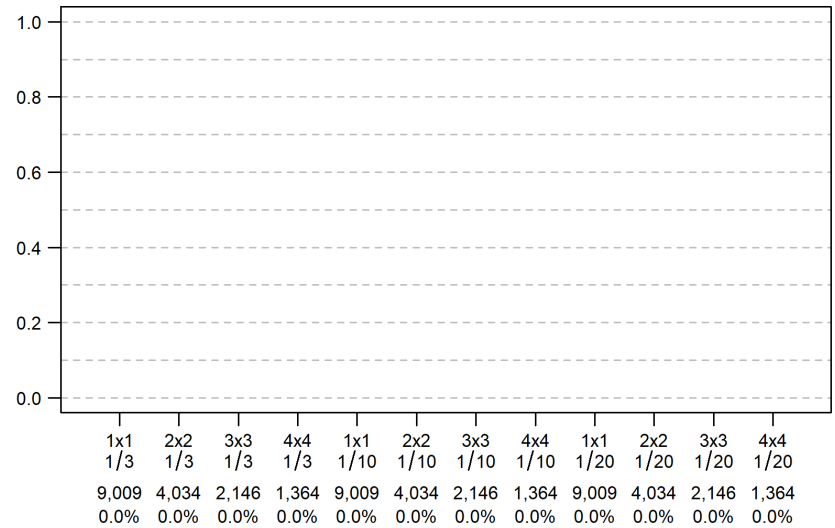
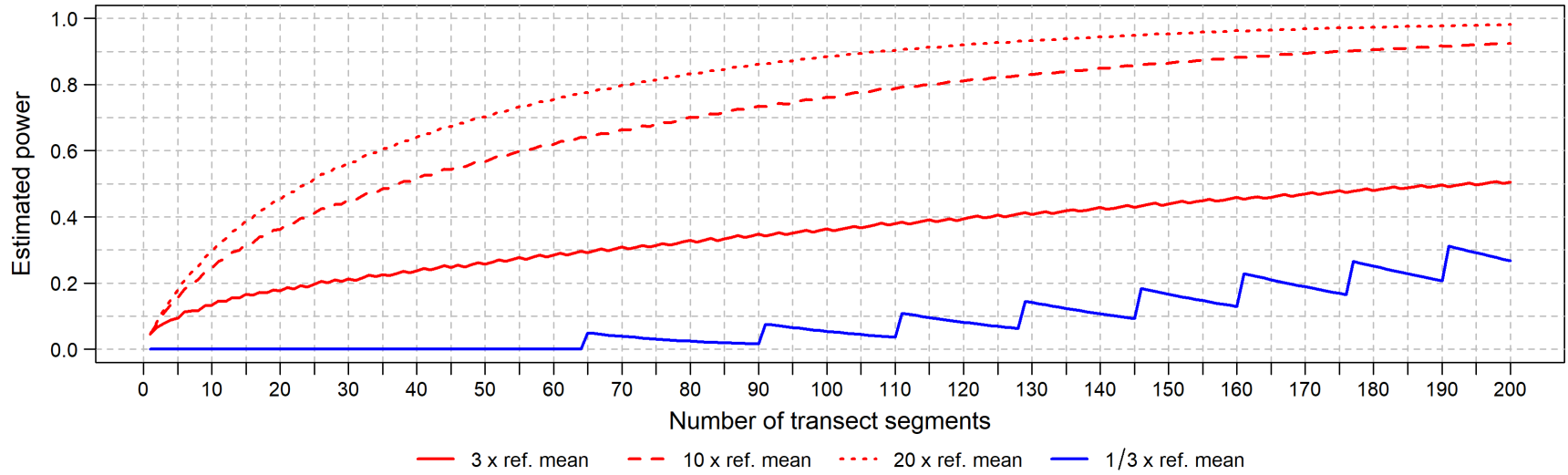
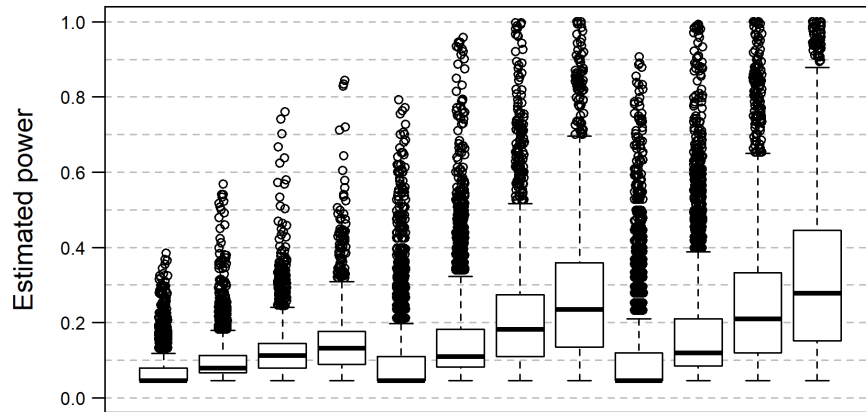


Figure E22. Power analysis results for Laughing Gull during spring based on the combined model (type I error rate = 0.05)

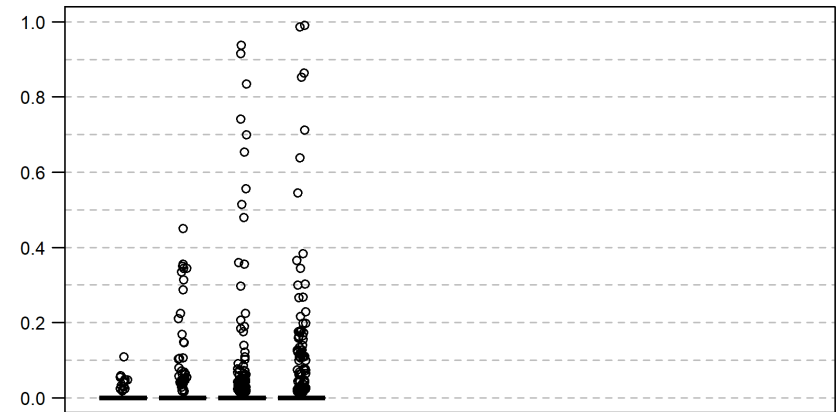
Laughing Gull: summer



Hotspot



Coldspot

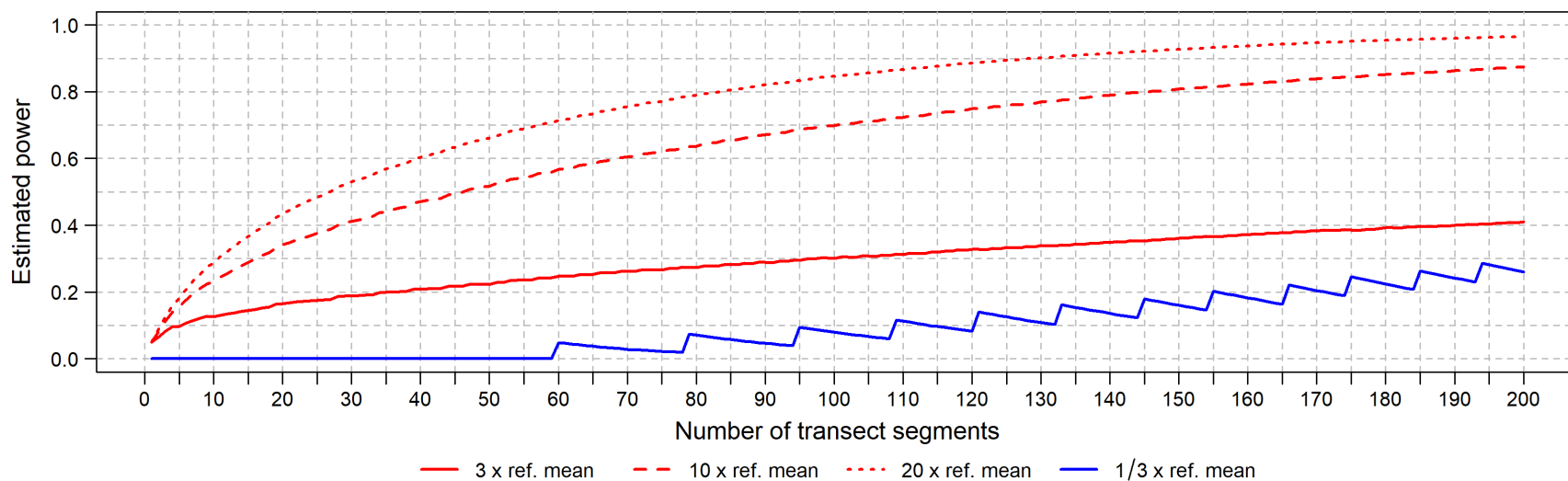


Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	3	3	3	3	10	10	10	10	20	20	20	20
No. grid cells:	14,218	6,076	3,300	2,098	14,218	6,076	3,300	2,098	14,218	6,076	3,300	2,098
Percent ≥ 0.8 :	0.0%	0.0%	0.0%	0.1%	0.0%	0.2%	0.7%	2.4%	0.1%	0.6%	2.2%	3.8%

Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	1/3	1/3	1/3	1/3	1/10	1/10	1/10	1/10	1/20	1/20	1/20	1/20
No. grid cells:	14,218	6,076	3,300	2,098	14,218	6,076	3,300	2,098	14,218	6,076	3,300	2,098
Percent ≥ 0.8 :	0.0%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

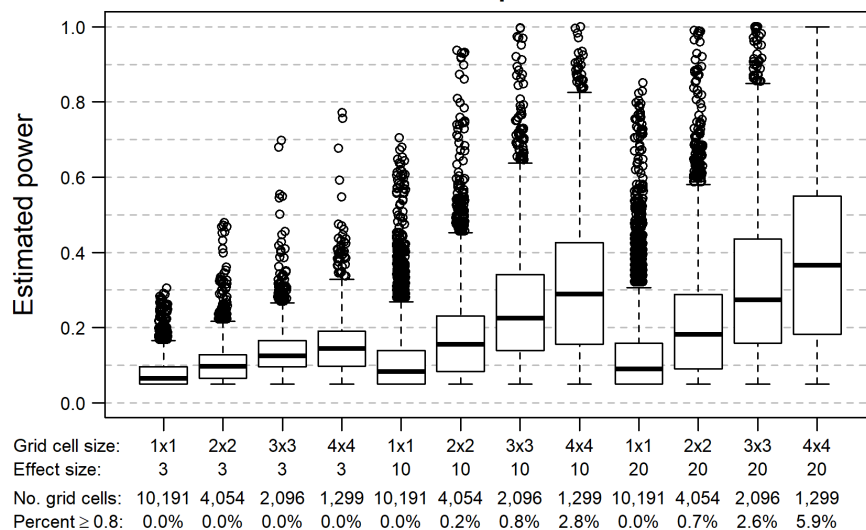
Figure E23. Power analysis results for Laughing Gull during summer based on the combined model (type I error rate = 0.05)

Laughing Gull: fall



E-28

Hotspot



Coldspot

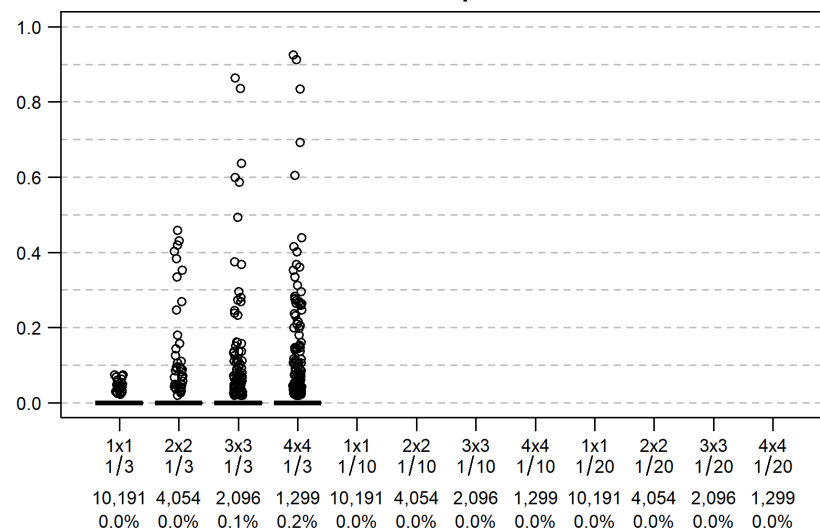
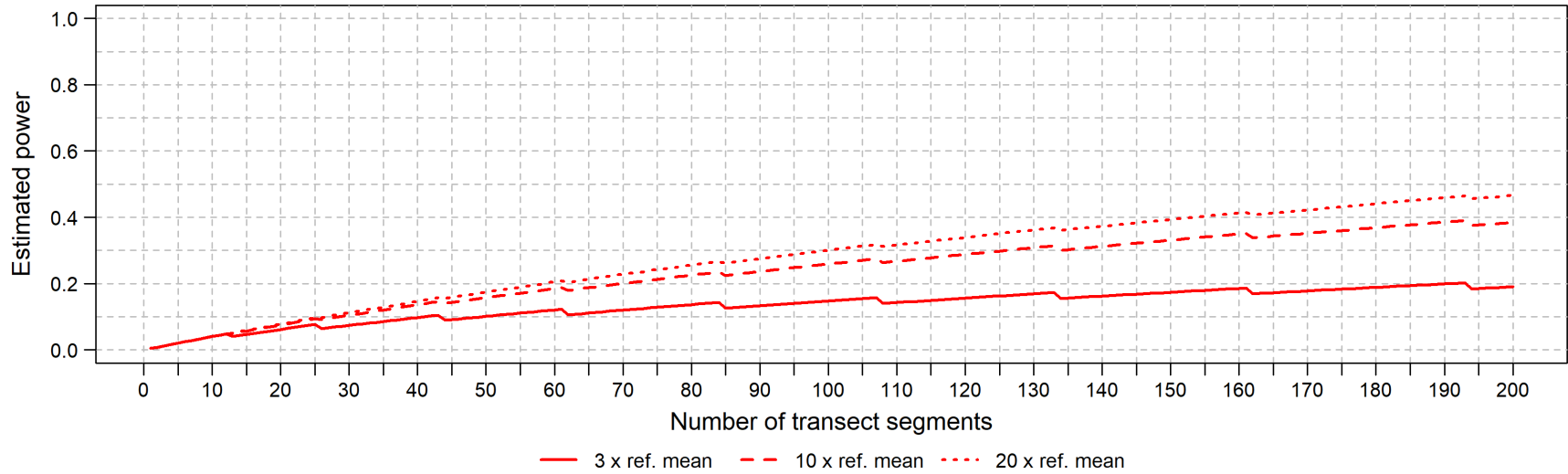
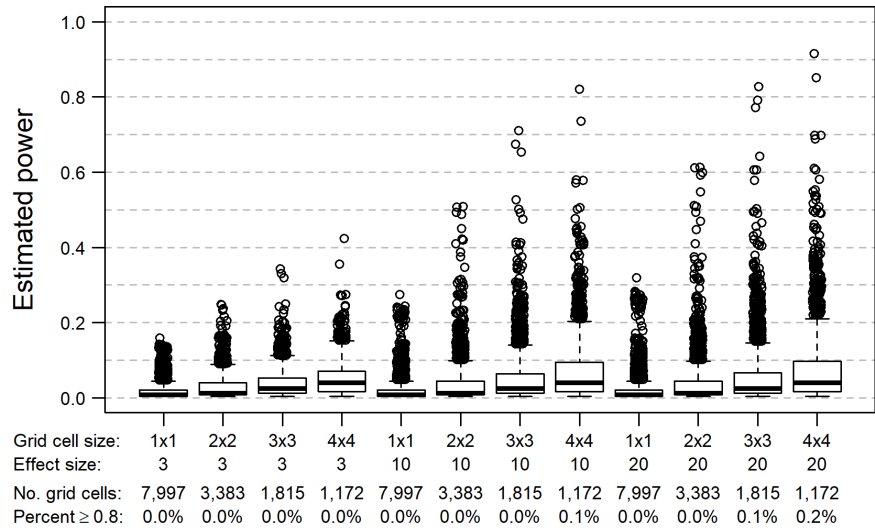


Figure E24. Power analysis results for Laughing Gull during fall based on the combined model (type I error rate = 0.05)

Laughing Gull: winter



Hotspot



Coldspot

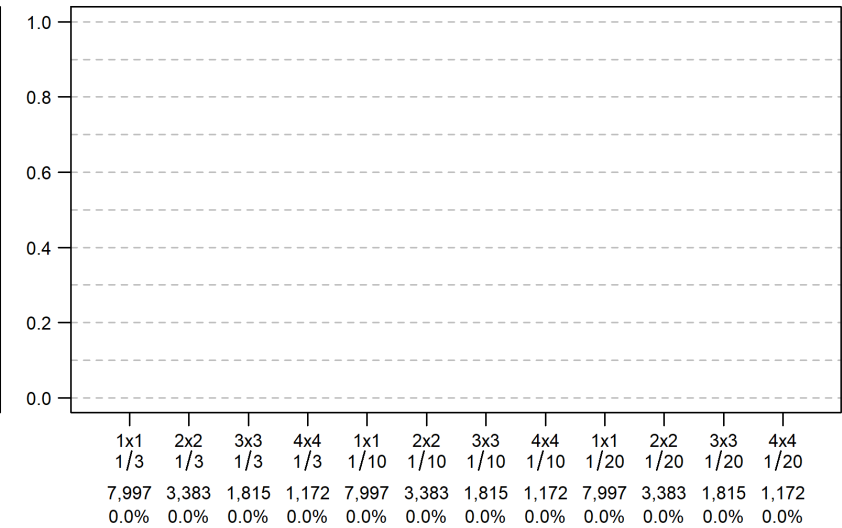
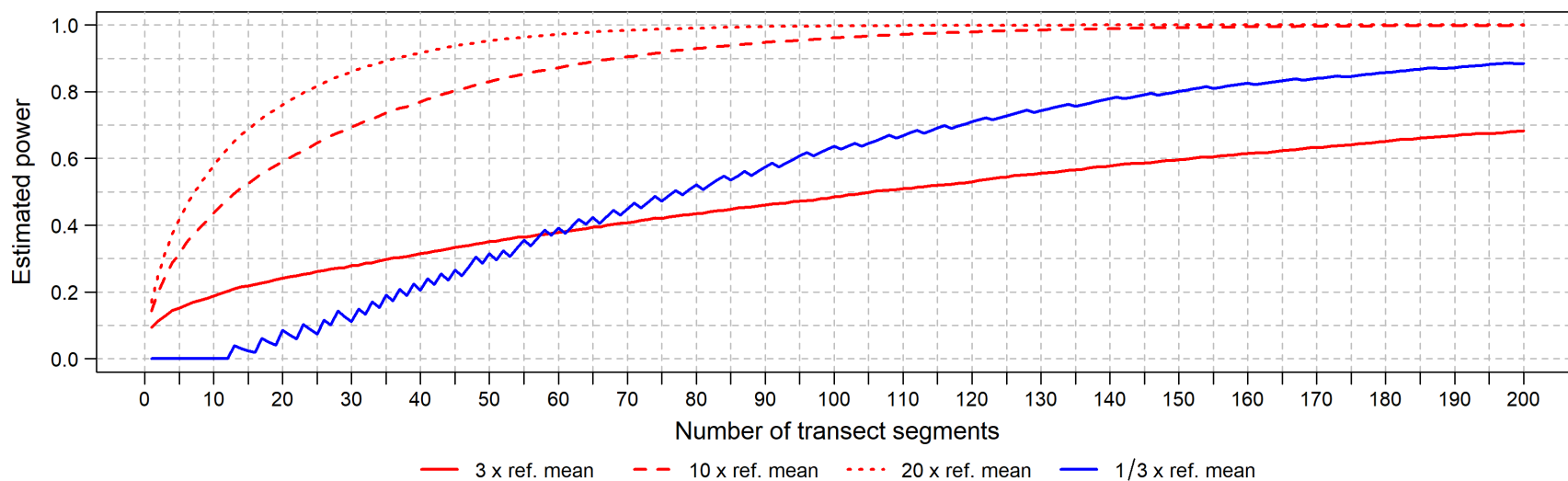


Figure E25. Power analysis results for Laughing Gull during winter based on the combined model (type I error rate = 0.05)

Herring Gull: spring



E-30

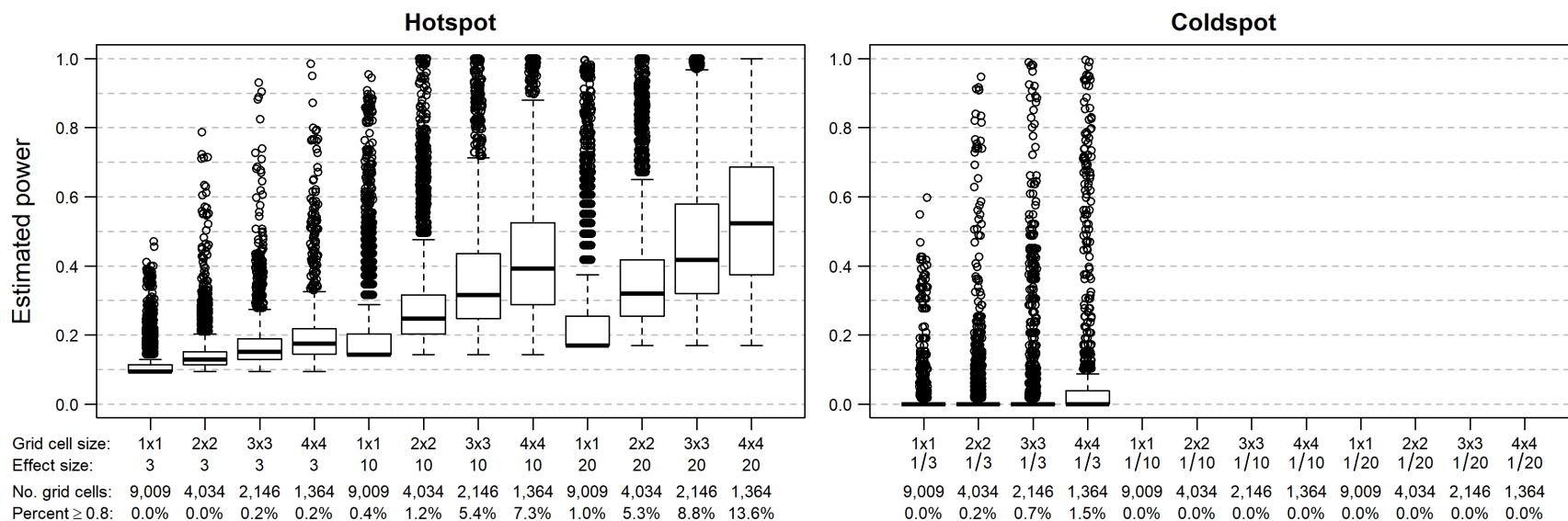
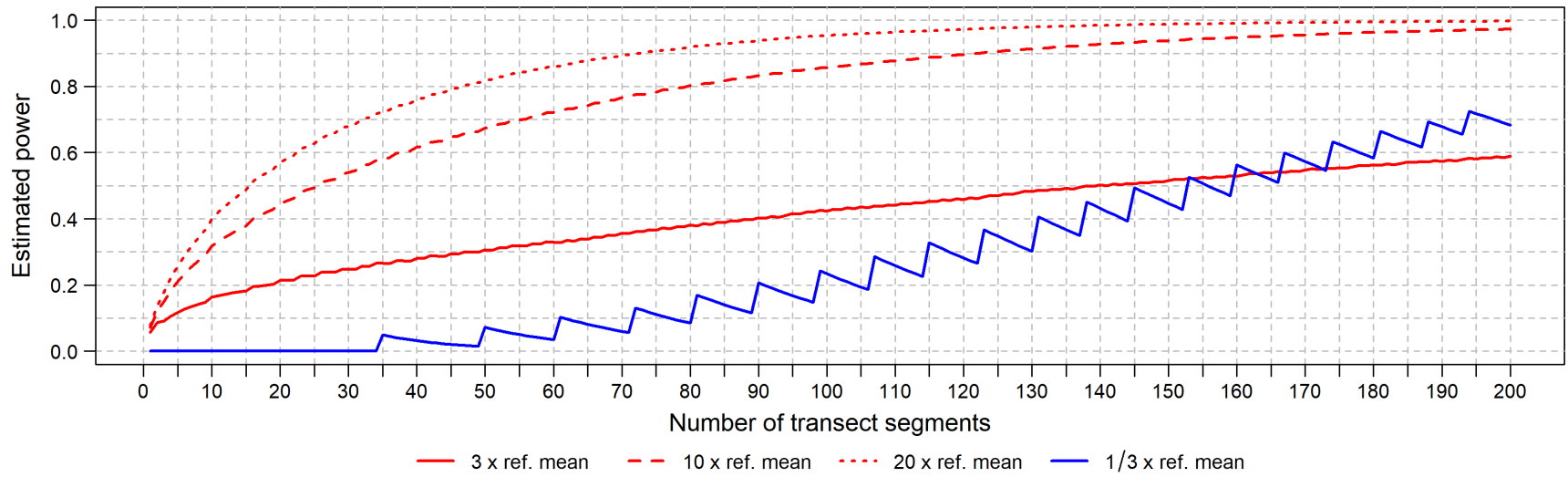


Figure E26. Power analysis results for Herring Gull during spring based on the combined model (type I error rate = 0.05)

Herring Gull: summer



E-31

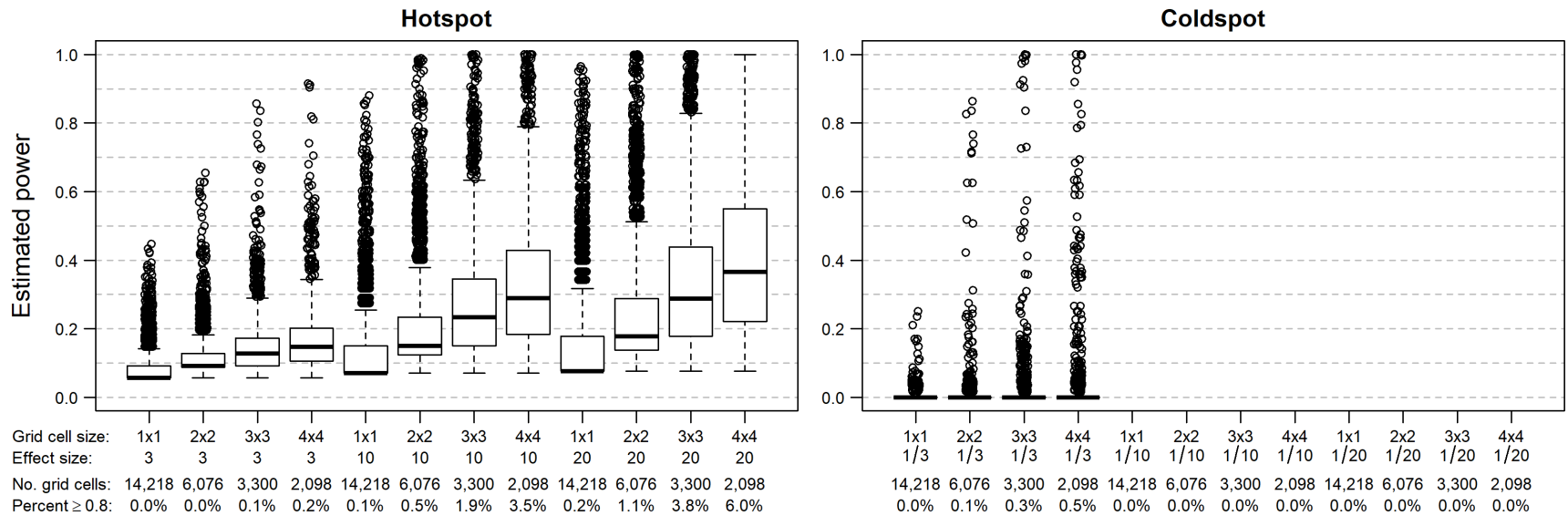
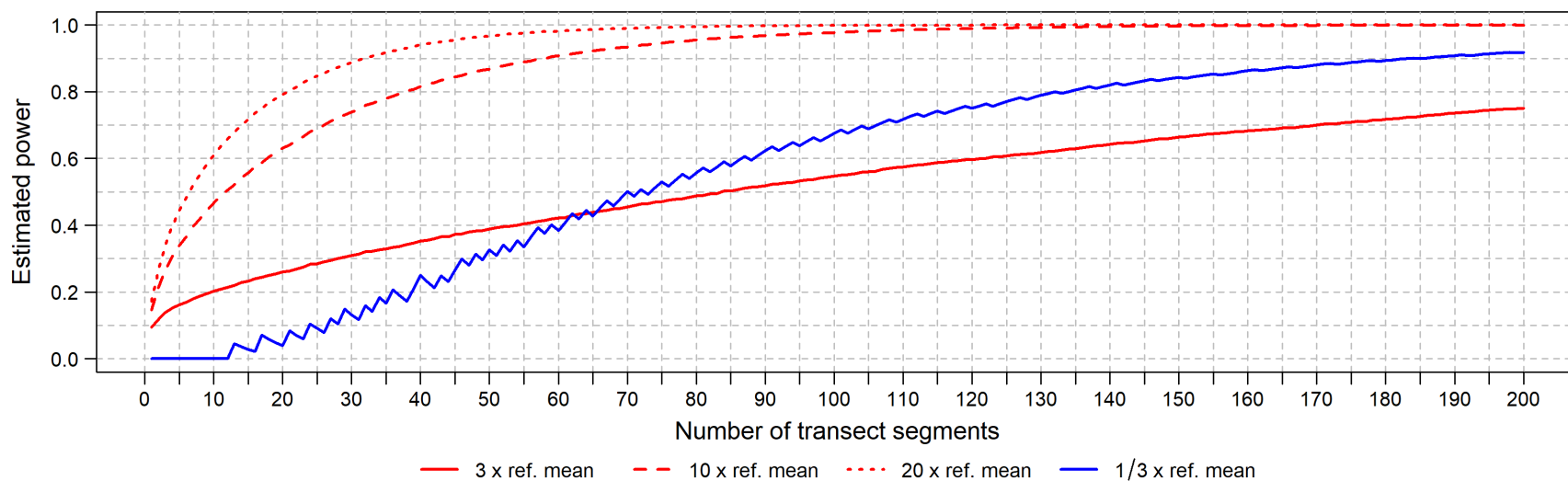
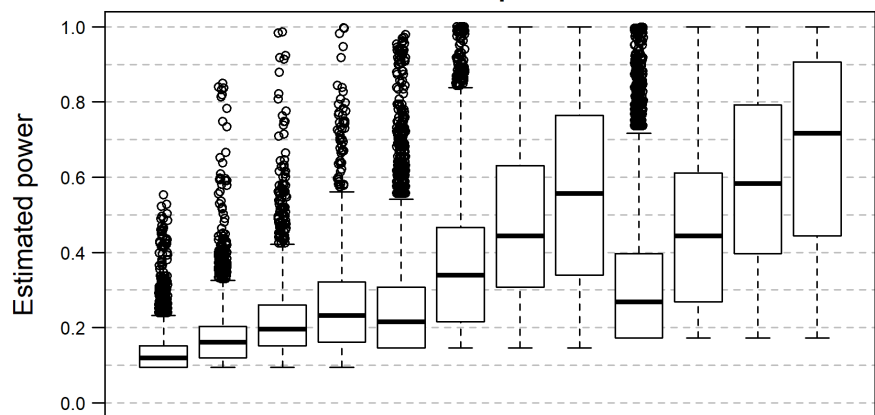


Figure E27. Power analysis results for Herring Gull during summer based on the combined model (type I error rate = 0.05)

Herring Gull: fall

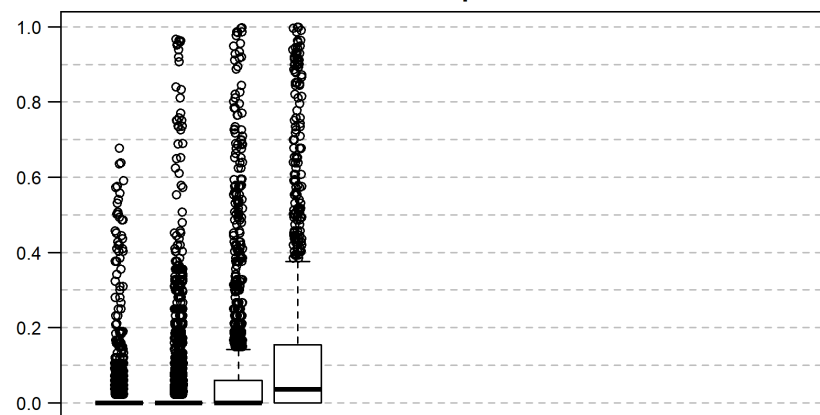


Hotspot



Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	3	3	3	3	10	10	10	10	20	20	20	20
No. grid cells:	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299
Percent ≥ 0.8 :	0.0%	0.1%	0.4%	0.7%	0.4%	3.3%	9.4%	21.1%	1.5%	8.4%	24.5%	39.0%

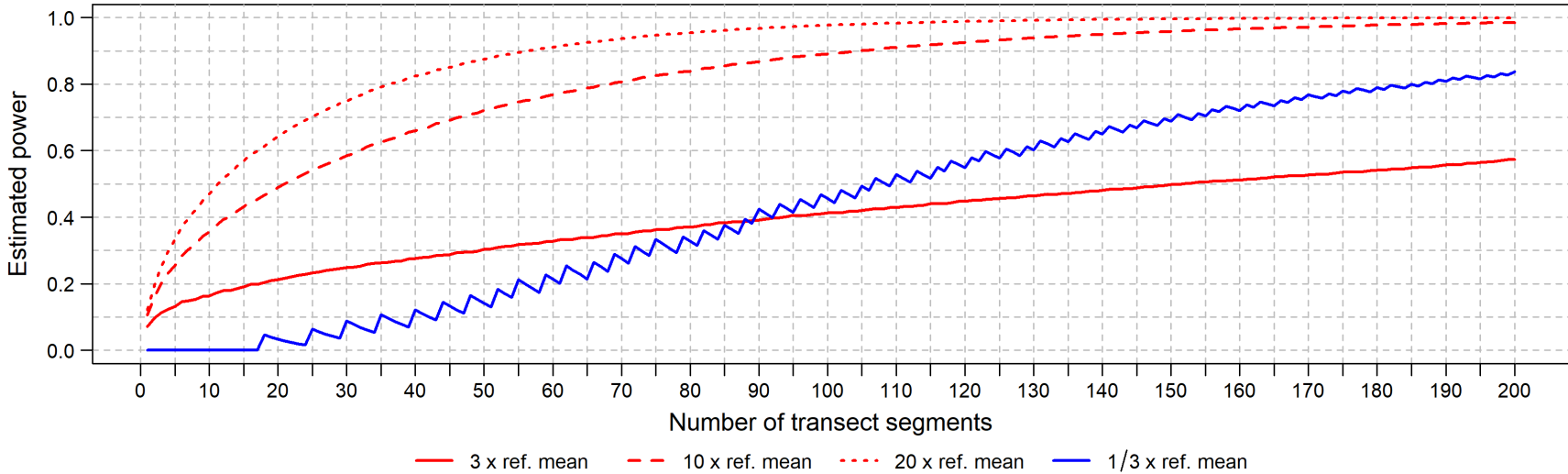
Coldspot



Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	1/3	1/3	1/3	1/3	1/10	1/10	1/10	1/10	1/20	1/20	1/20	1/20
No. grid cells:	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299
Percent ≥ 0.8 :	0.0%	0.3%	1.0%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Figure E28. Power analysis results for Herring Gull during fall based on the combined model (type I error rate = 0.05)

Herring Gull: winter



Hotspot

Coldspot

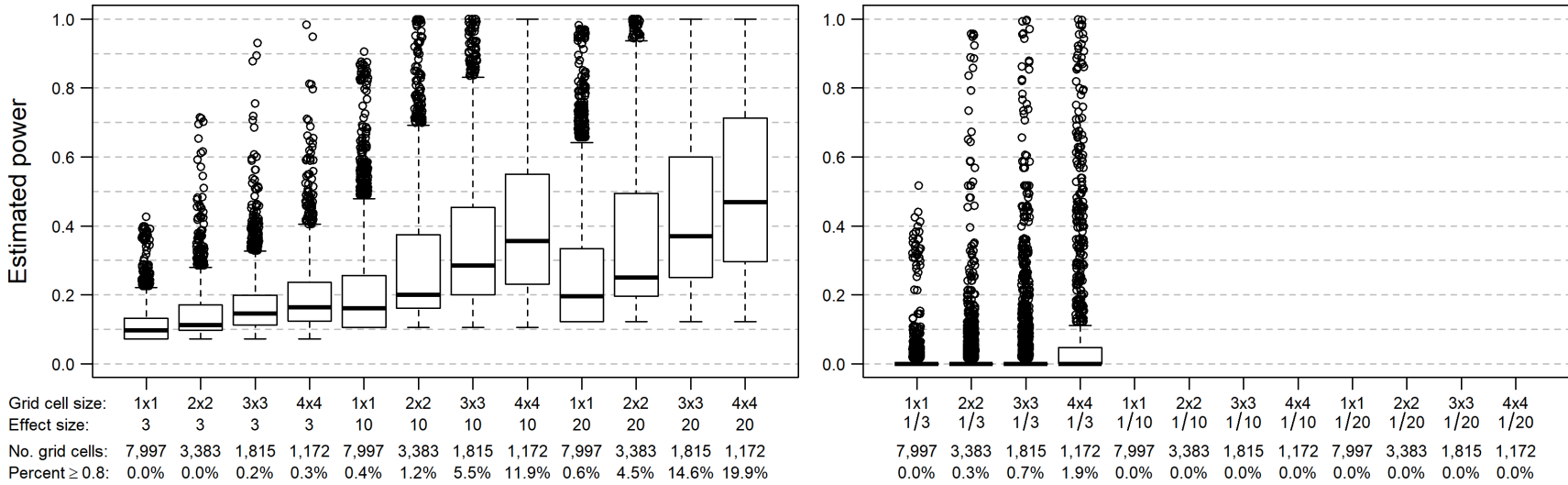
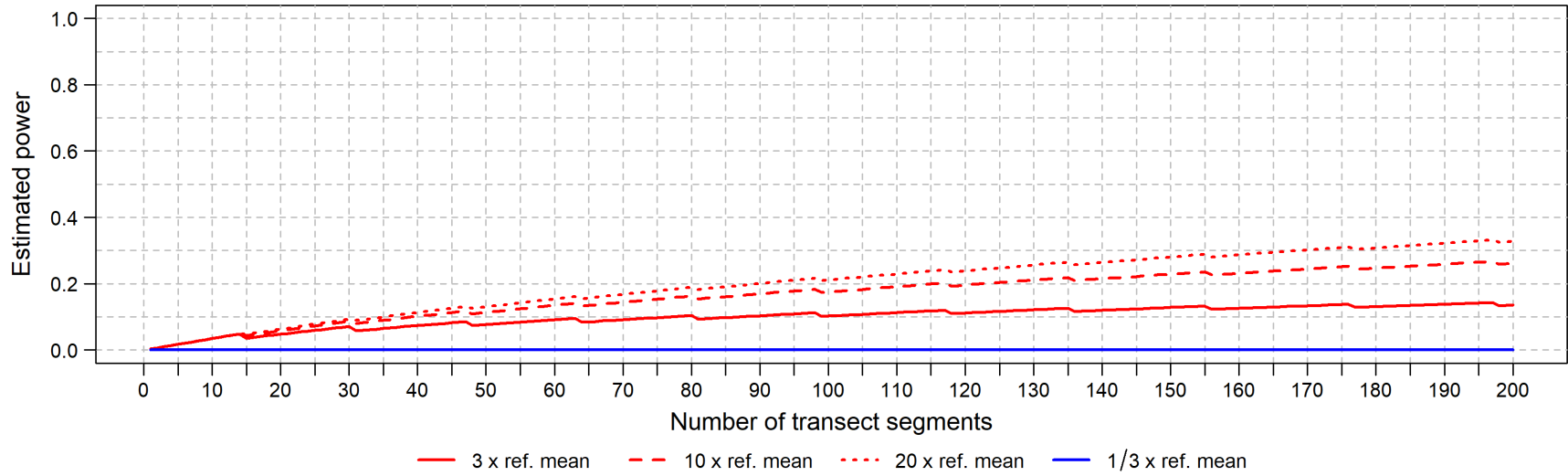
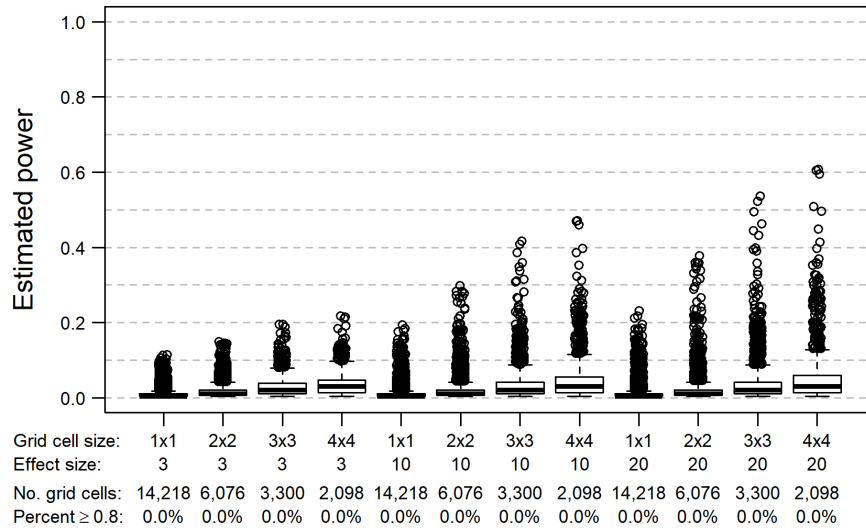


Figure E29. Power analysis results for Herring Gull during winter based on the combined model (type I error rate = 0.05)

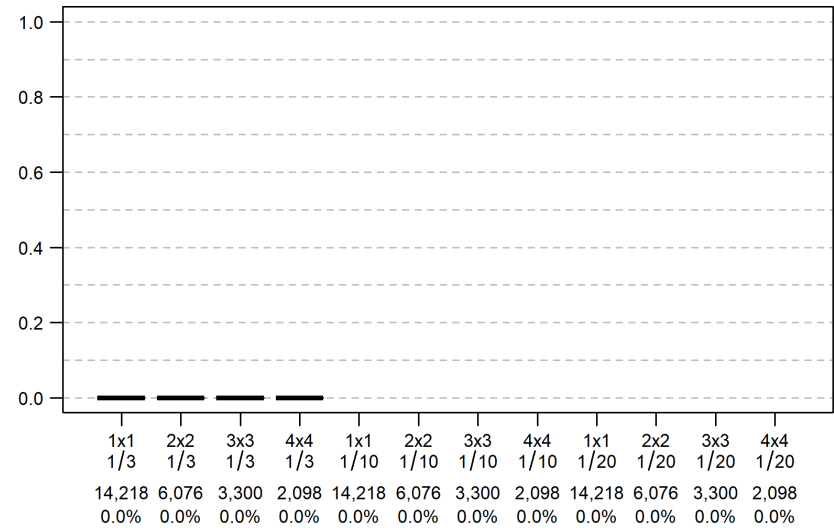
Least Tern: summer



Hotspot



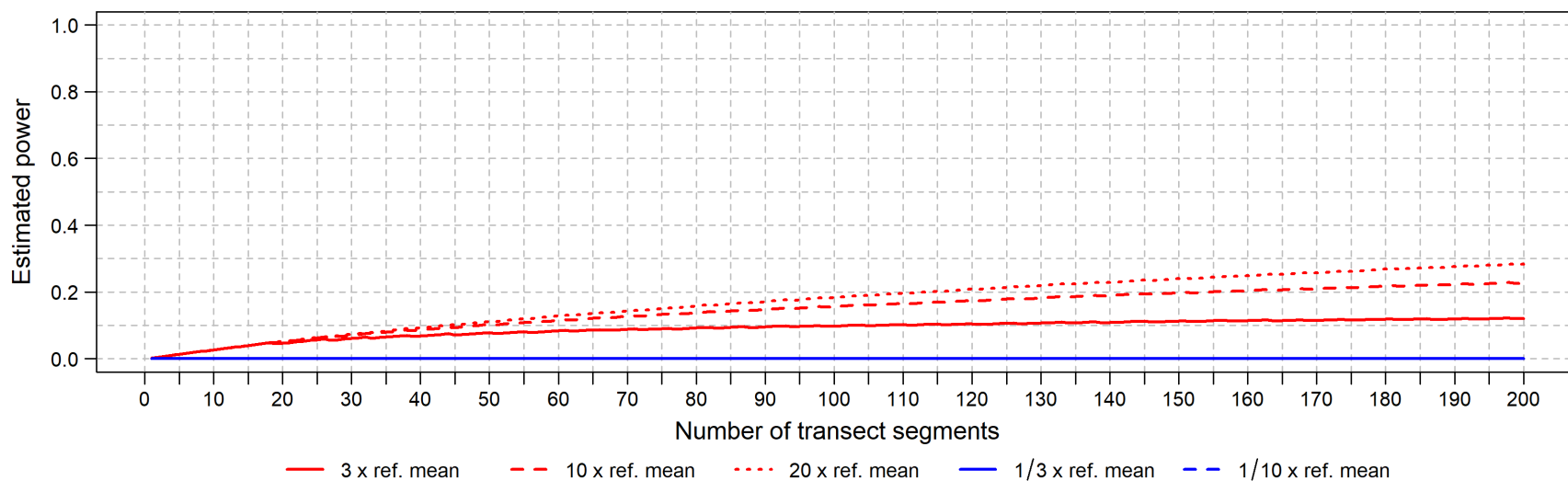
Coldspot



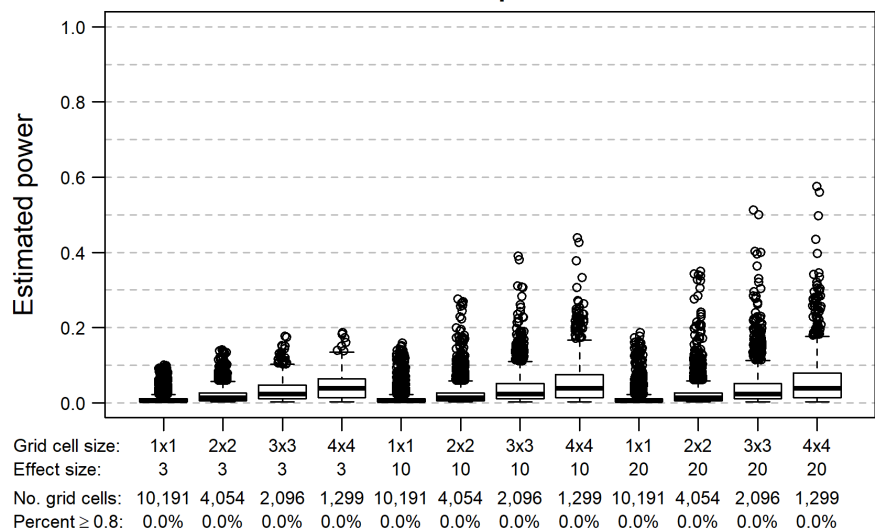
E-34

Figure E30. Power analysis results for Least Tern during summer based on the combined model (type I error rate = 0.05)

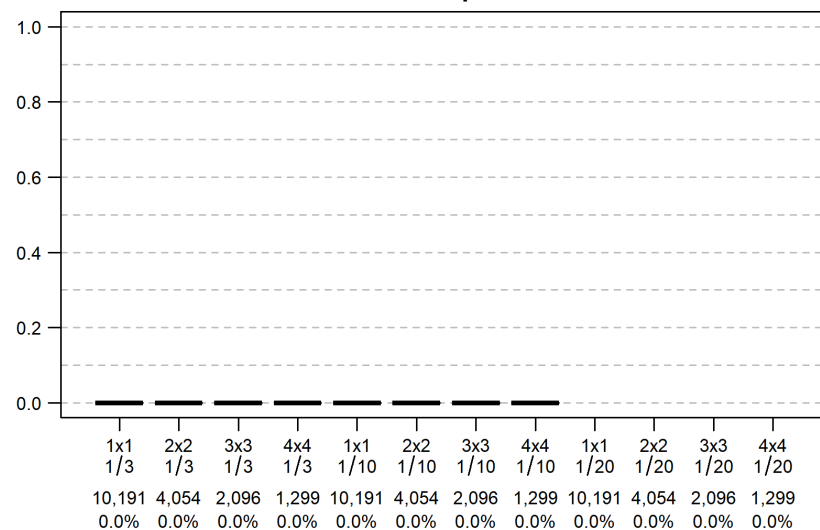
Least Tern: fall



Hotspot



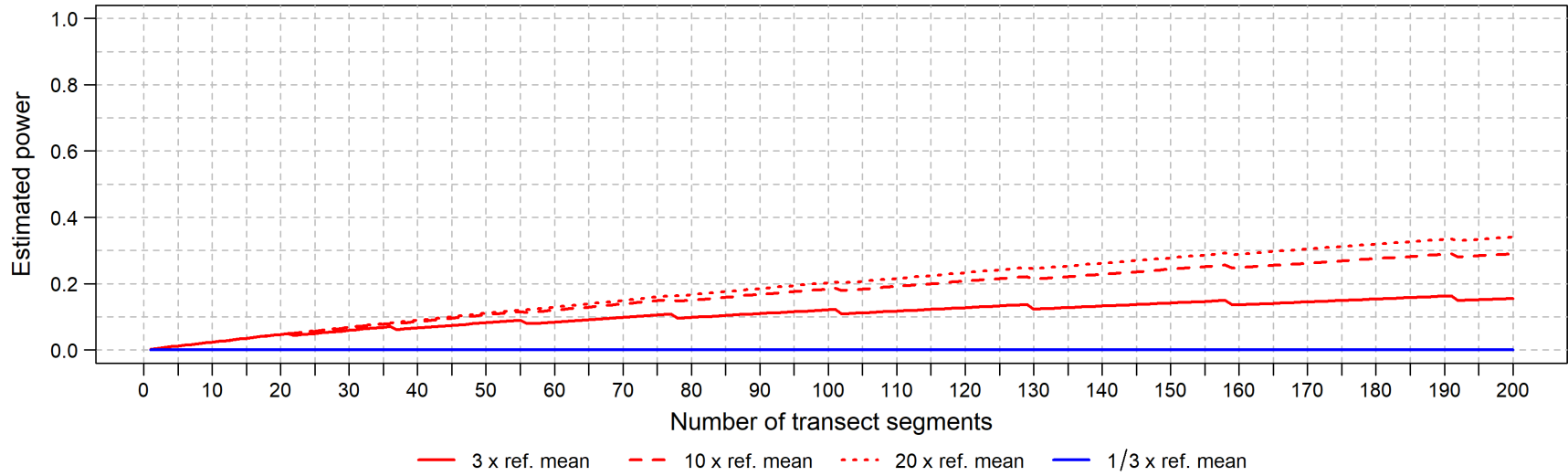
Coldspot



E-35

Figure E31. Power analysis results for Least Tern during fall based on the combined model (type I error rate = 0.05)

Roseate Tern: spring



Hotspot

Coldspot

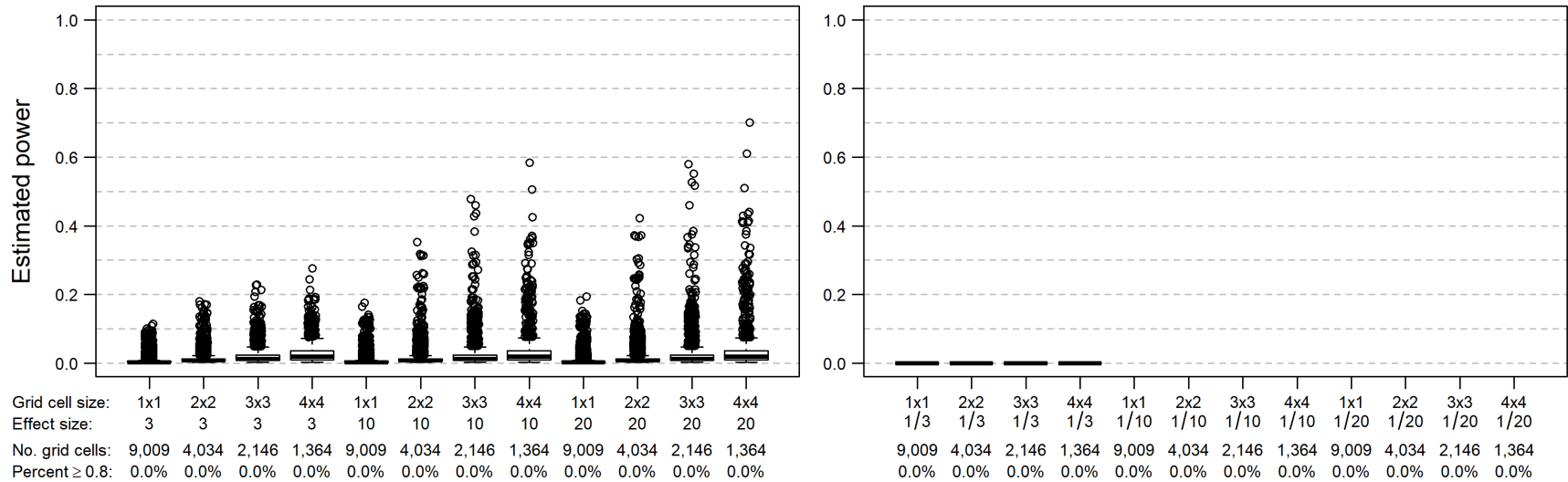
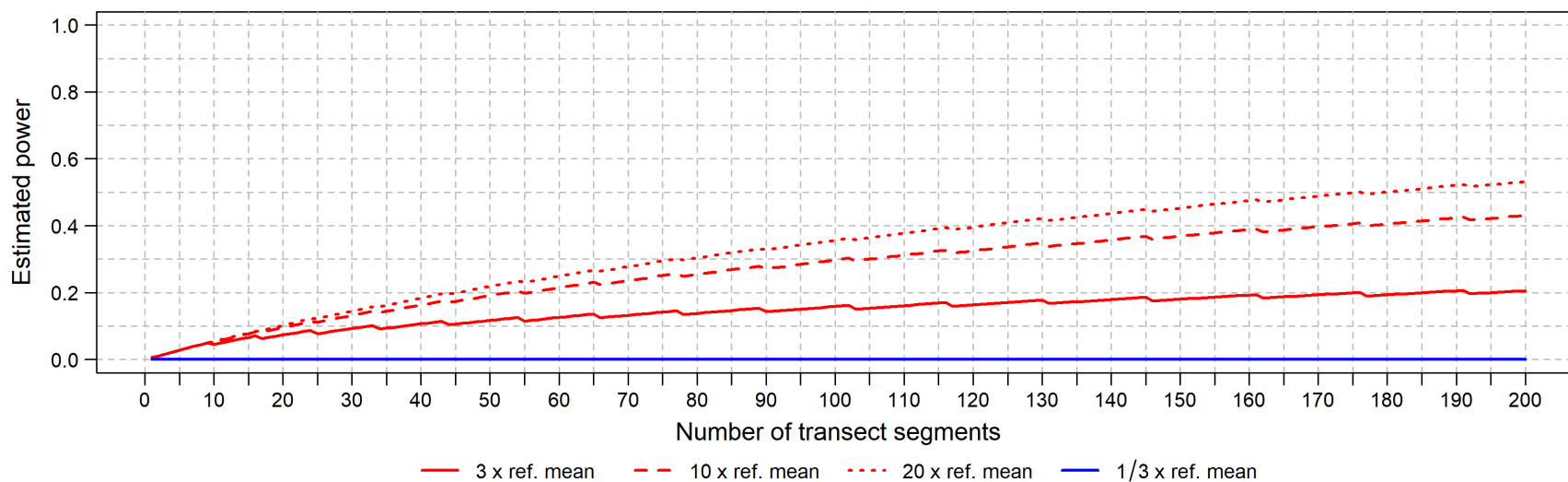
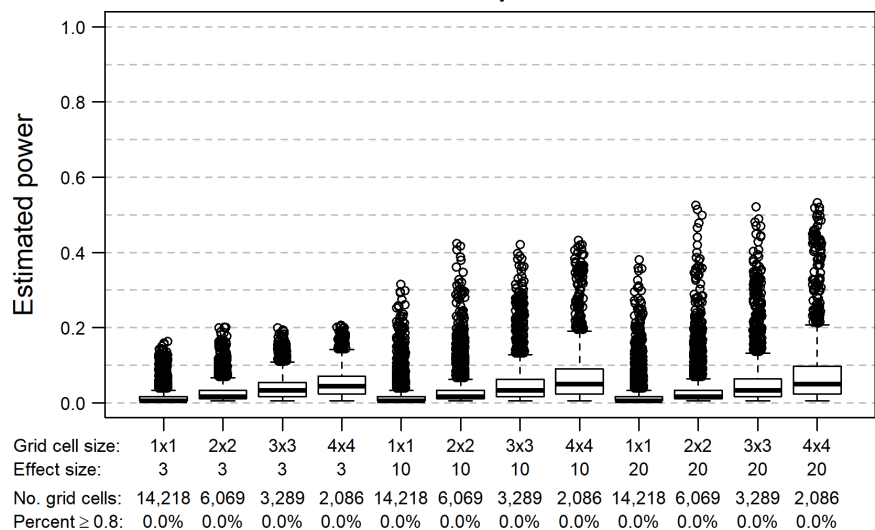


Figure E32. Power analysis results for Roseate Tern during spring based on the combined model (type I error rate = 0.05)

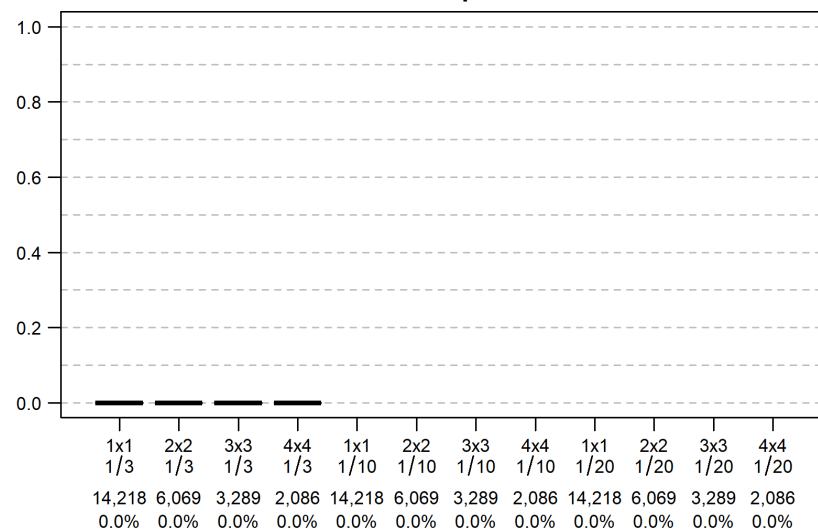
Roseate Tern: summer



Hotspot



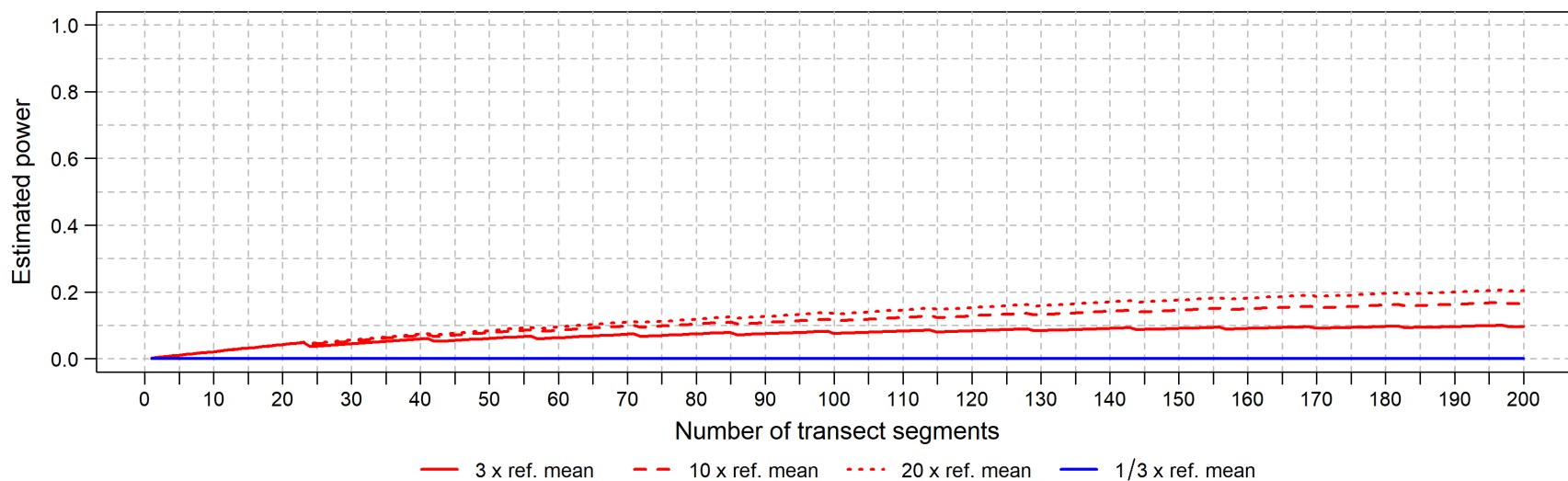
Coldspot



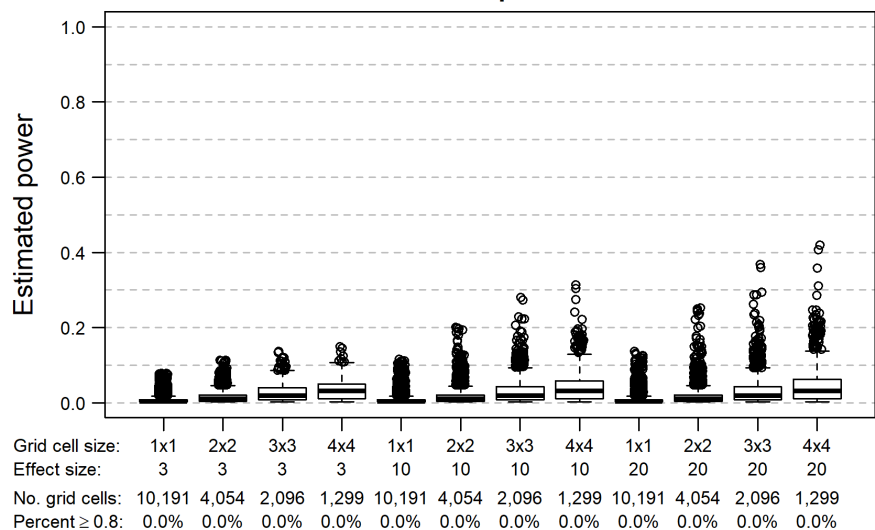
E-37

Figure E33. Power analysis results for Roseate Tern during summer based on the combined model (type I error rate = 0.05)

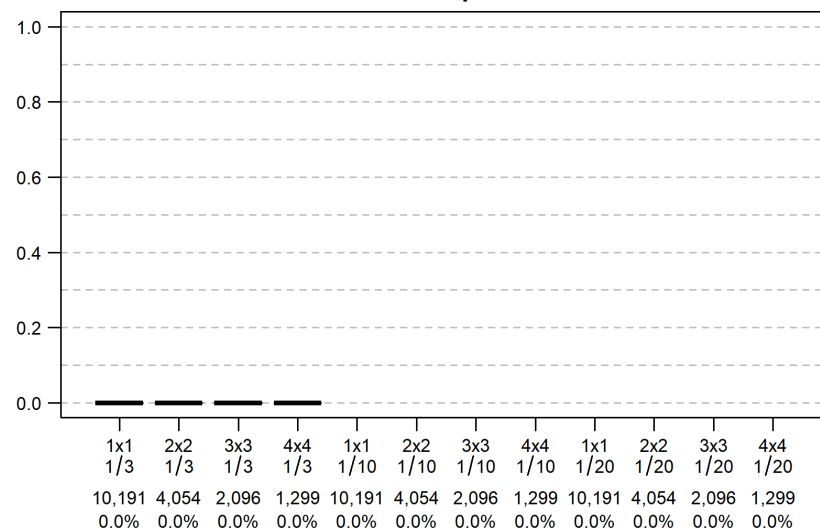
Roseate Tern: fall



Hotspot



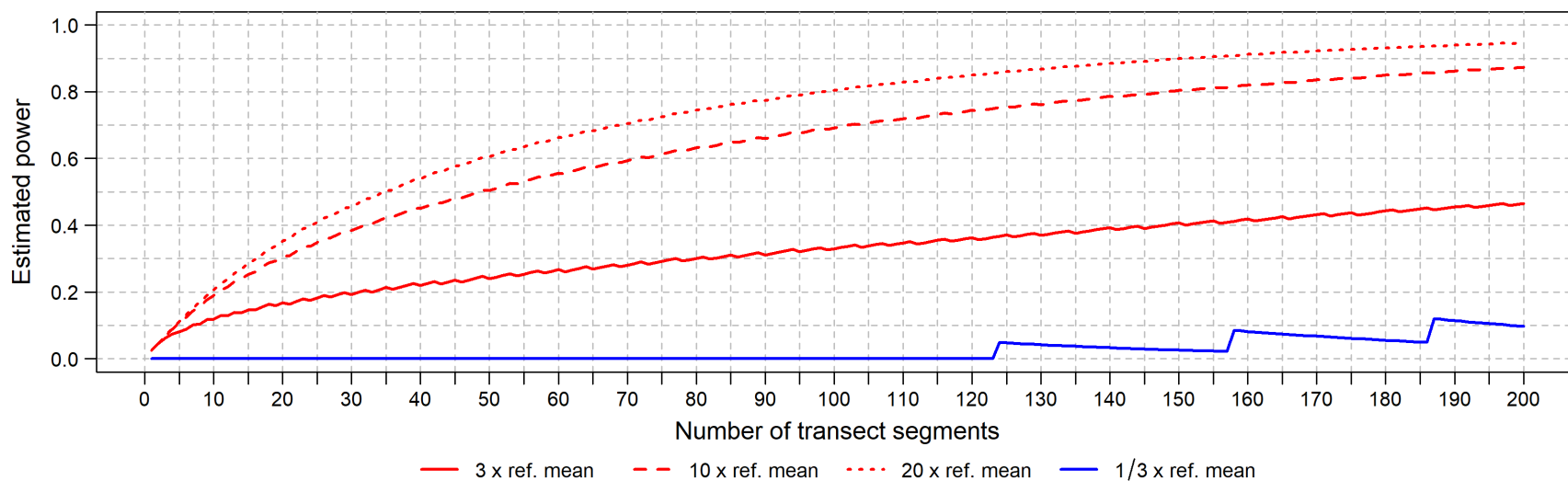
Coldspot



E-38

Figure E34. Power analysis results for Roseate Tern during fall based on the combined model (type I error rate = 0.05)

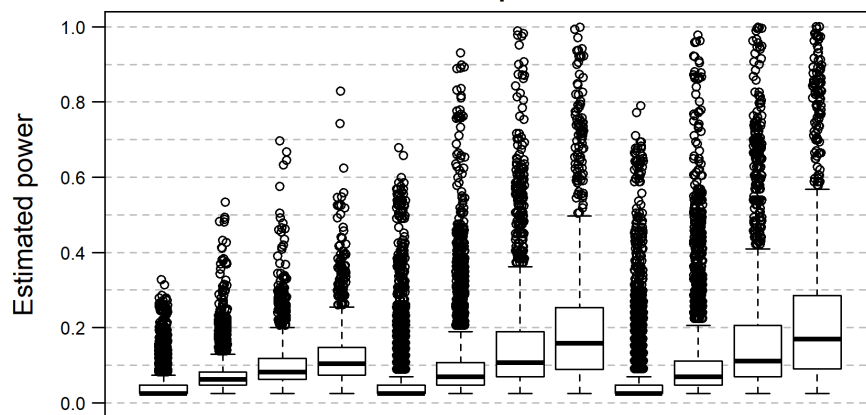
Common Tern: spring



— 3 x ref. mean - - 10 x ref. mean ··· 20 x ref. mean — 1/3 x ref. mean

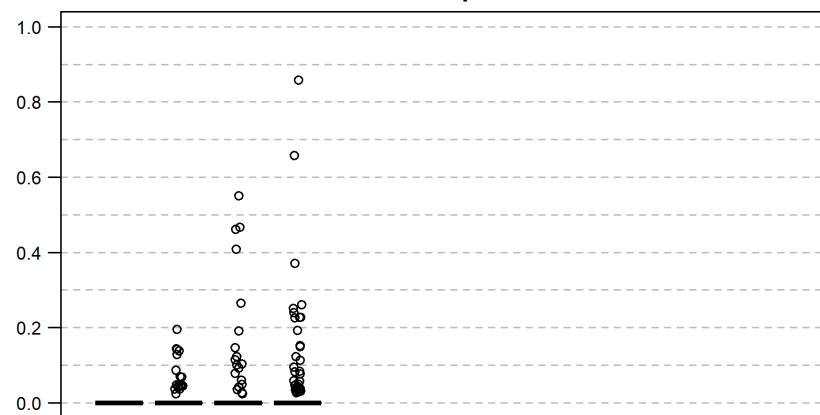
E-39

Hotspot



Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	3	3	3	3	10	10	10	10	20	20	20	20
No. grid cells:	9,009	4,034	2,146	1,364	9,009	4,034	2,146	1,364	9,009	4,034	2,146	1,364
Percent ≥ 0.8 :	0.0%	0.0%	0.0%	0.1%	0.0%	0.2%	0.7%	1.5%	0.0%	0.5%	1.2%	4.0%

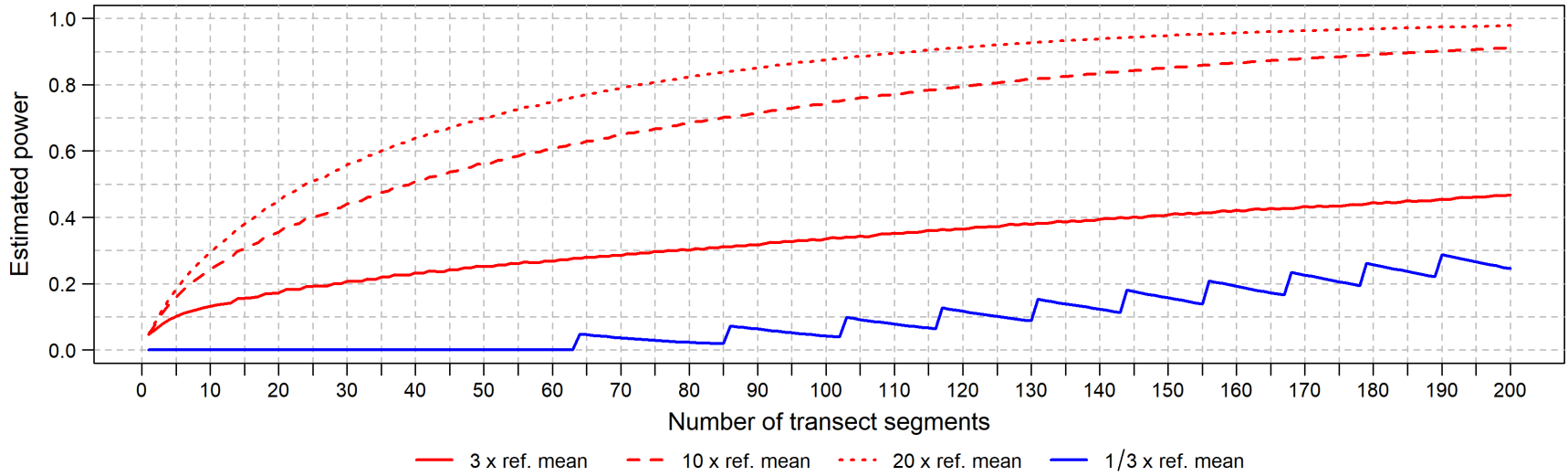
Coldspot



Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	1/3	1/3	1/3	1/3	1/10	1/10	1/10	1/10	1/20	1/20	1/20	1/20
No. grid cells:	9,009	4,034	2,146	1,364	9,009	4,034	2,146	1,364	9,009	4,034	2,146	1,364
Percent ≥ 0.8 :	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Figure E35. Power analysis results for Common Tern during spring based on the combined model (type I error rate = 0.05)

Common Tern: summer



E-40

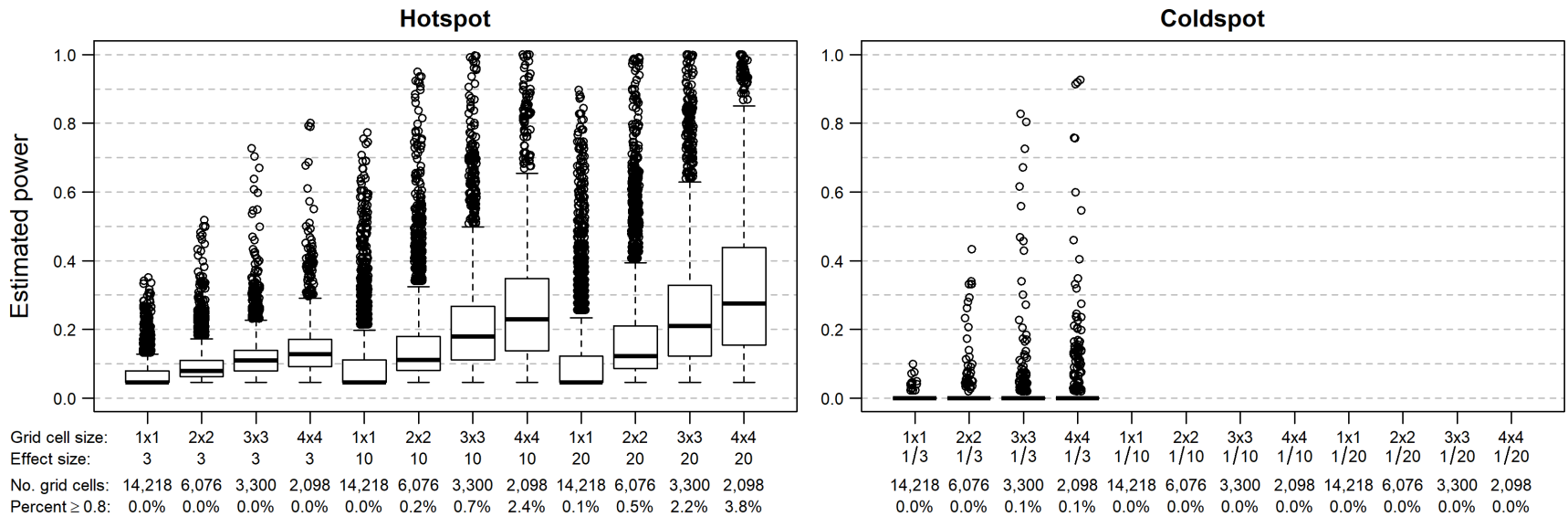
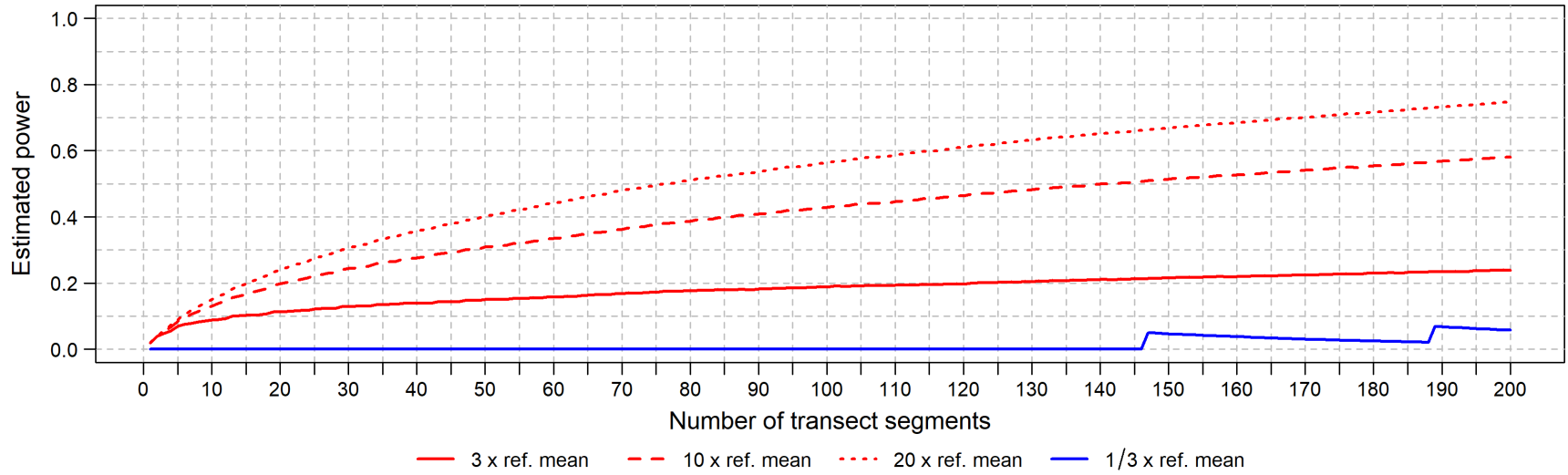


Figure E36. Power analysis results for Common Tern during summer based on the combined model (type I error rate = 0.05)

Common Tern: fall



— 3 x ref. mean
 - - - 10 x ref. mean
 . . . 20 x ref. mean
 — 1/3 x ref. mean

Hotspot

Coldspot

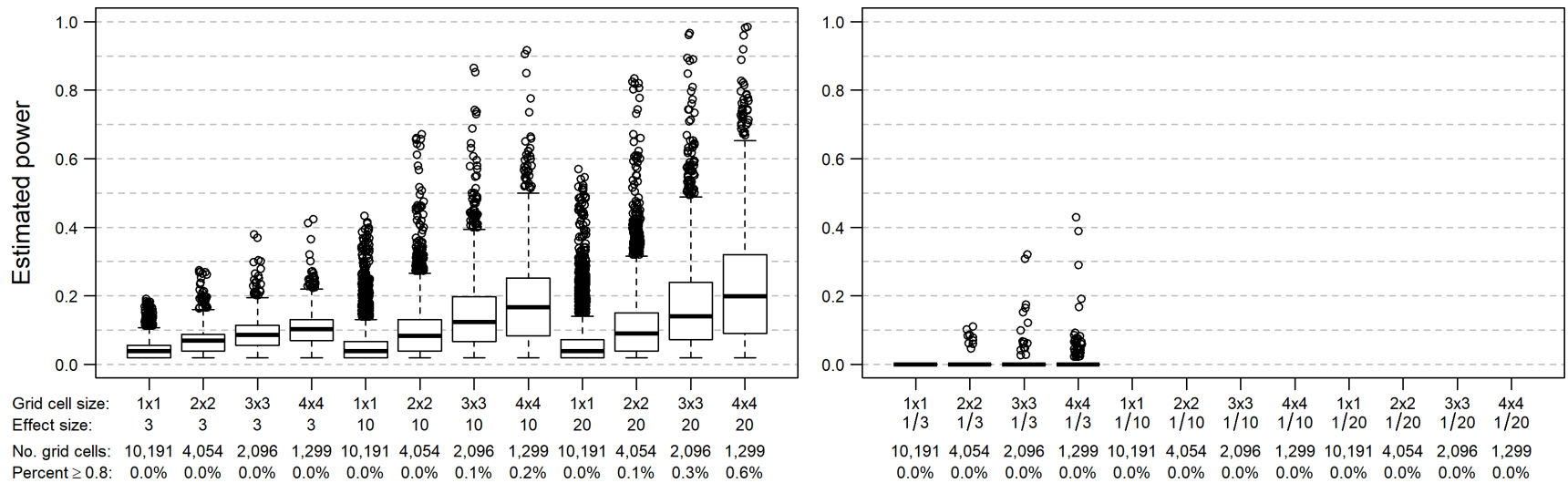
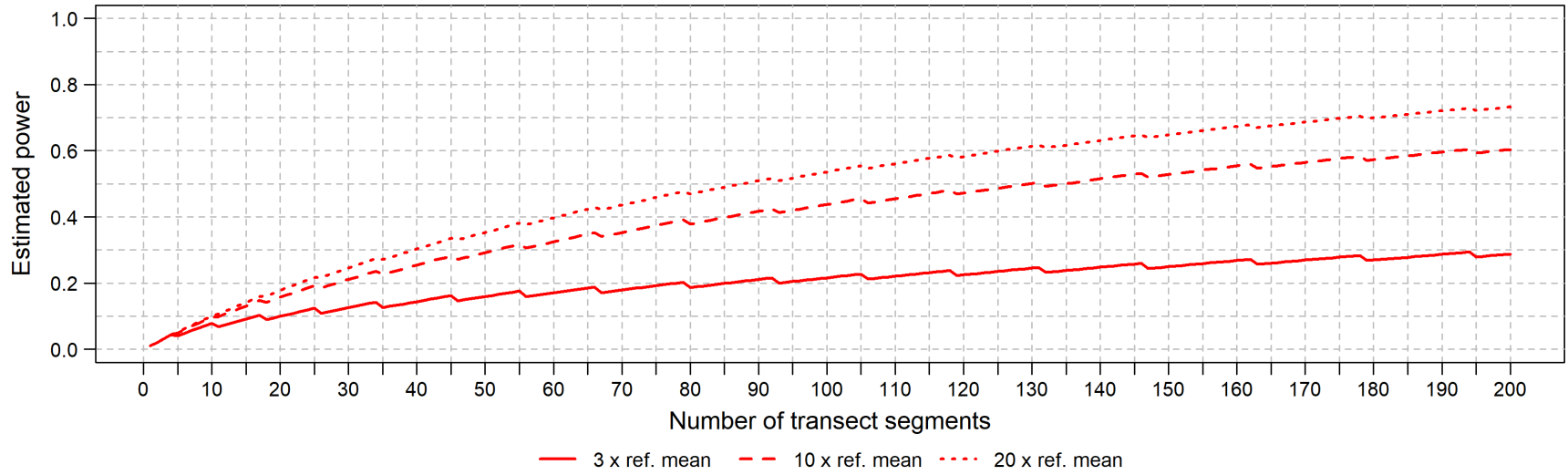


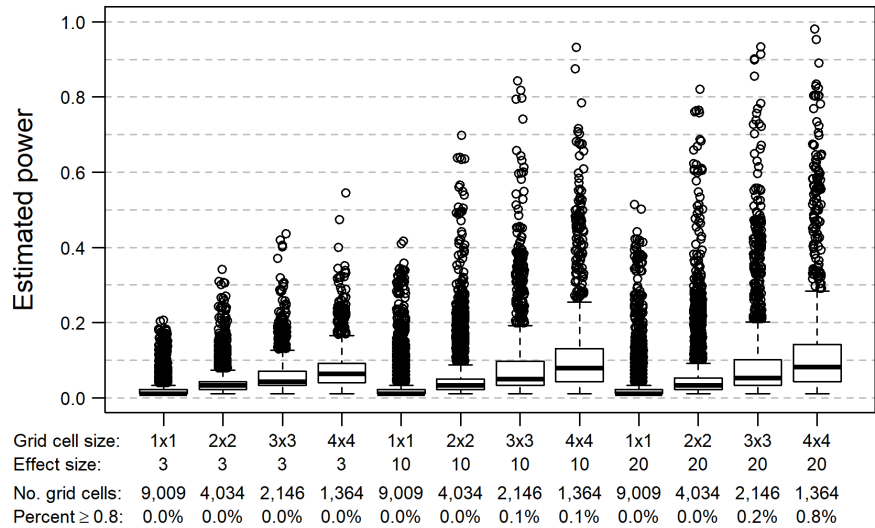
Figure E37. Power analysis results for Common Tern during fall based on the combined model (type I error rate = 0.05)

Royal Tern: spring



E-42

Hotspot



Coldspot

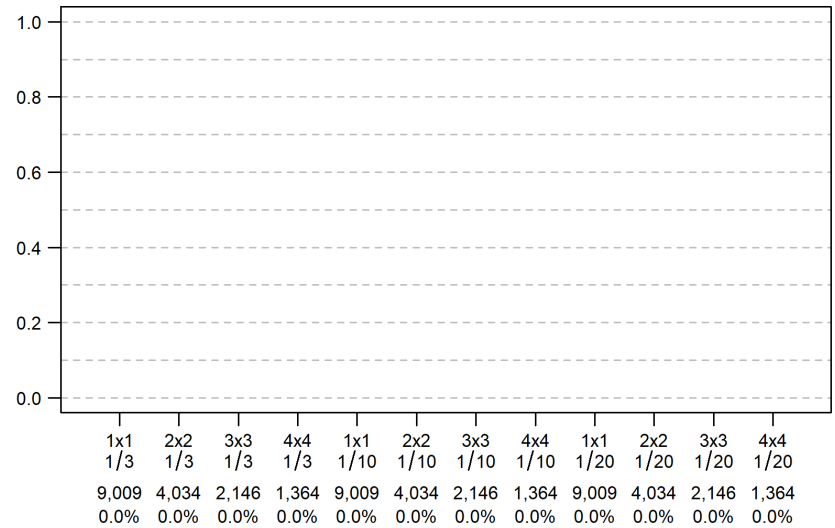
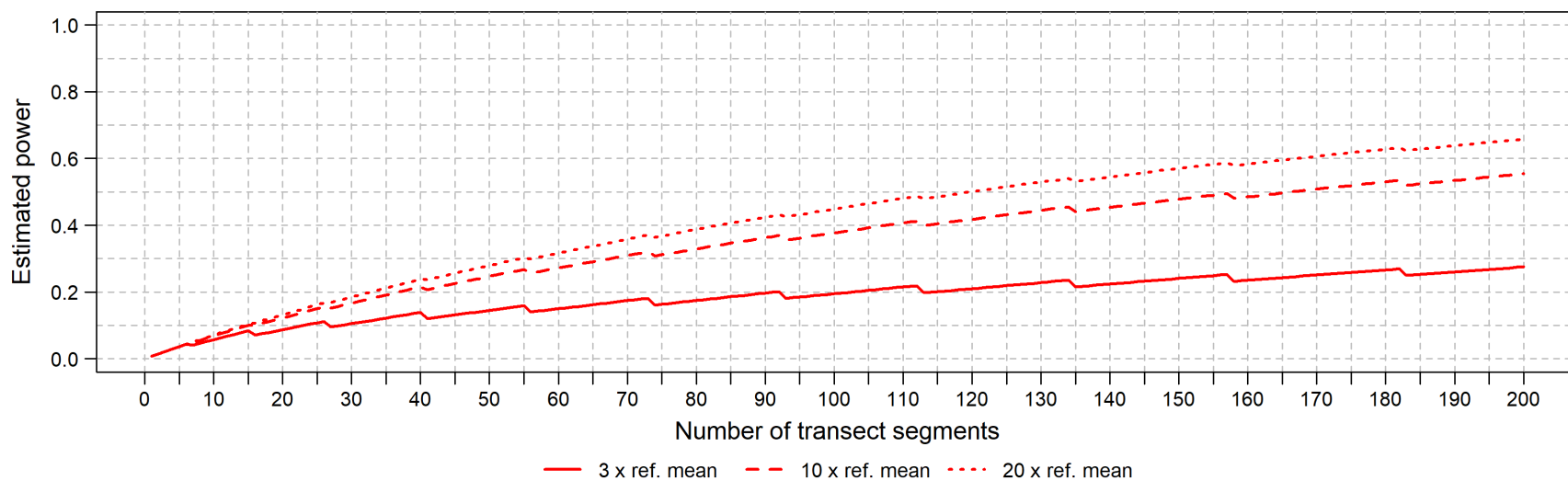


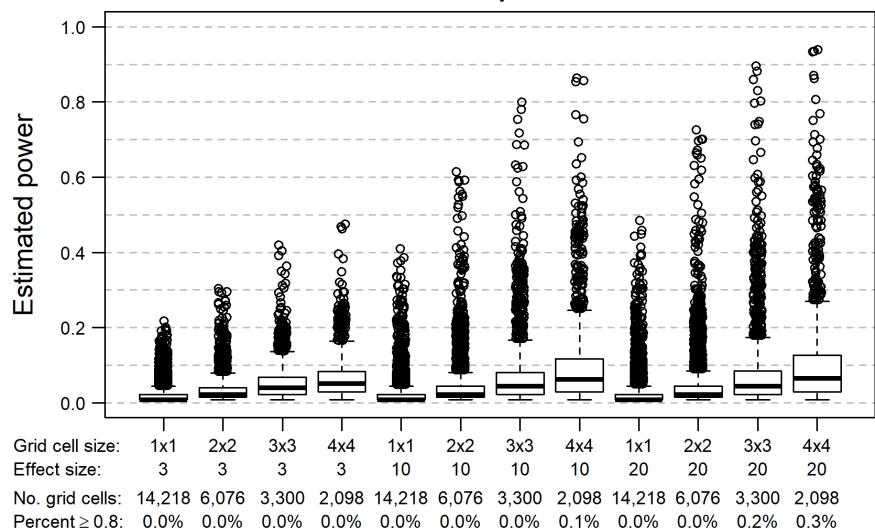
Figure E38. Power analysis results for Royal Tern during spring based on the combined model (type I error rate = 0.05)

Royal Tern: summer



E-43

Hotspot



Coldspot

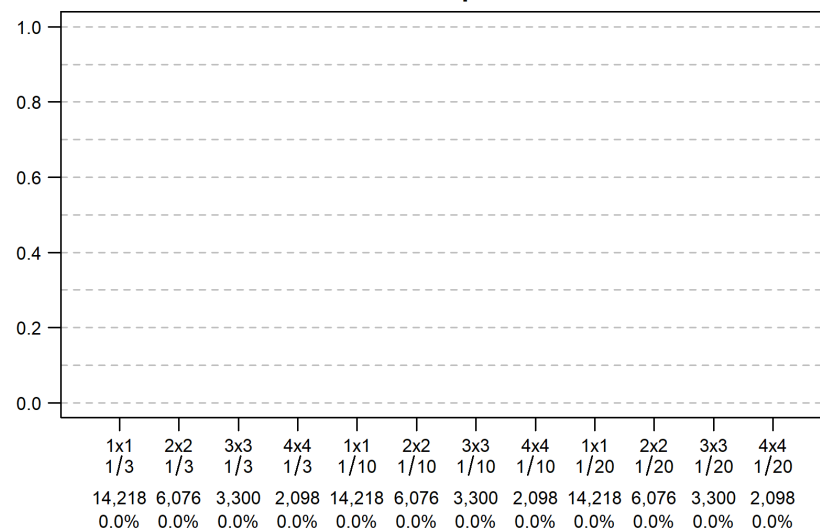
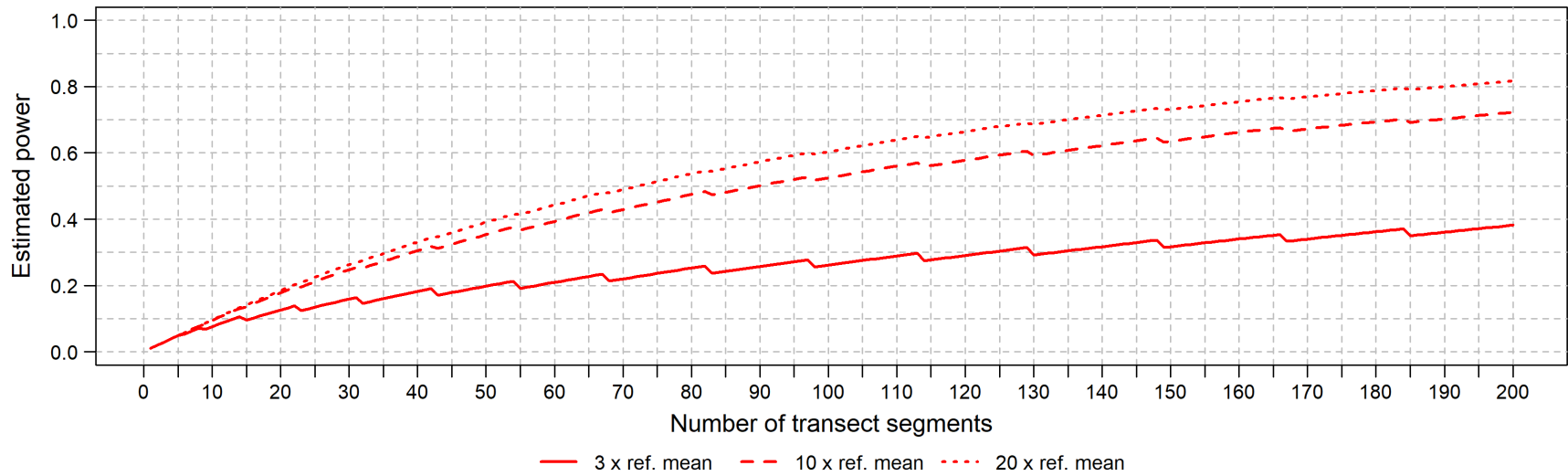


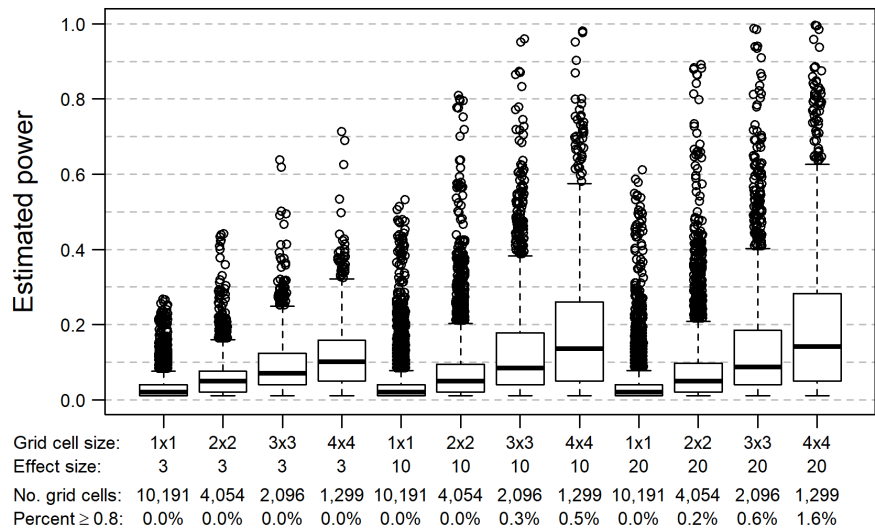
Figure E39. Power analysis results for Royal Tern during summer based on the combined model (type I error rate = 0.05)

Royal Tern: fall



E-44

Hotspot



Coldspot

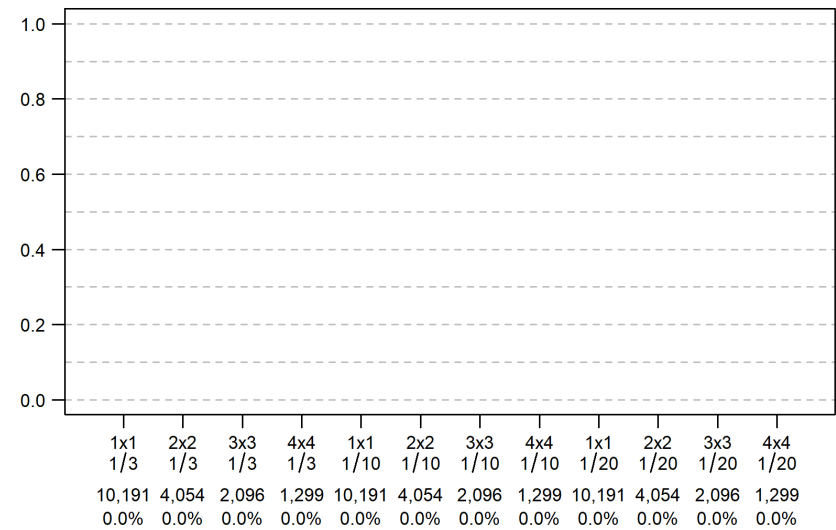
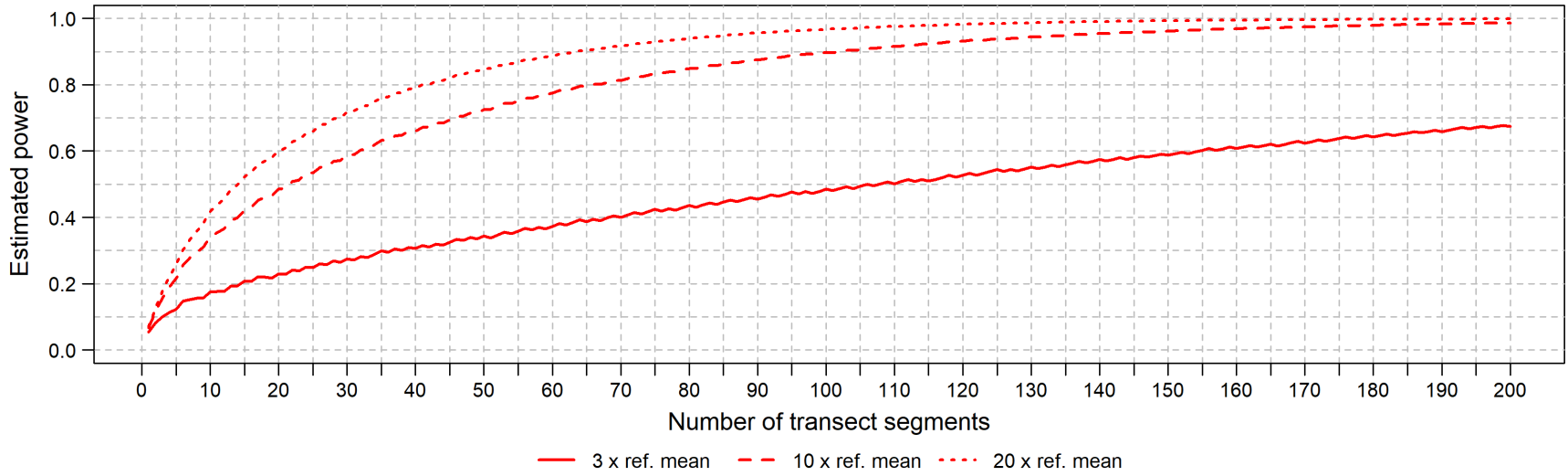


Figure E40. Power analysis results for Royal Tern during fall based on the combined model (type I error rate = 0.05)

Red-throated Loon: spring



E-45

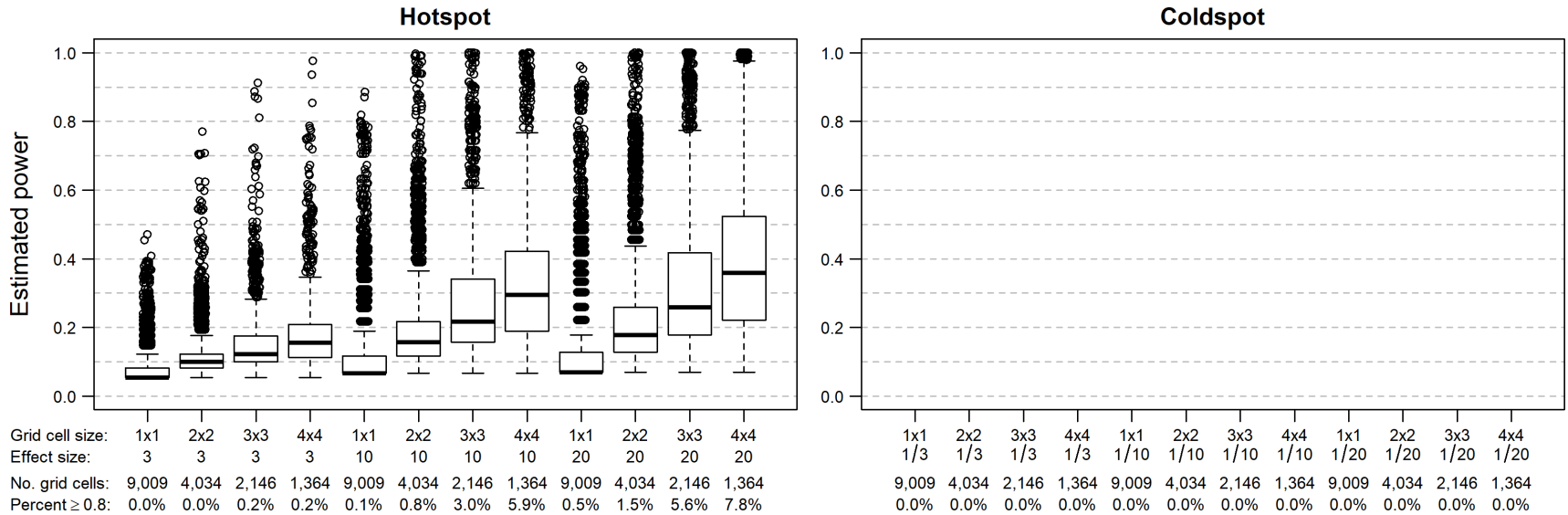
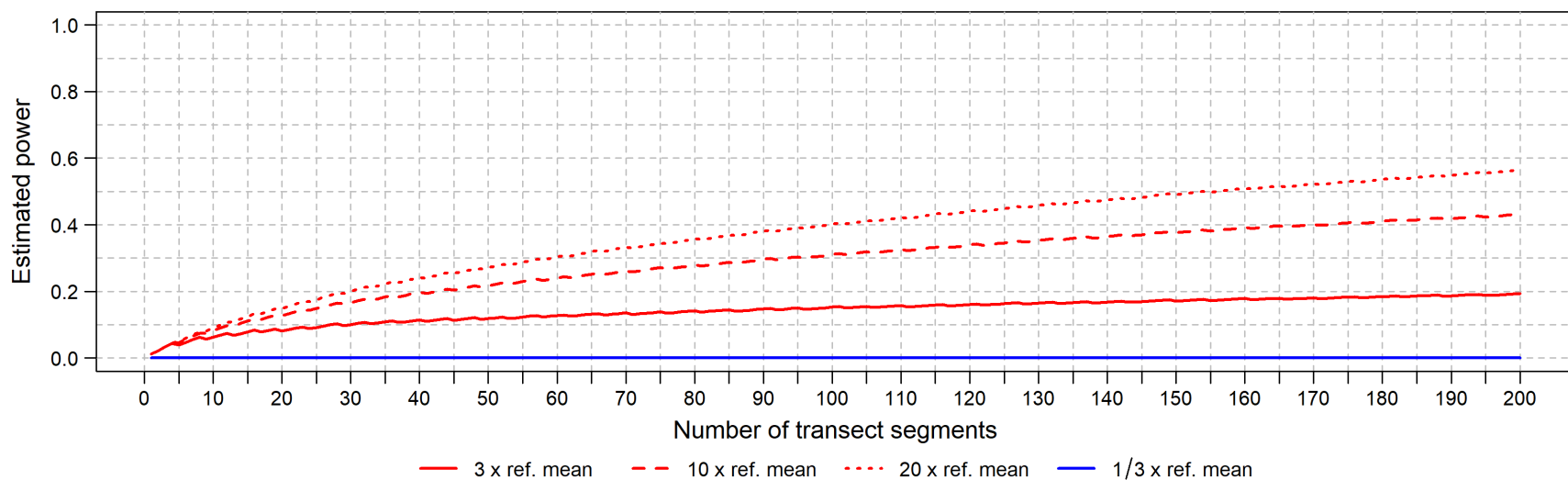


Figure E41. Power analysis results for Red-throated Loon during spring based on the combined model (type I error rate = 0.05)

Red-throated Loon: fall



Hotspot

Coldspot

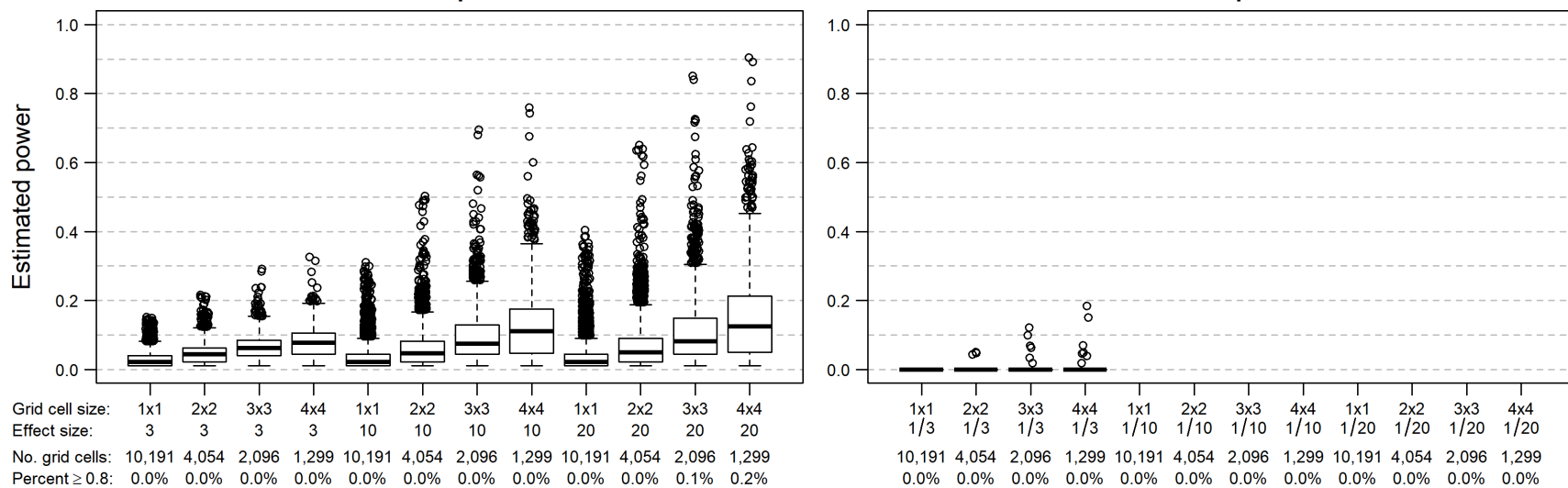
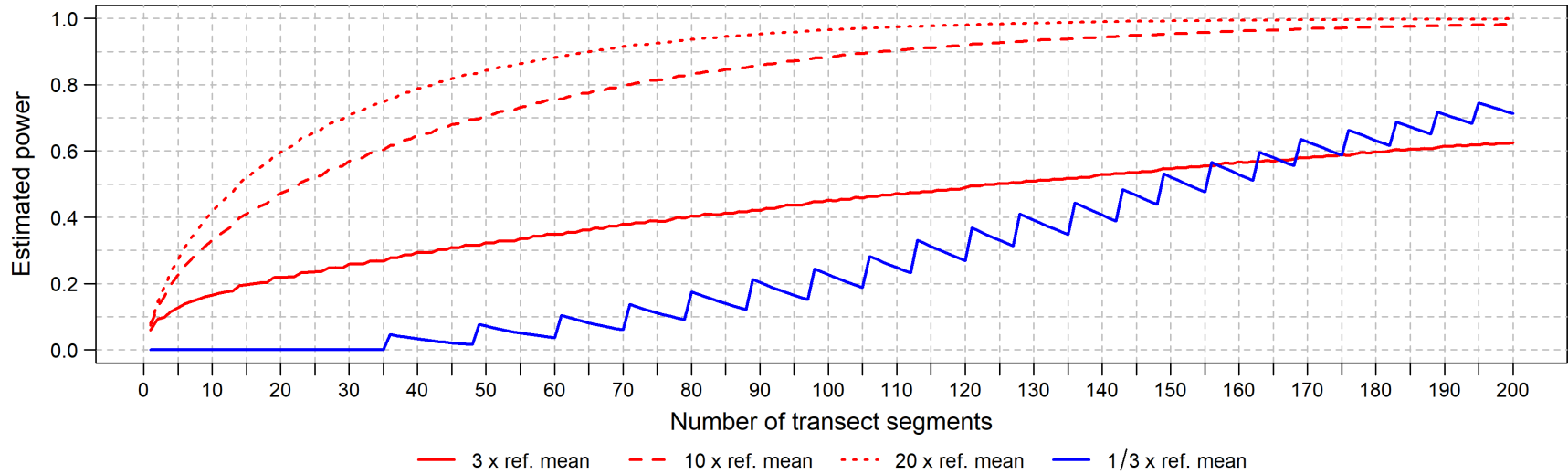
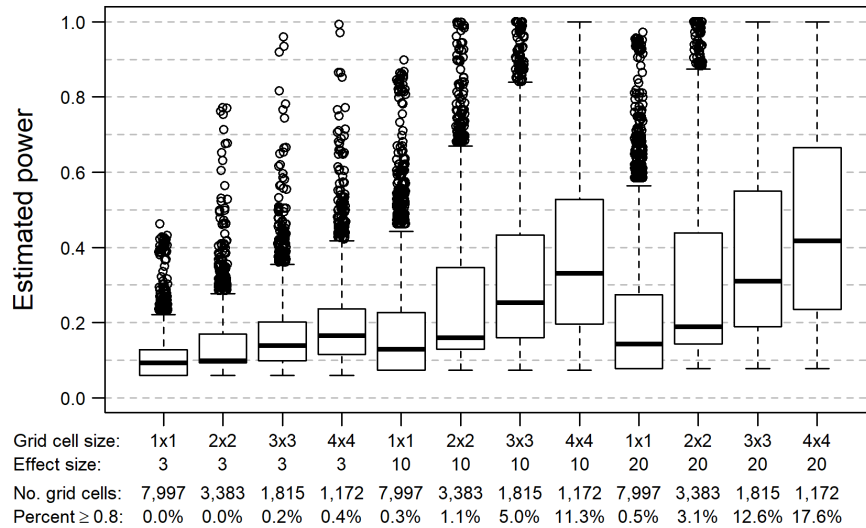


Figure E42. Power analysis results for Red-throated Loon during fall based on the combined model (type I error rate = 0.05)

Red-throated Loon: winter



Hotspot



Coldspot

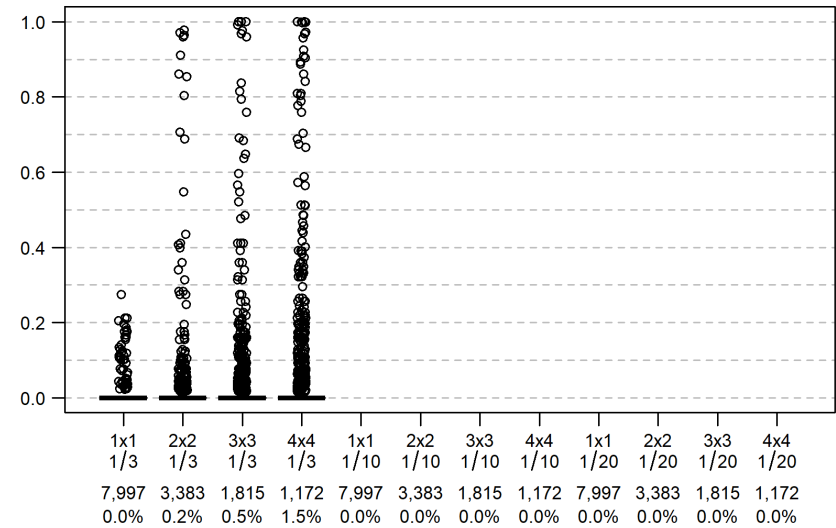
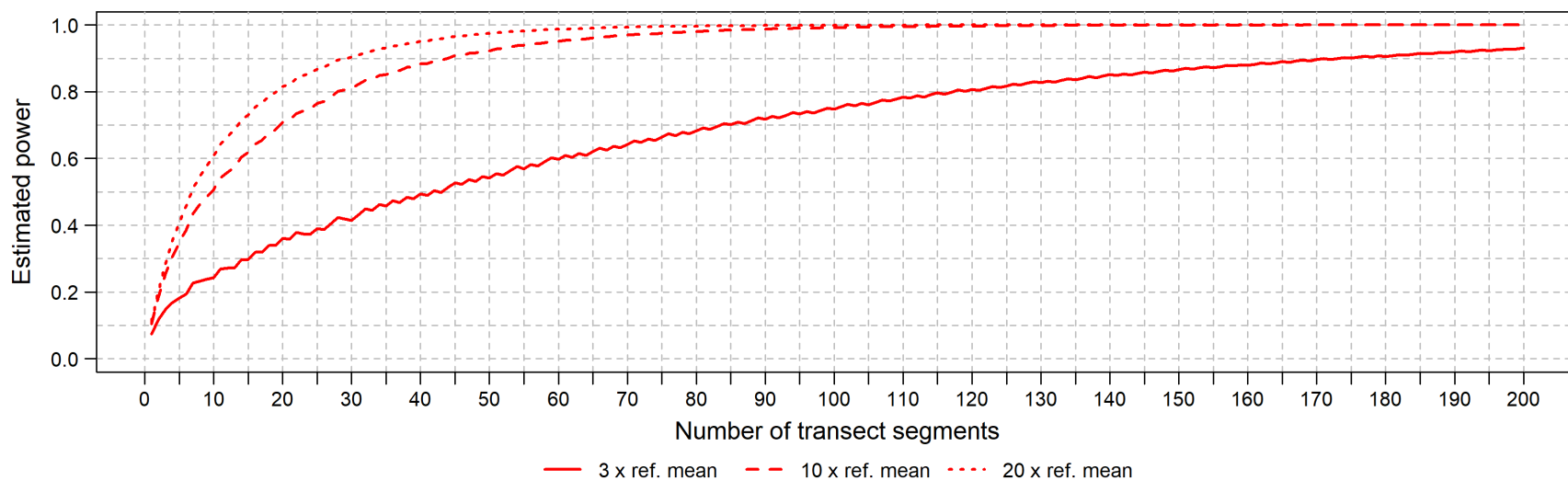


Figure E43. Power analysis results for Red-throated Loon during winter based on the combined model (type I error rate = 0.05)

Common Loon: spring



E-48

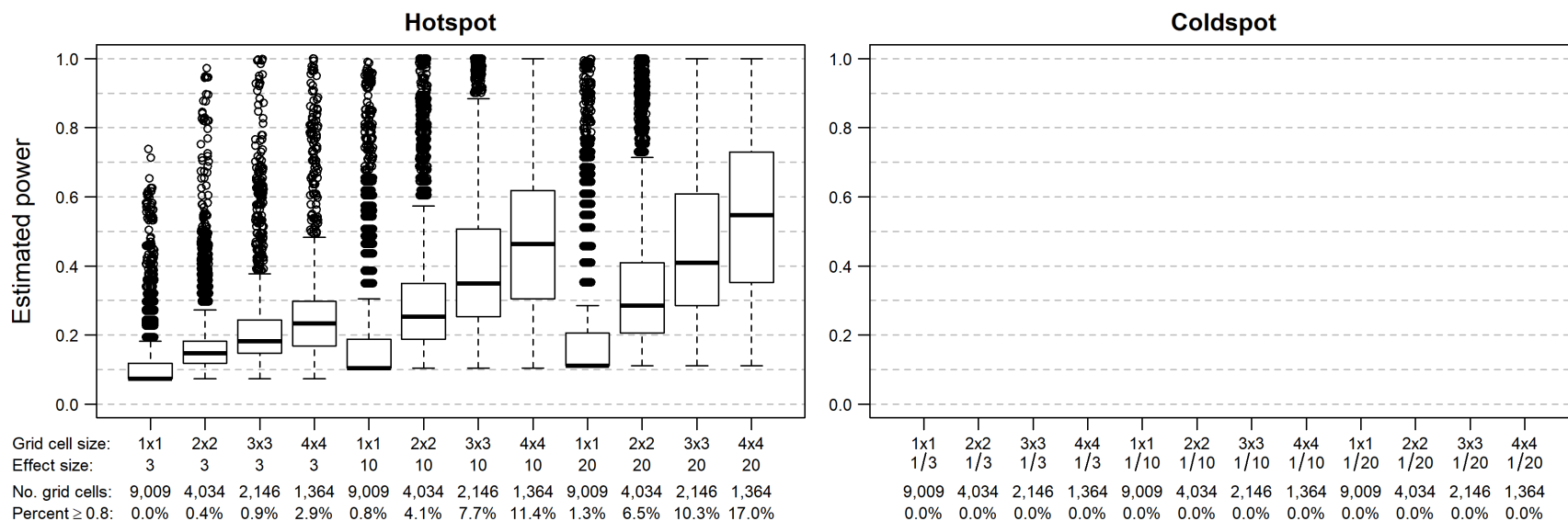
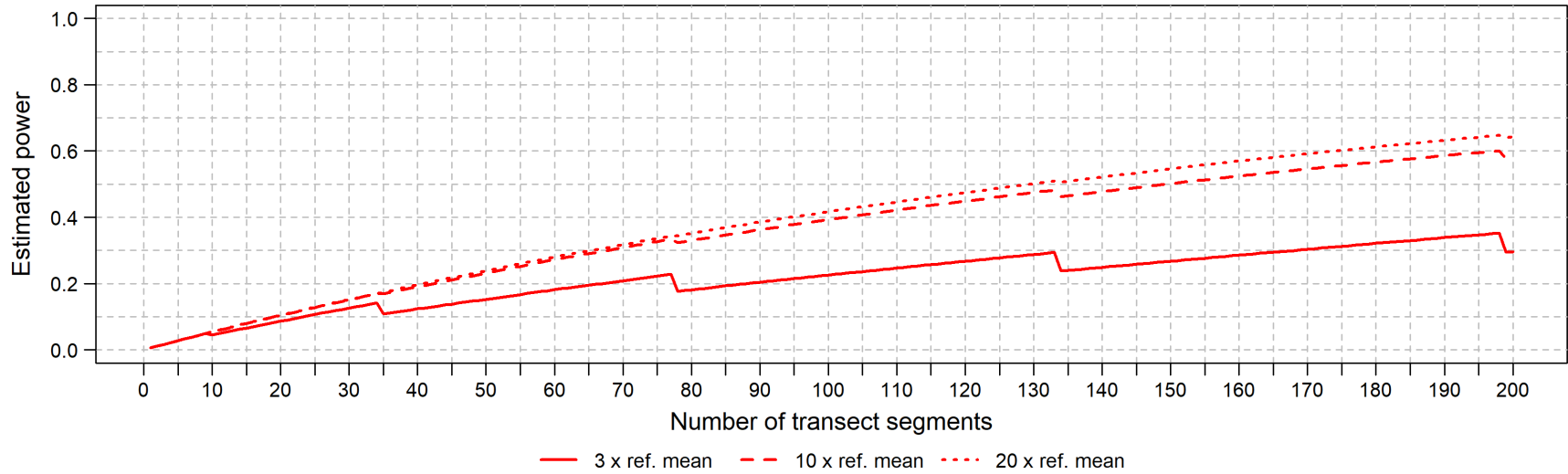


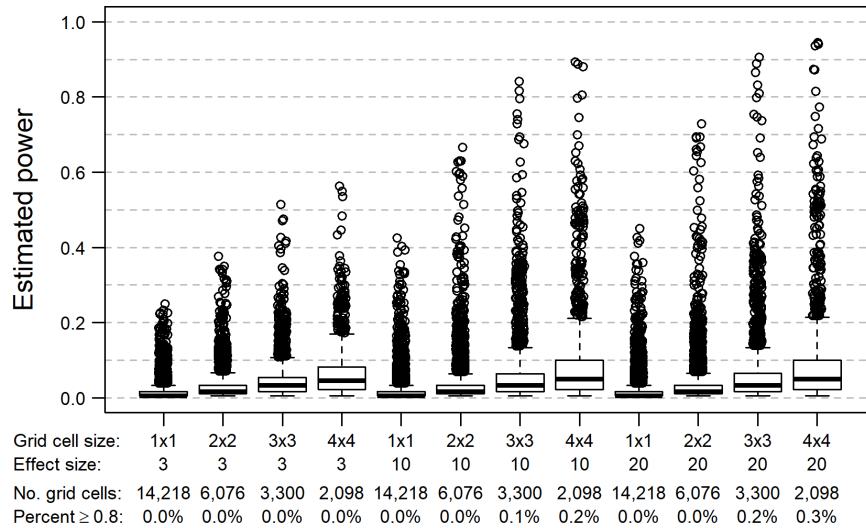
Figure E44. Power analysis results for Common Loon during spring based on the combined model (type I error rate = 0.05)

Common Loon: summer



E-49

Hotspot



Coldspot

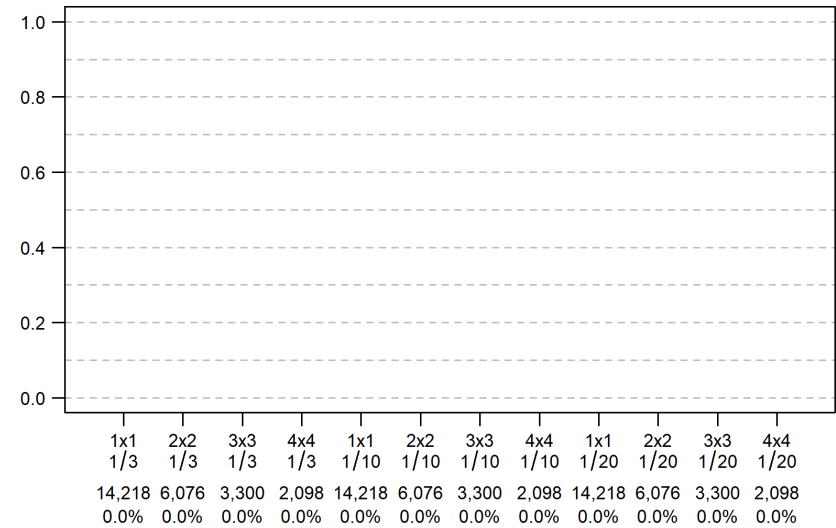
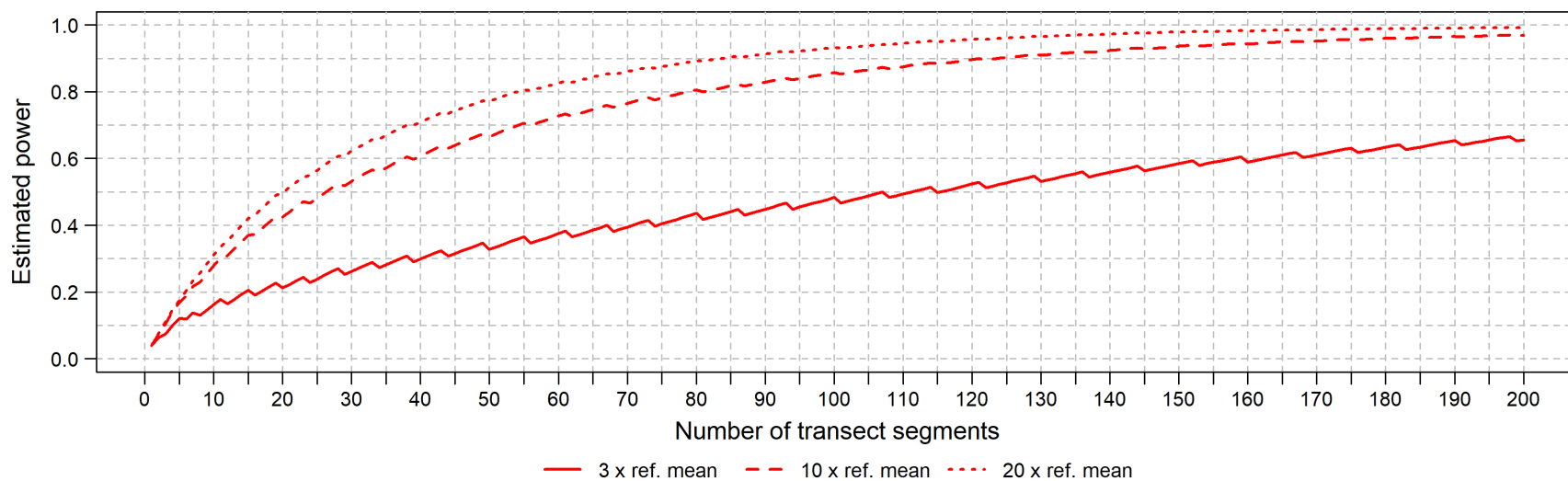


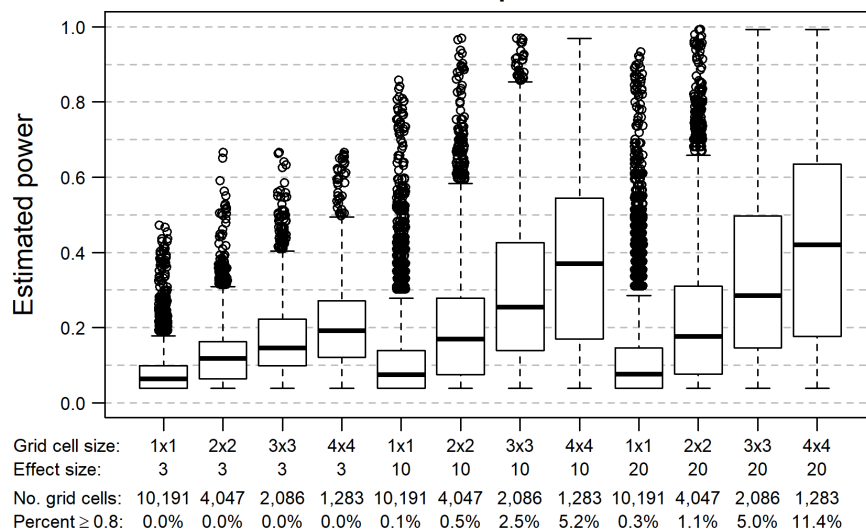
Figure E45. Power analysis results for Common Loon during summer based on the combined model (type I error rate = 0.05)

Common Loon: fall



E-50

Hotspot



Coldspot

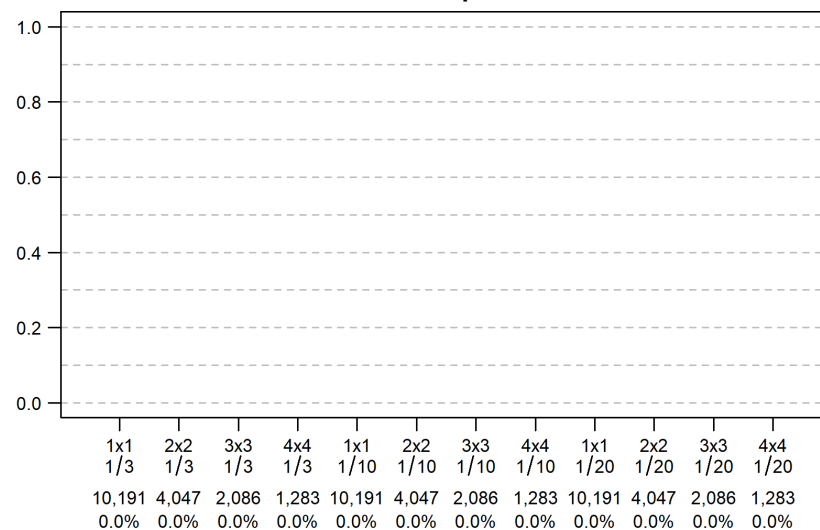
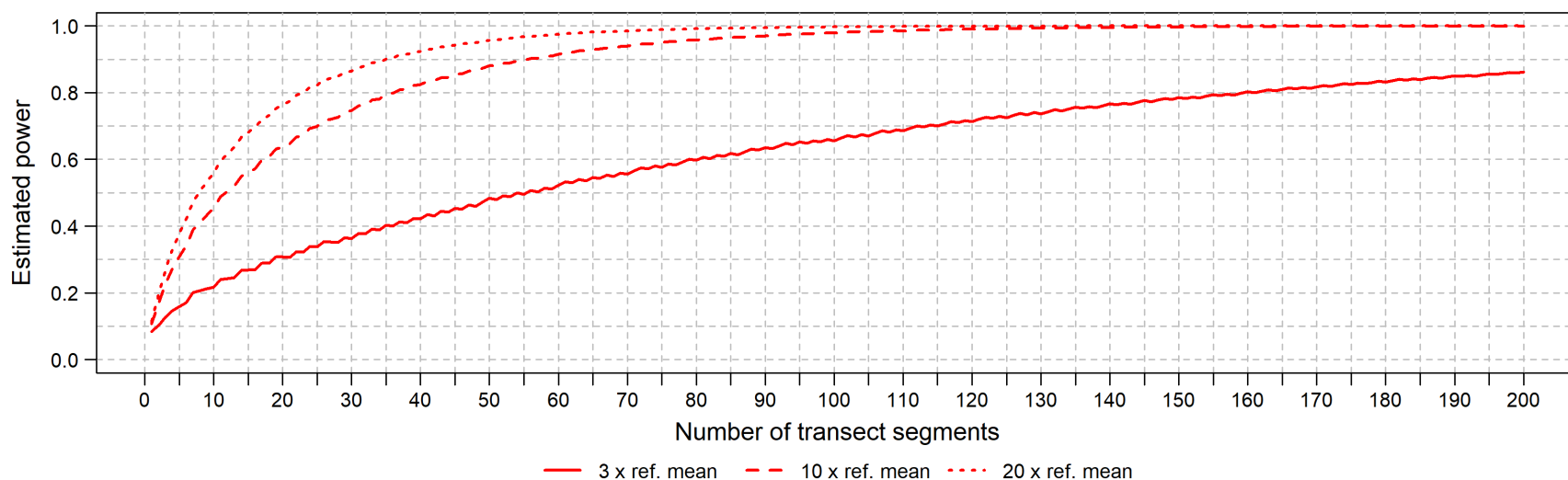


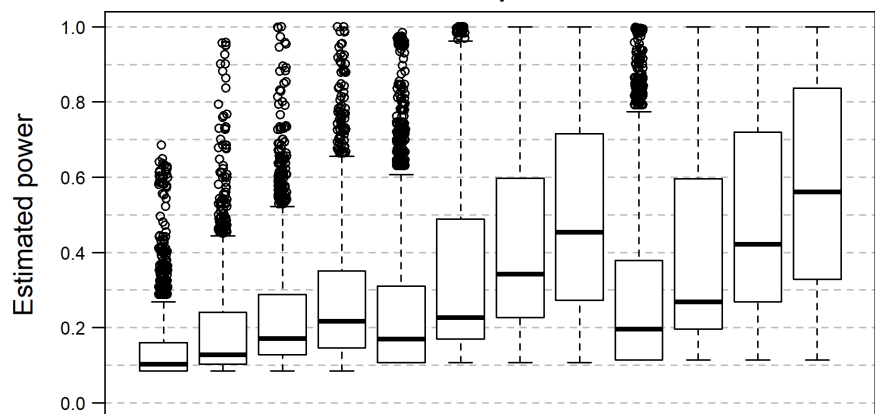
Figure E46. Power analysis results for Common Loon during fall based on the combined model (type I error rate = 0.05)

Common Loon: winter

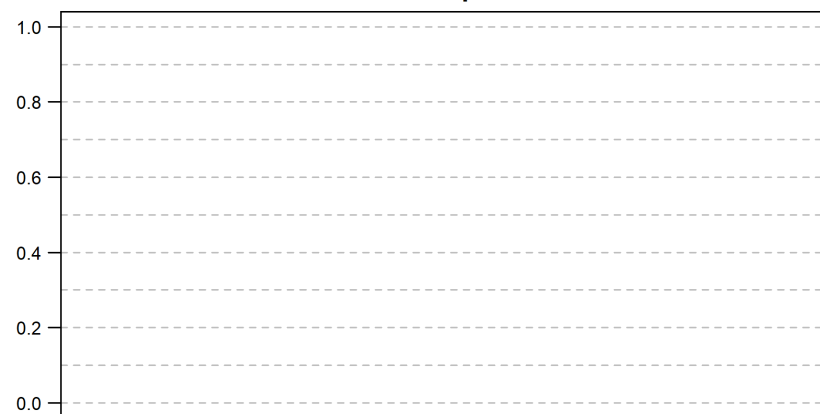


E-51

Hotspot



Coldspot

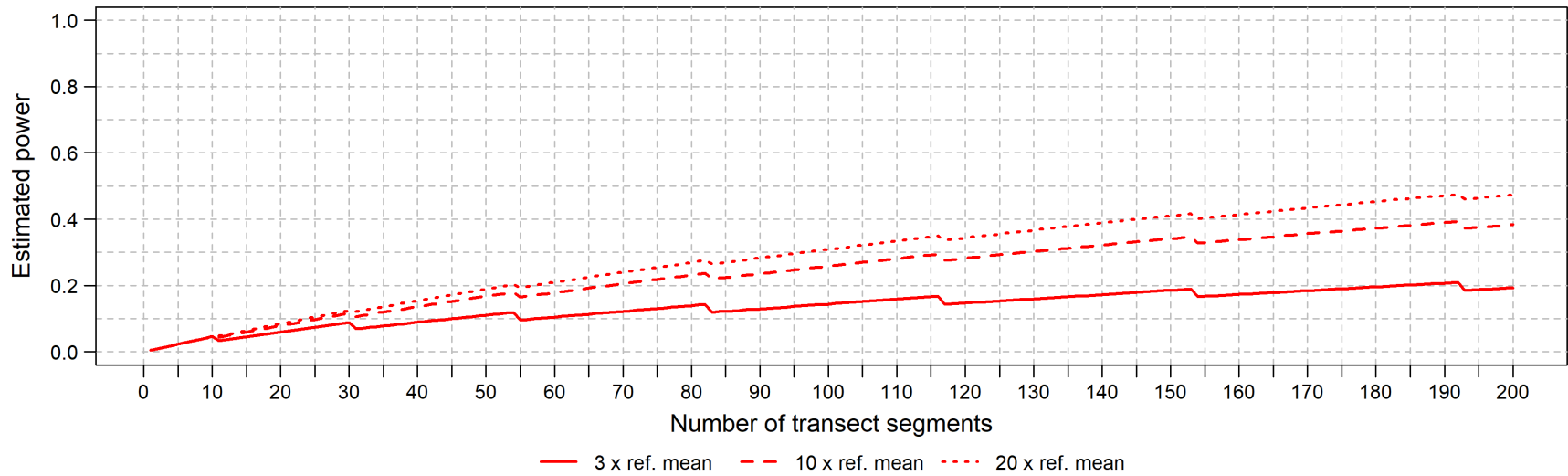


Grid cell size: 1x1 2x2 3x3 4x4 1x1 2x2 3x3 4x4 1x1 2x2 3x3 4x4
 Effect size: 3 3 3 3 10 10 10 10 20 20 20 20
 No. grid cells: 7,997 3,383 1,815 1,172 7,997 3,383 1,815 1,172 7,997 3,383 1,815 1,172
 Percent ≥ 0.8: 0.0% 0.3% 0.9% 2.5% 0.6% 4.5% 14.6% 19.9% 1.7% 11.6% 20.8% 27.2%

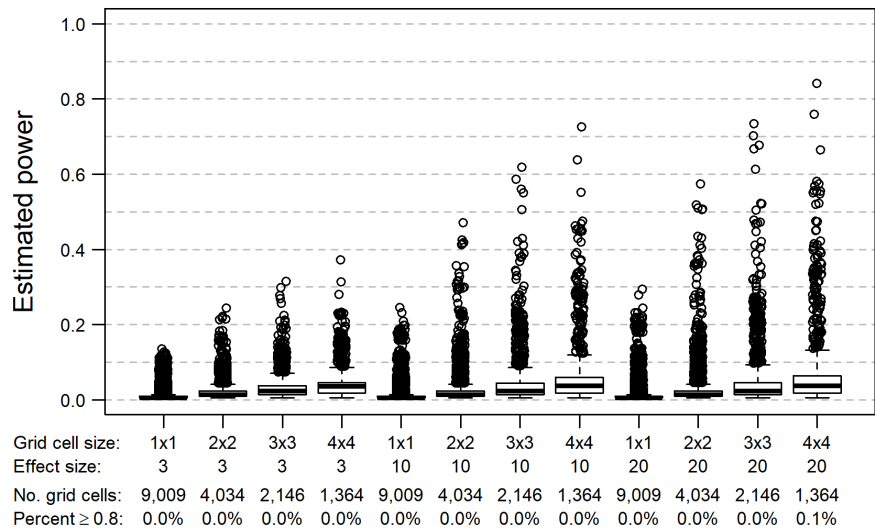
1x1 2x2 3x3 4x4 1x1 2x2 3x3 4x4 1x1 2x2 3x3 4x4
 1/3 1/3 1/3 1/3 1/10 1/10 1/10 1/10 1/20 1/20 1/20 1/20
 7,997 3,383 1,815 1,172 7,997 3,383 1,815 1,172 7,997 3,383 1,815 1,172
 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0%

Figure E47. Power analysis results for Common Loon during winter based on the combined model (type I error rate = 0.05)

Black-capped Petrel: spring



Hotspot



Coldspot

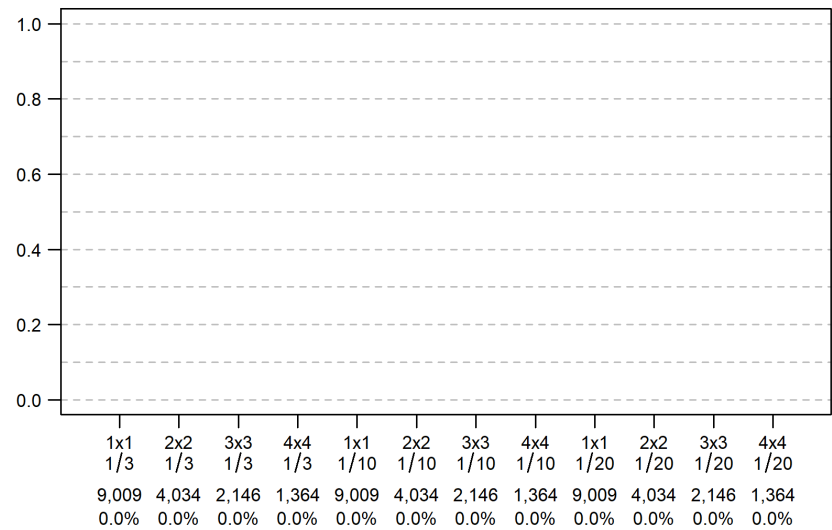
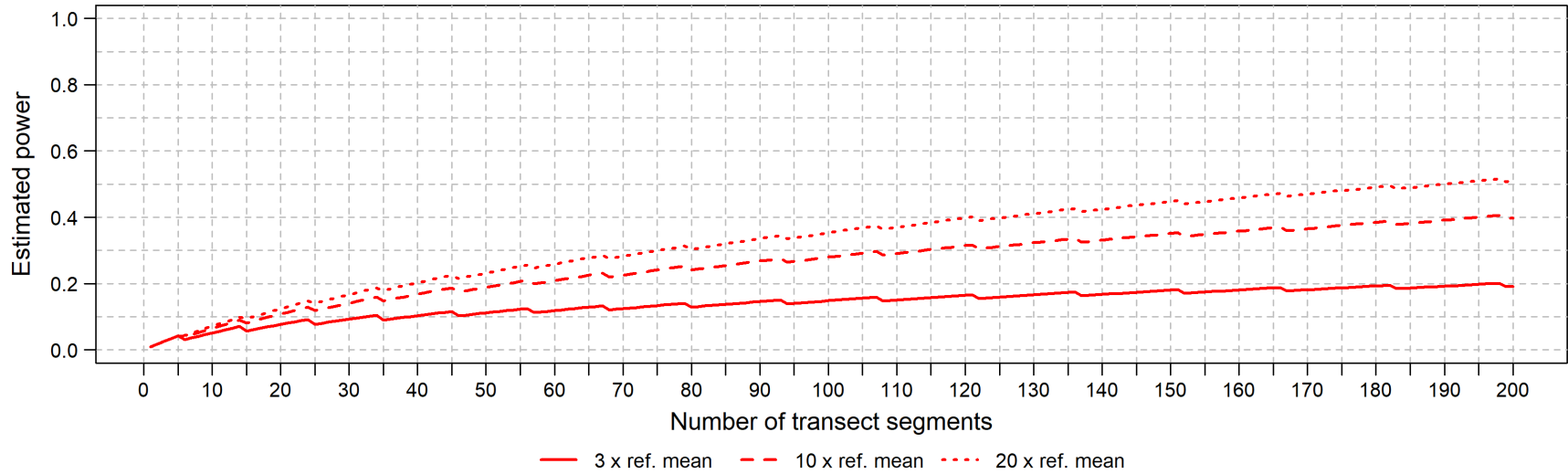
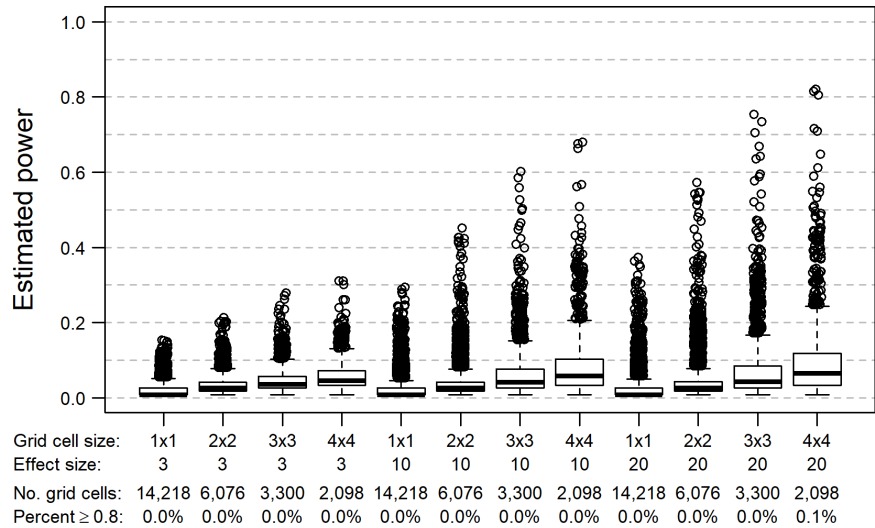


Figure E48. Power analysis results for Black-capped Petrel during spring based on the combined model (type I error rate = 0.05)

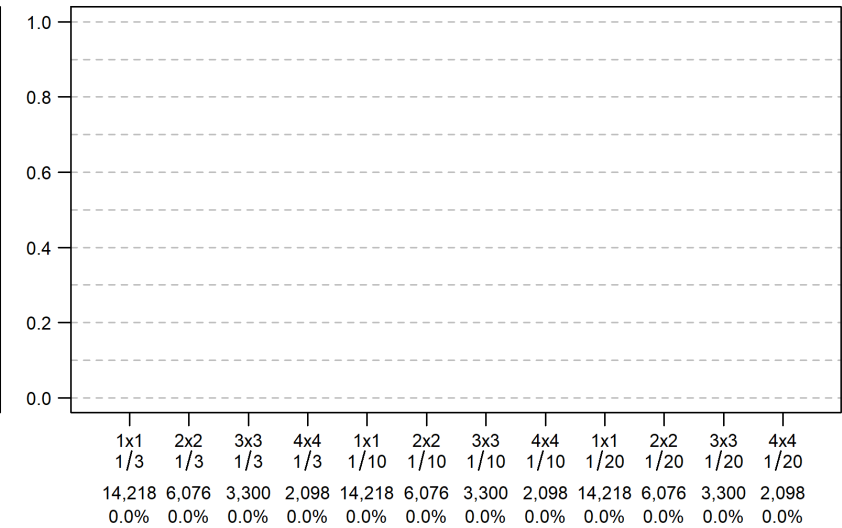
Black-capped Petrel: summer



Hotspot



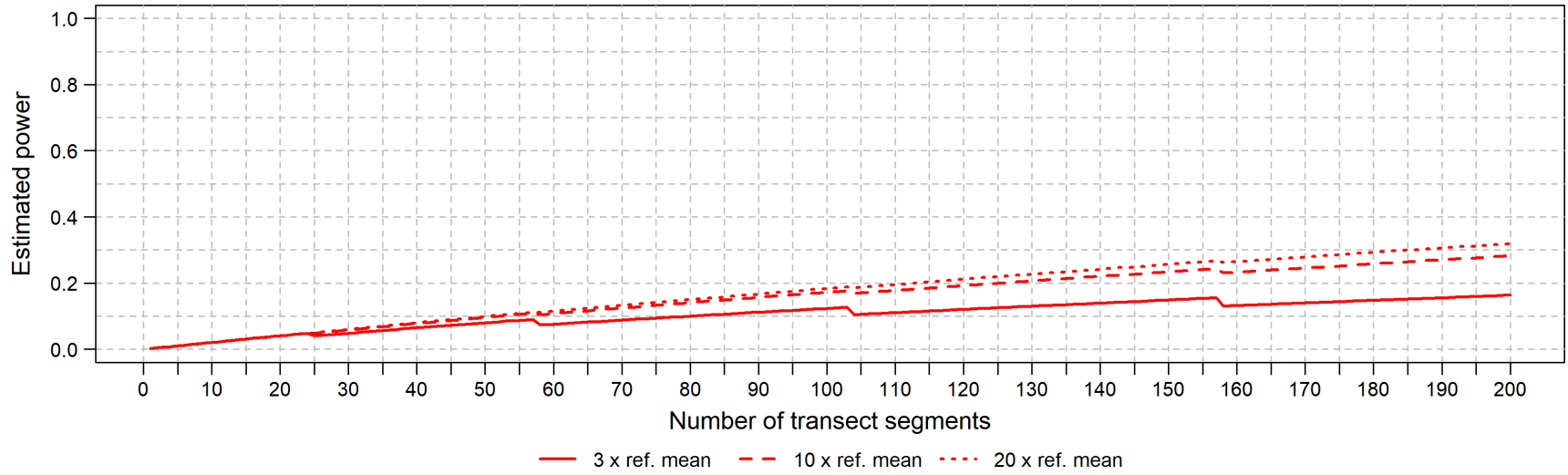
Coldspot



E-53

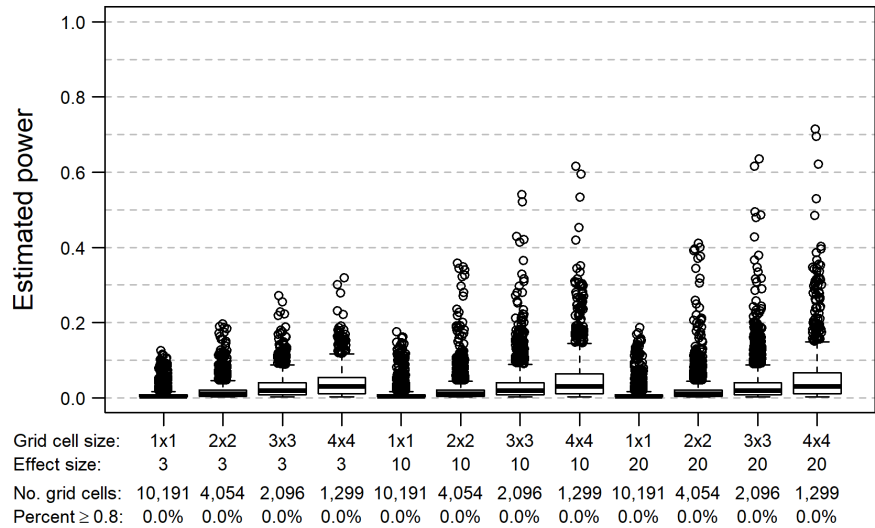
Figure E49. Power analysis results for Black-capped Petrel during summer based on the combined model (type I error rate = 0.05)

Black-capped Petrel: fall



E-54

Hotspot



Coldspot

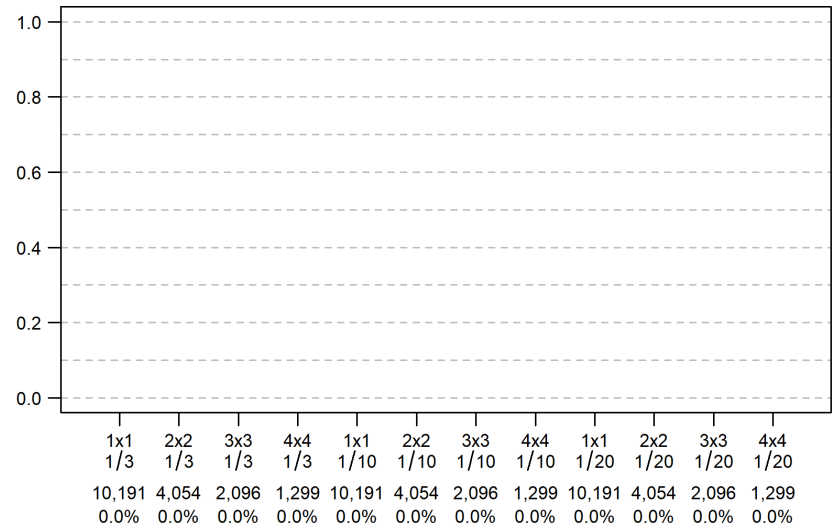
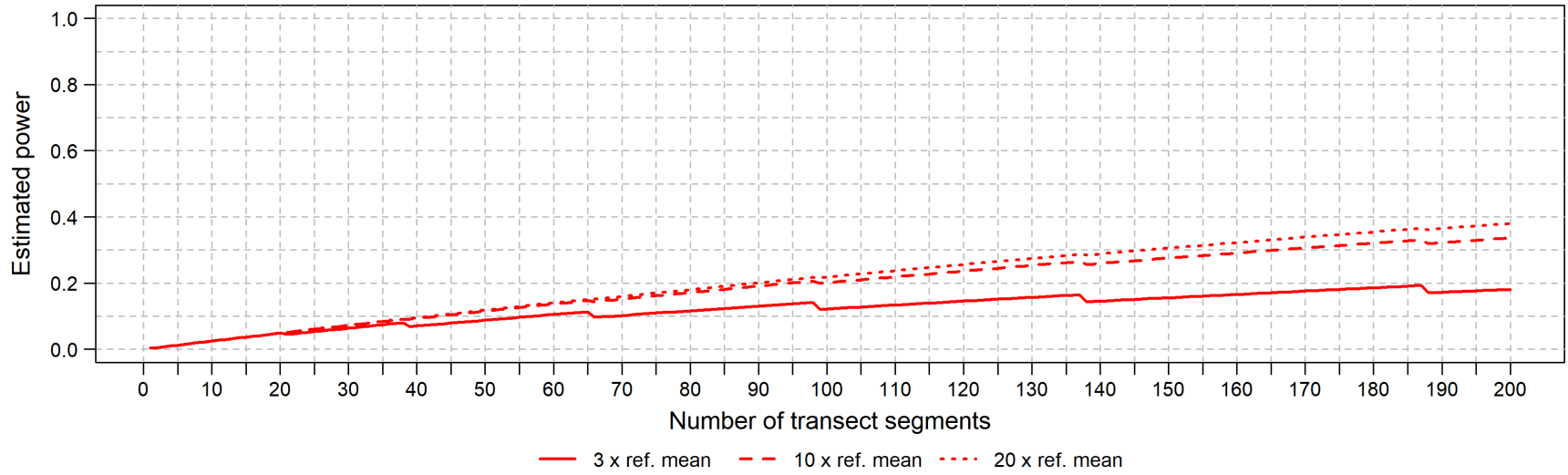


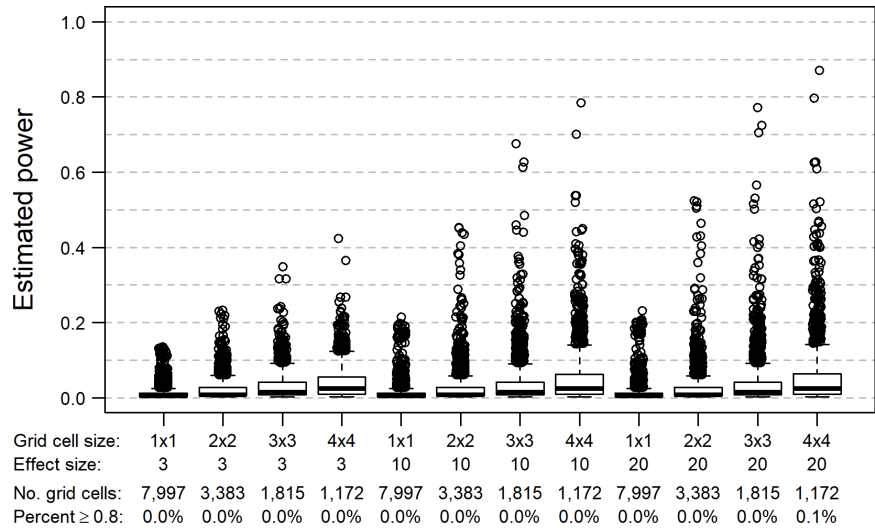
Figure E50. Power analysis results for Black-capped Petrel during fall based on the combined model (type I error rate = 0.05)

Black-capped Petrel: winter



E-55

Hotspot



Coldspot

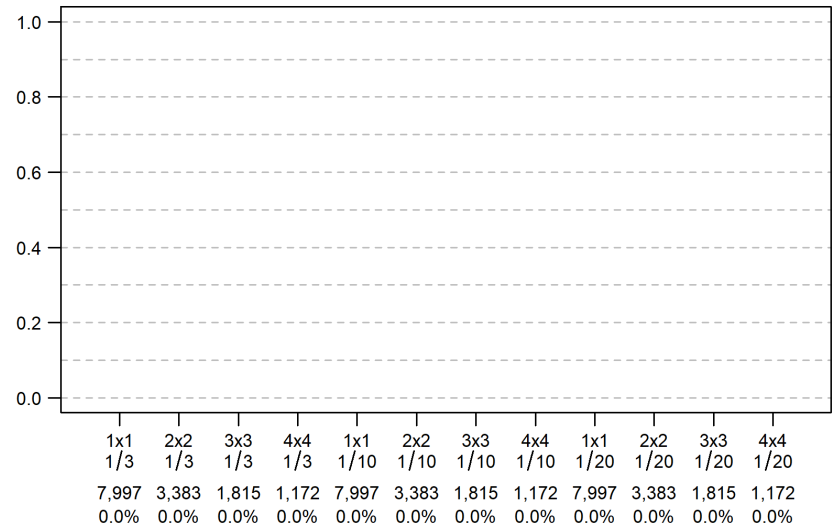
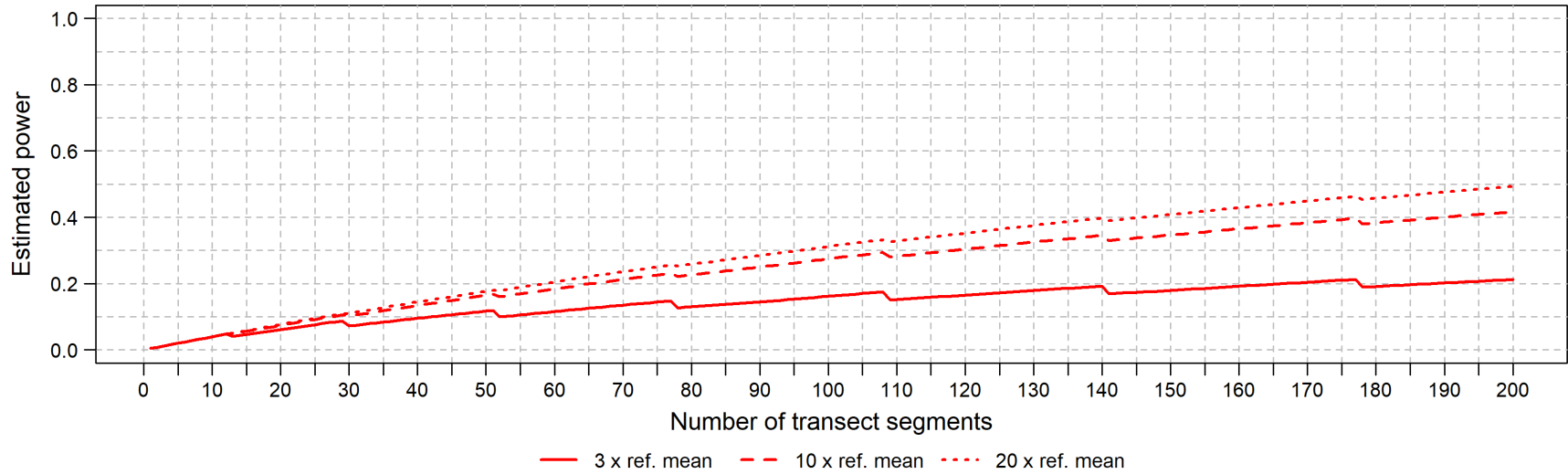


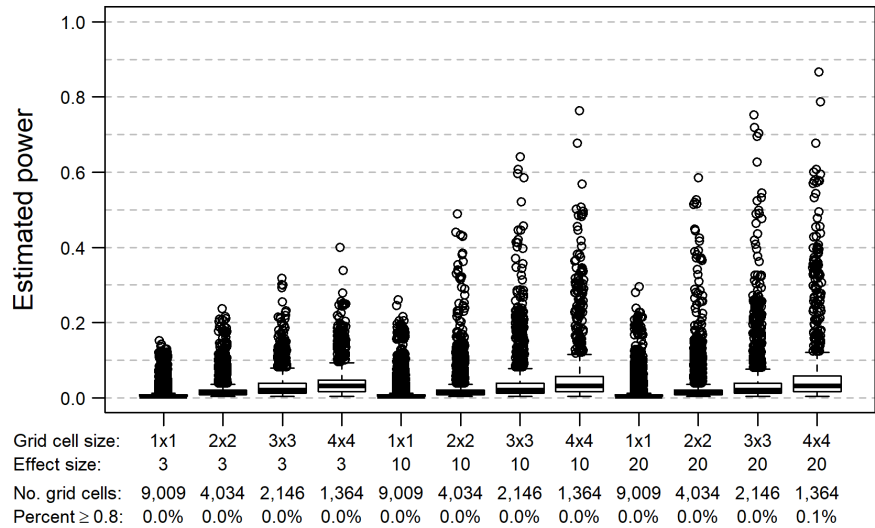
Figure E51. Power analysis results for Black-capped Petrel during winter based on the combined model (type I error rate = 0.05)

Cory's Shearwater: spring



E-56

Hotspot



Coldspot

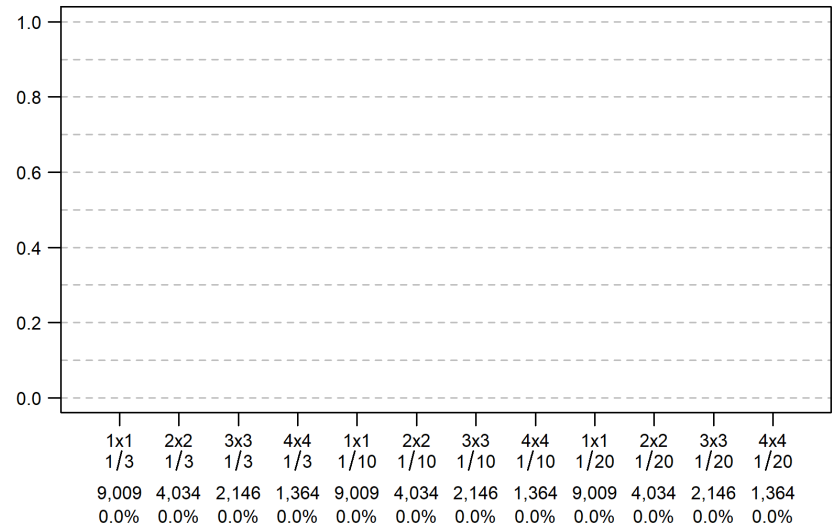
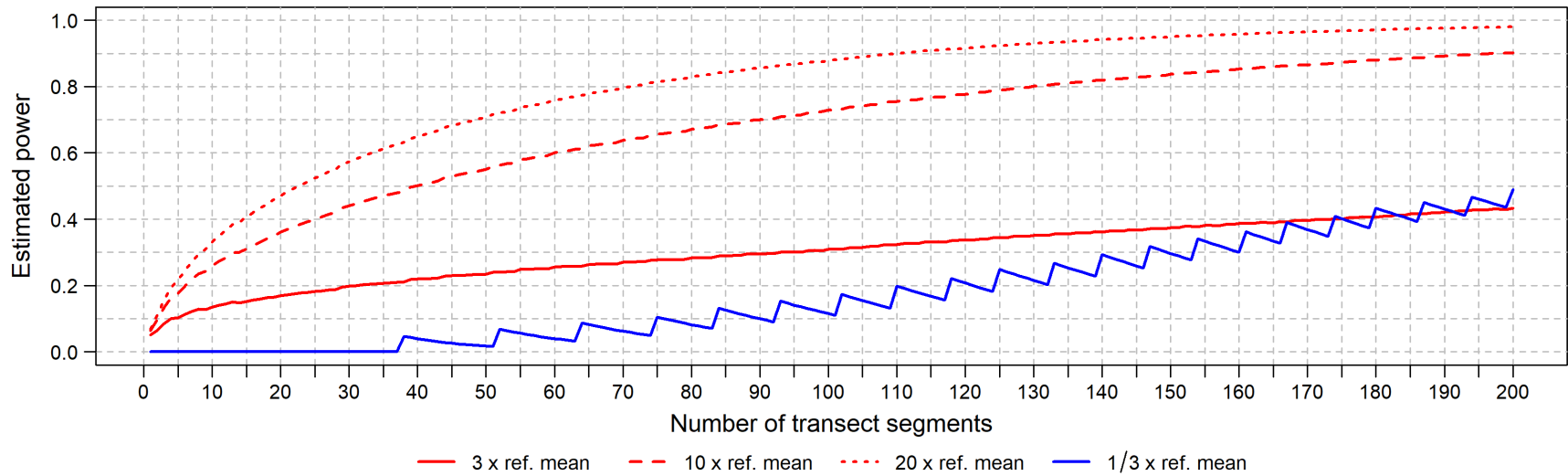


Figure E52. Power analysis results for Cory's Shearwater during spring based on the combined model (type I error rate = 0.05)

Cory's Shearwater: summer



E-57

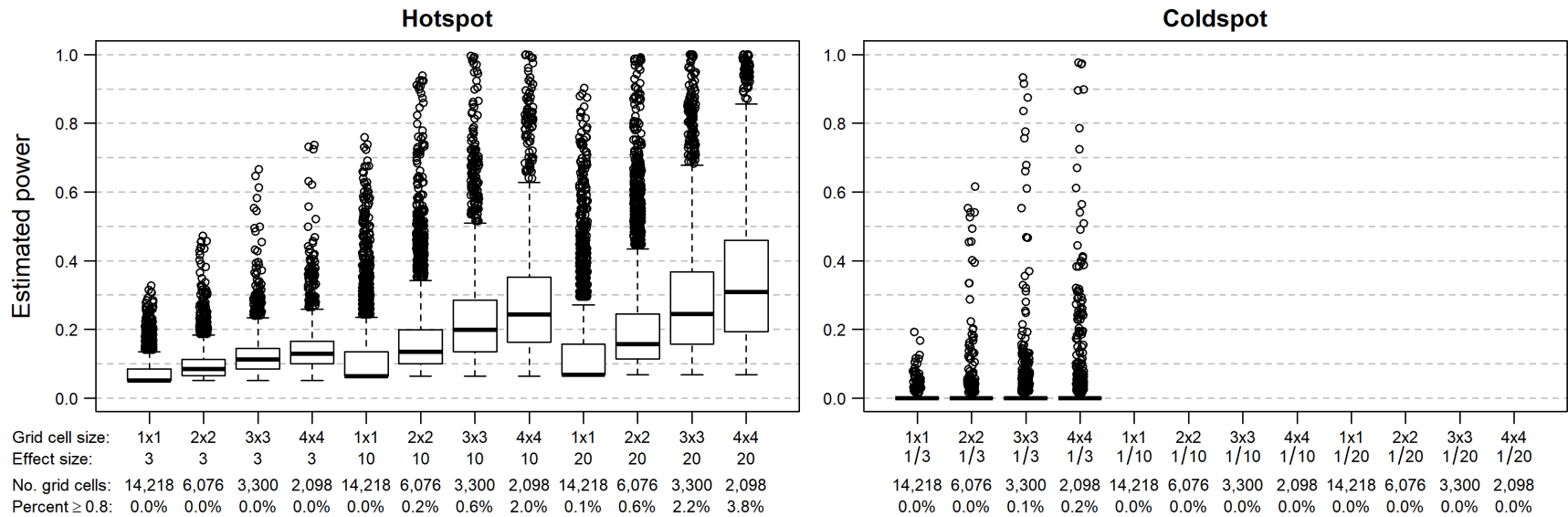
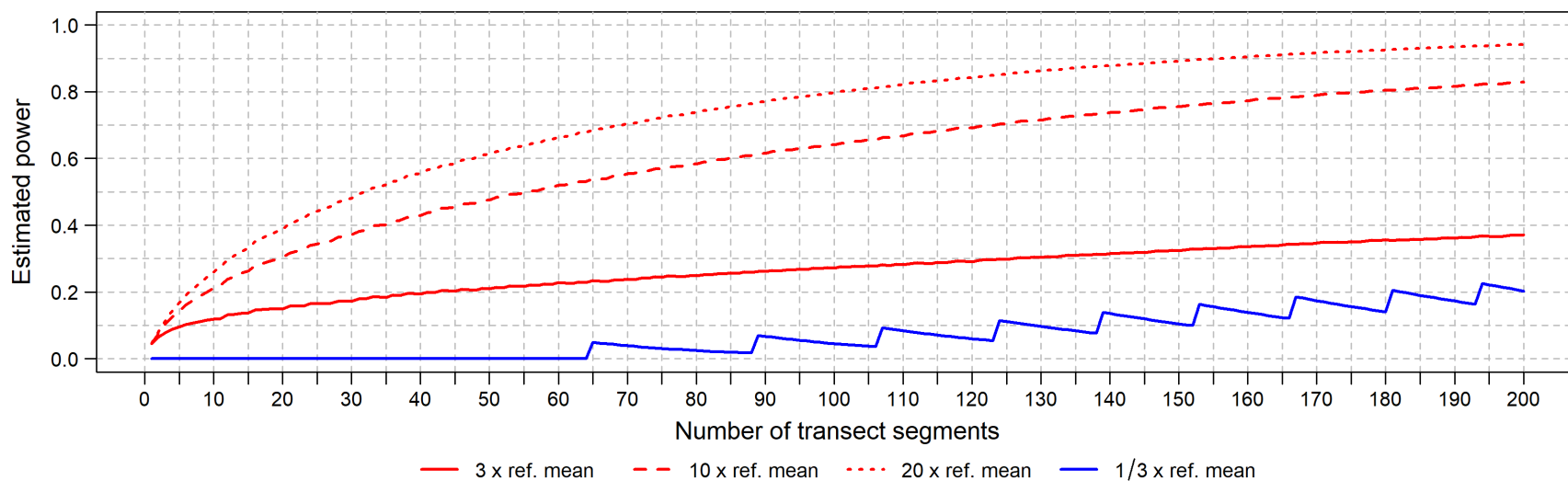


Figure E53. Power analysis results for Cory's Shearwater during summer based on the combined model (type I error rate = 0.05)

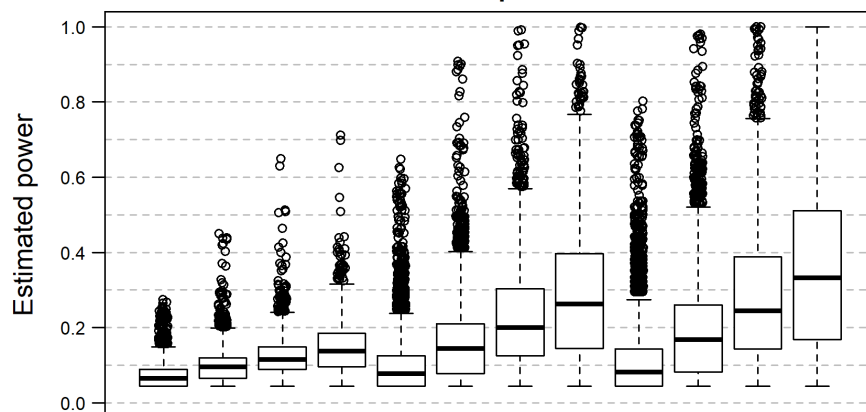
Cory's Shearwater: fall



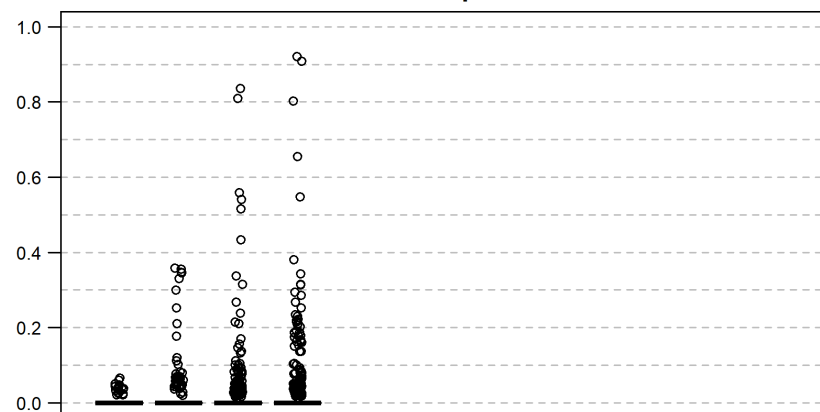
— 3 x ref. mean - - 10 x ref. mean ··· 20 x ref. mean — 1/3 x ref. mean

E-58

Hotspot



Coldspot

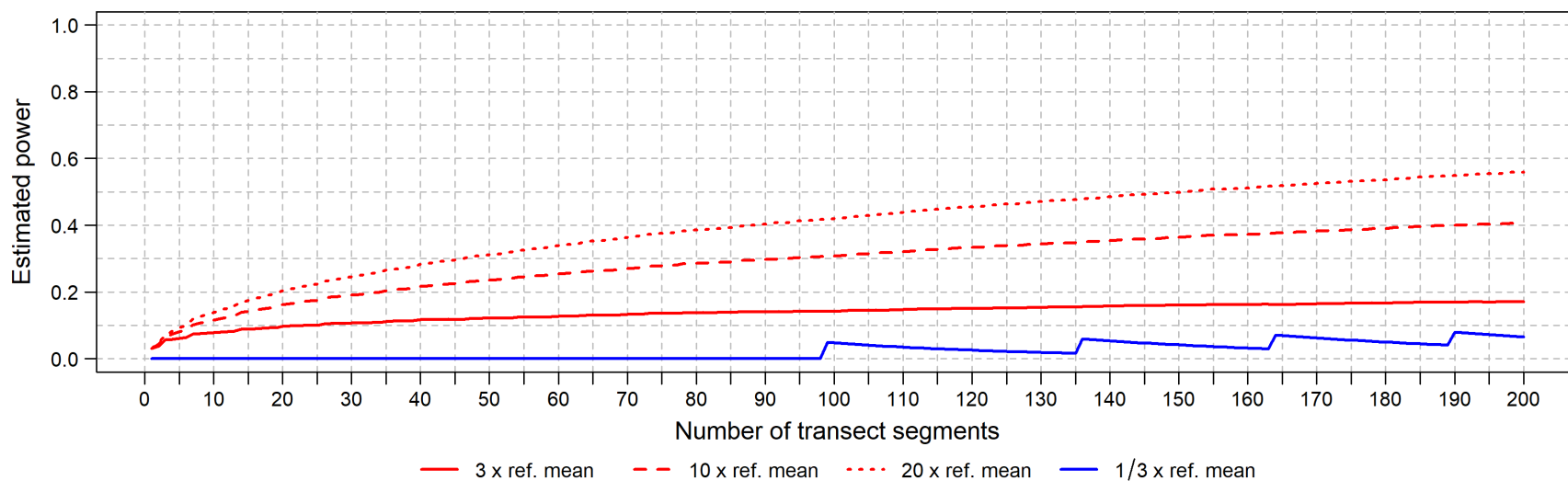


Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	3	3	3	3	10	10	10	10	20	20	20	20
No. grid cells:	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299
Percent ≥ 0.8:	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.7%	2.0%	0.0%	0.6%	1.9%	4.5%

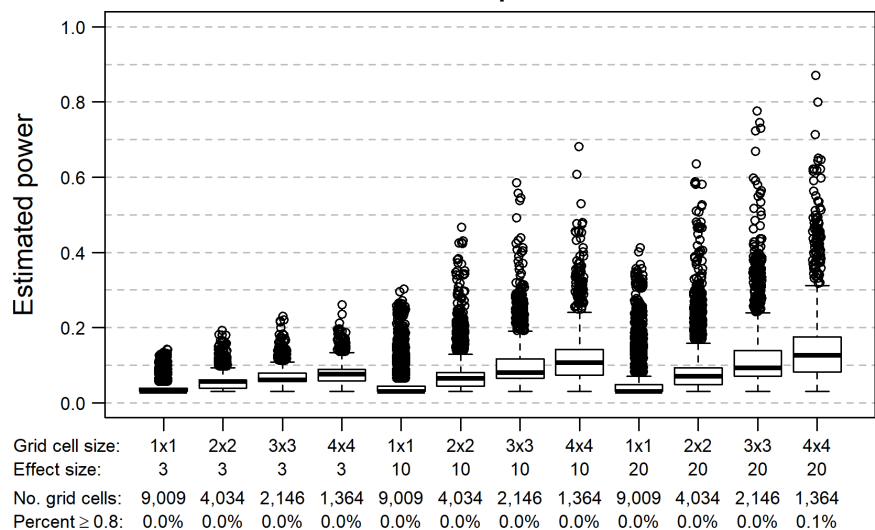
Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	1/3	1/3	1/3	1/3	1/10	1/10	1/10	1/10	1/20	1/20	1/20	1/20
No. grid cells:	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299
Percent ≥ 0.8:	0.0%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Figure E54. Power analysis results for Cory's Shearwater during fall based on the combined model (type I error rate = 0.05)

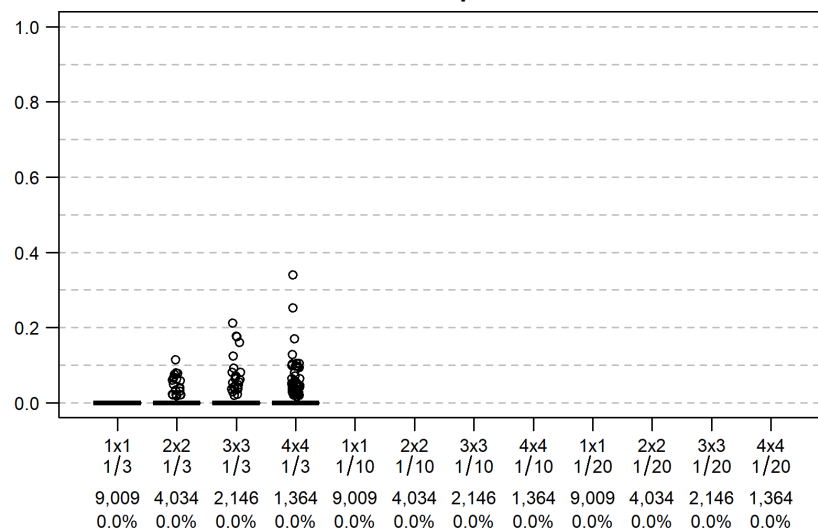
Sooty Shearwater: spring



Hotspot



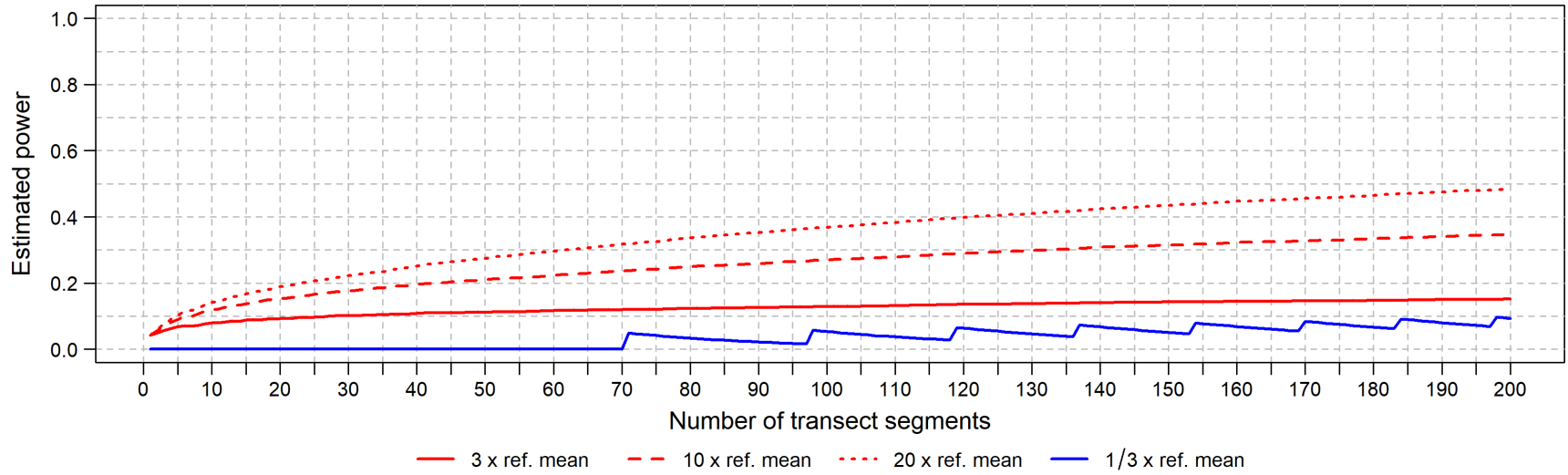
Coldspot



E-59

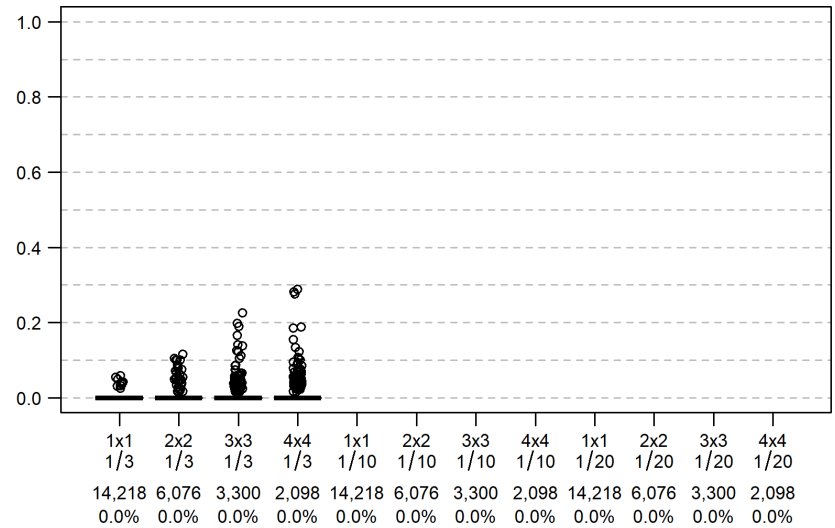
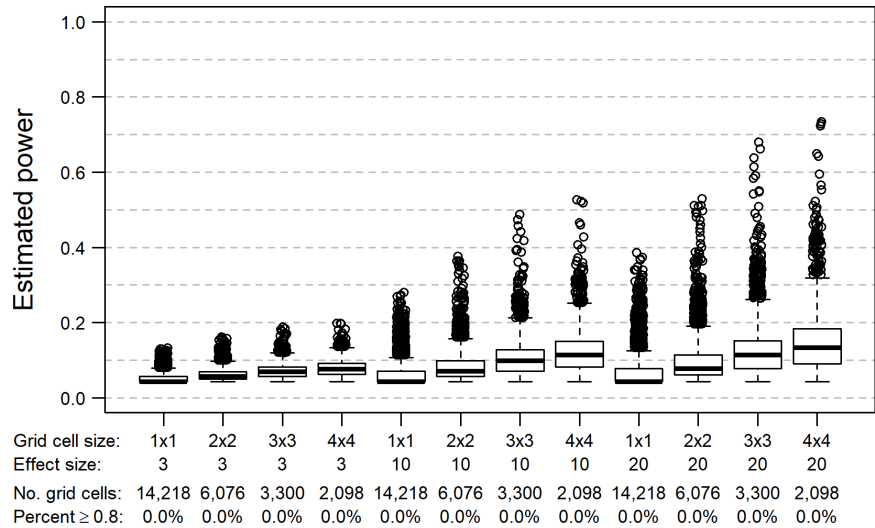
Figure E55. Power analysis results for Sooty Shearwater during spring based on the combined model (type I error rate = 0.05)

Sooty Shearwater: summer



Hotspot

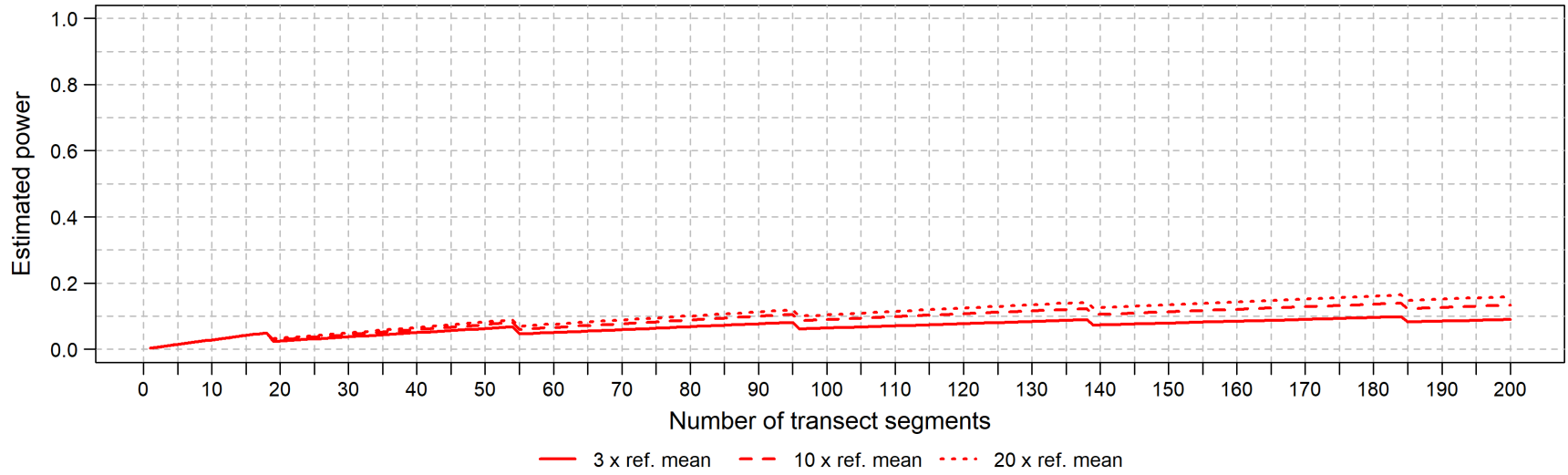
Coldspot



E-60

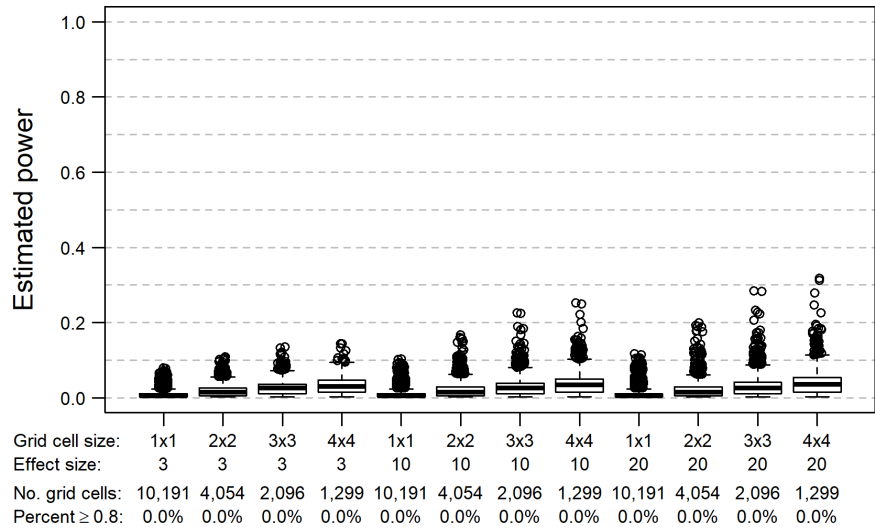
Figure E56. Power analysis results for Sooty Shearwater during summer based on the combined model (type I error rate = 0.05)

Sooty Shearwater: fall



E-61

Hotspot



Coldspot

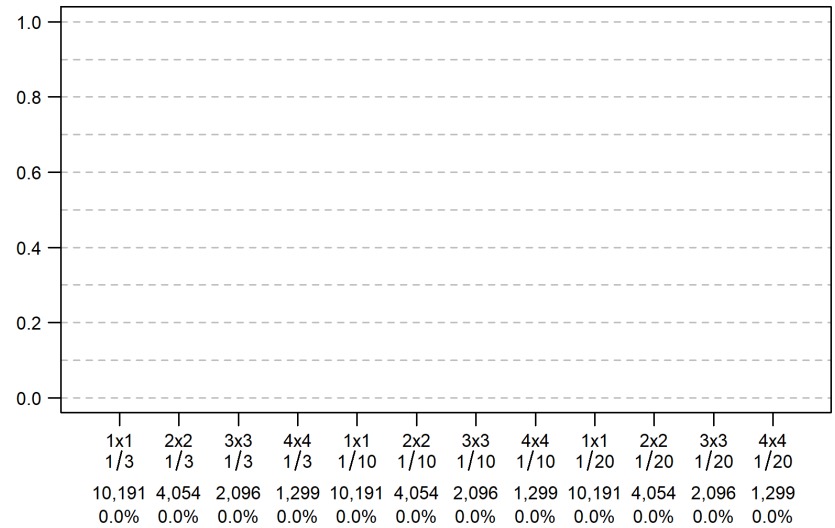
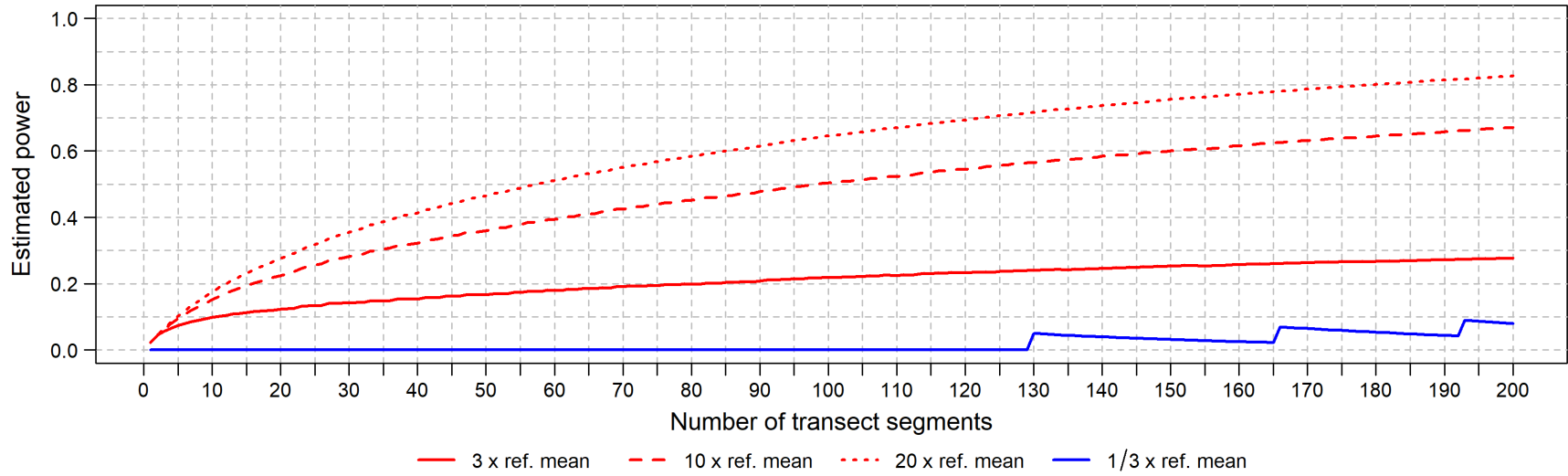
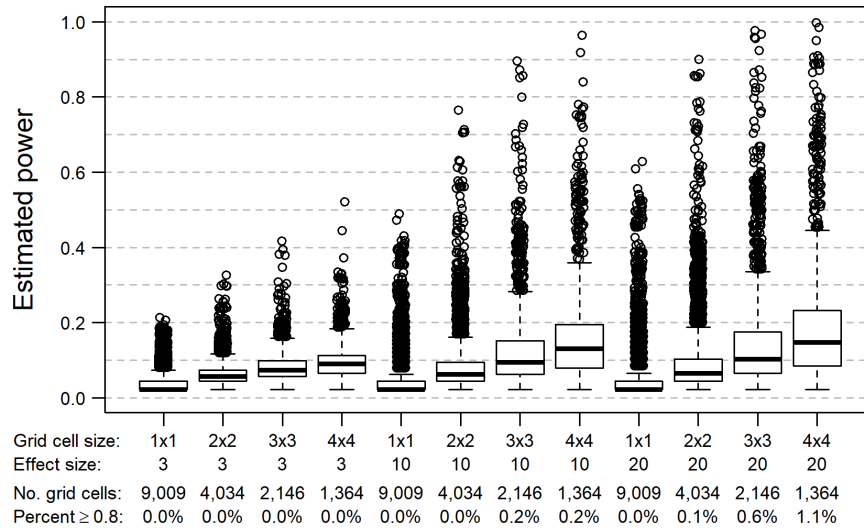


Figure E57. Power analysis results for Sooty Shearwater during fall based on the combined model (type I error rate = 0.05)

Great Shearwater: spring



Hotspot



Coldspot

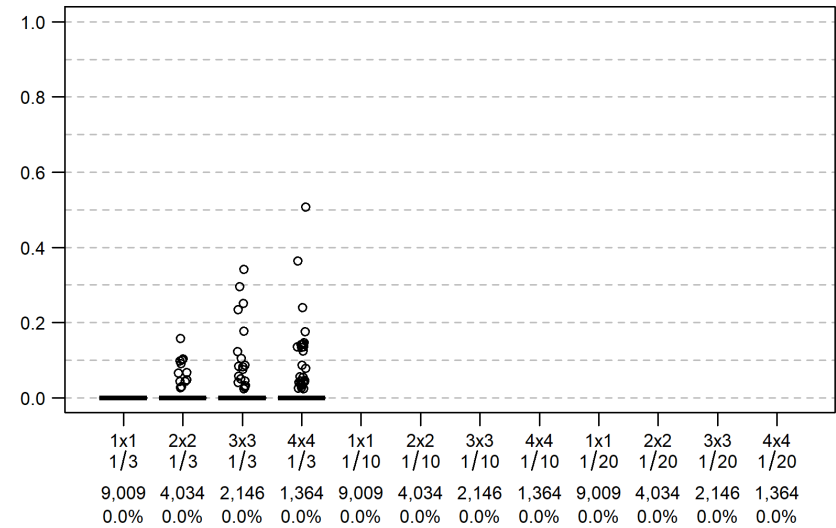
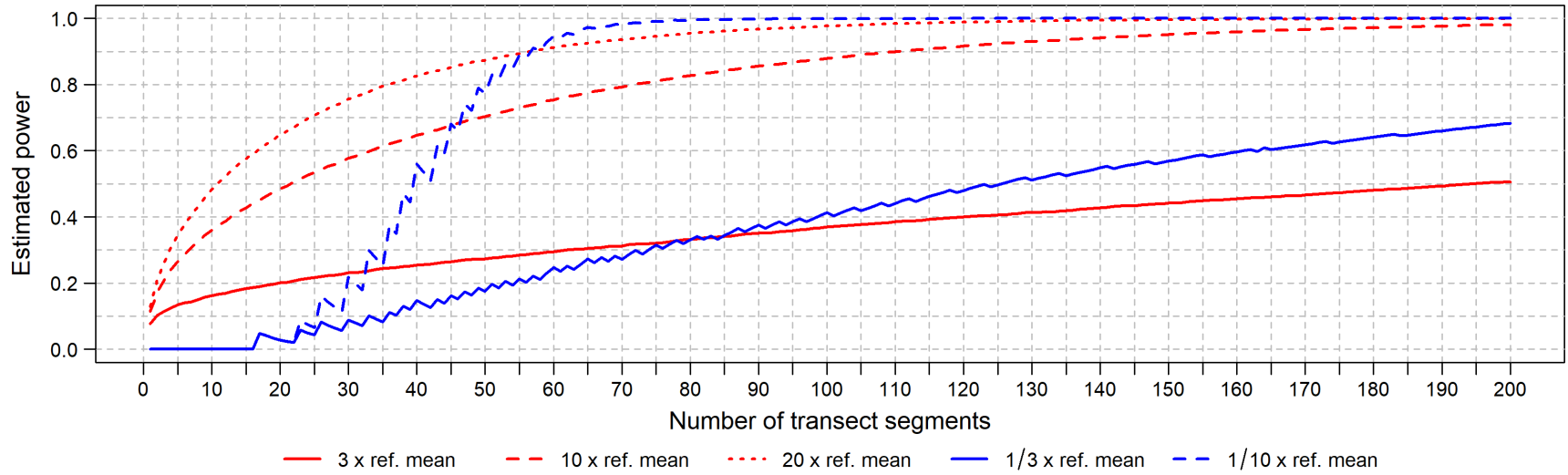
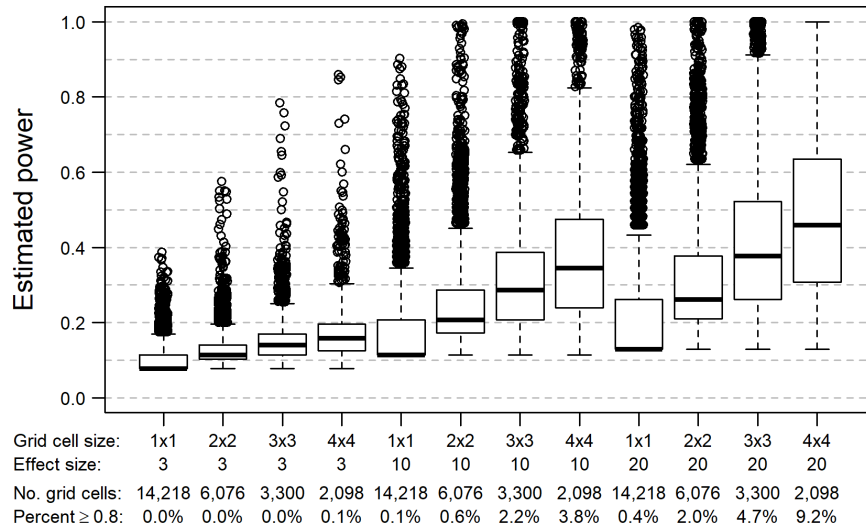


Figure E58. Power analysis results for Great Shearwater during spring based on the combined model (type I error rate = 0.05)

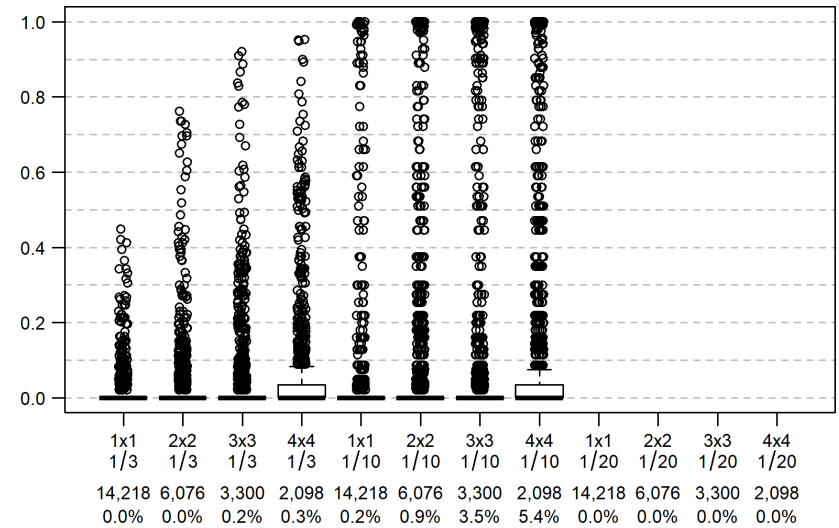
Great Shearwater: summer



Hotspot



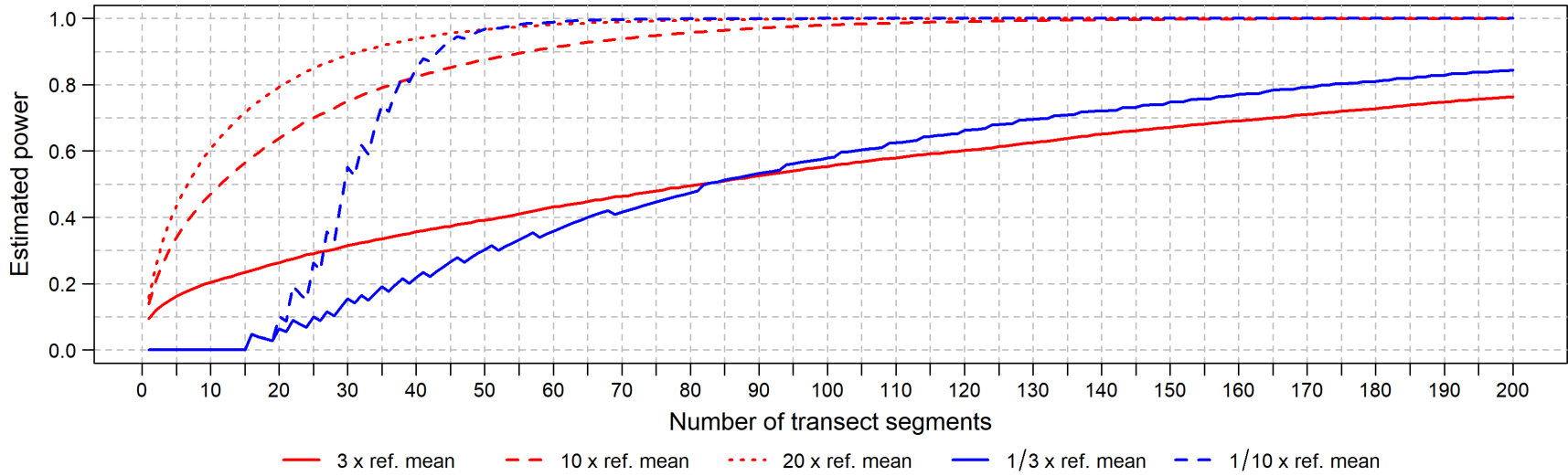
Coldspot



E-63

Figure E59. Power analysis results for Great Shearwater during summer based on the combined model (type I error rate = 0.05)

Great Shearwater: fall



E-64

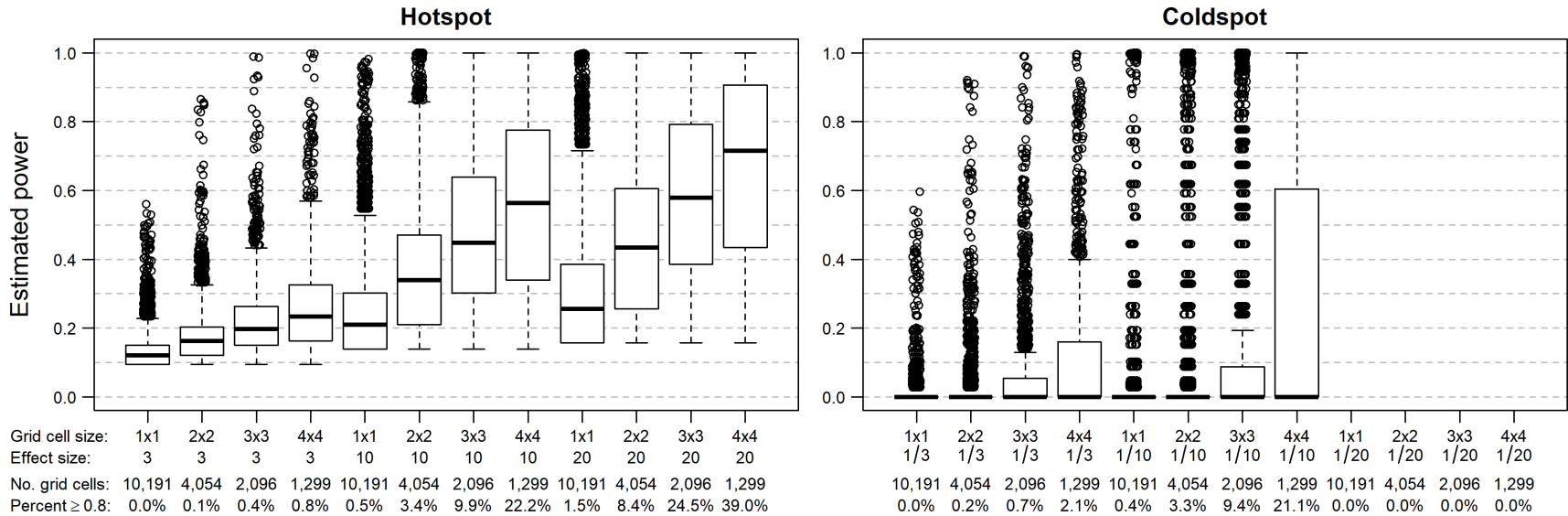
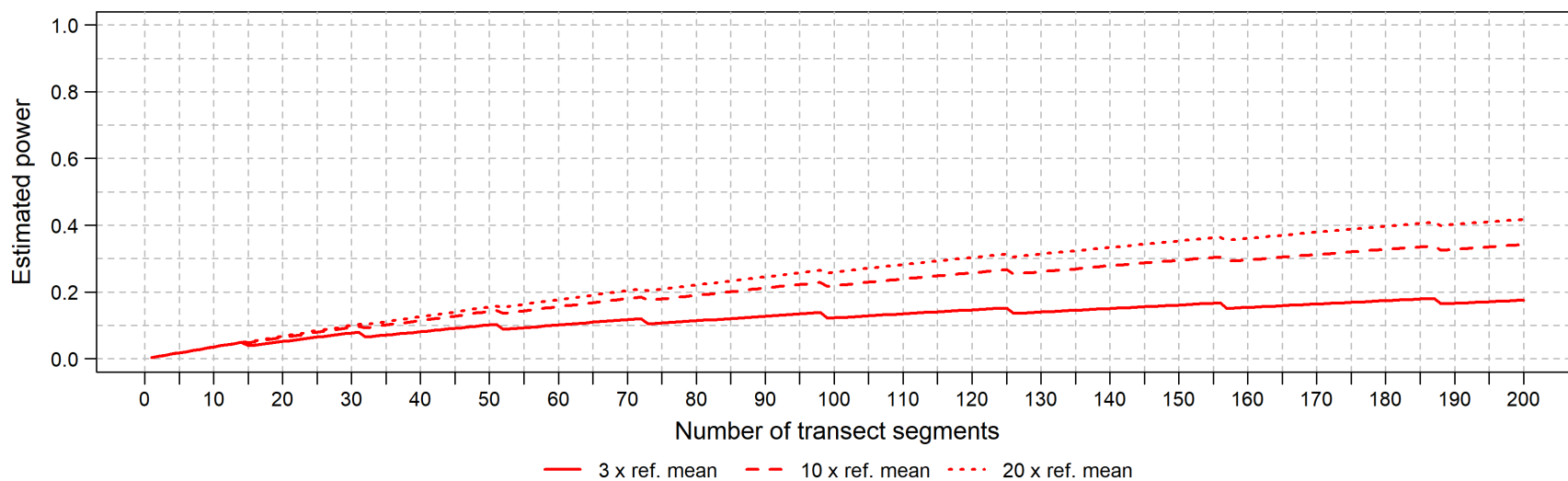


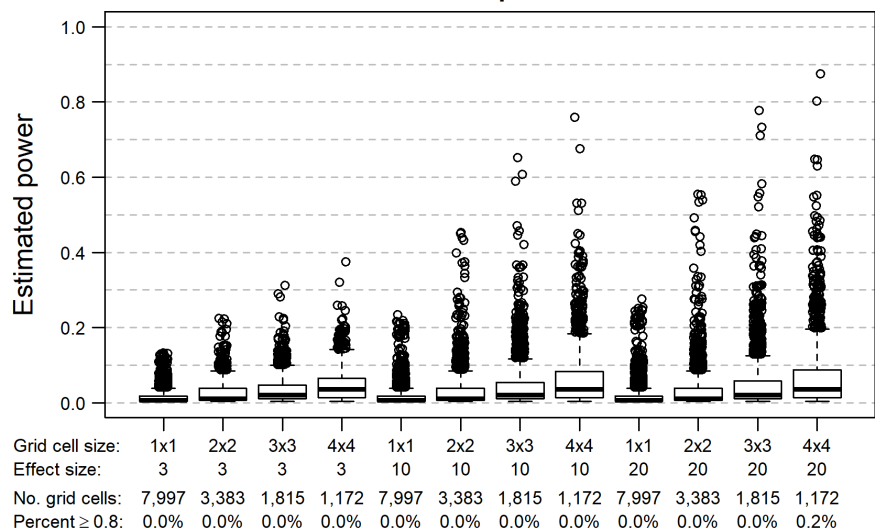
Figure E60. Power analysis results for Great Shearwater during fall based on the combined model (type I error rate = 0.05)

Great Shearwater: winter



E-65

Hotspot



Coldspot

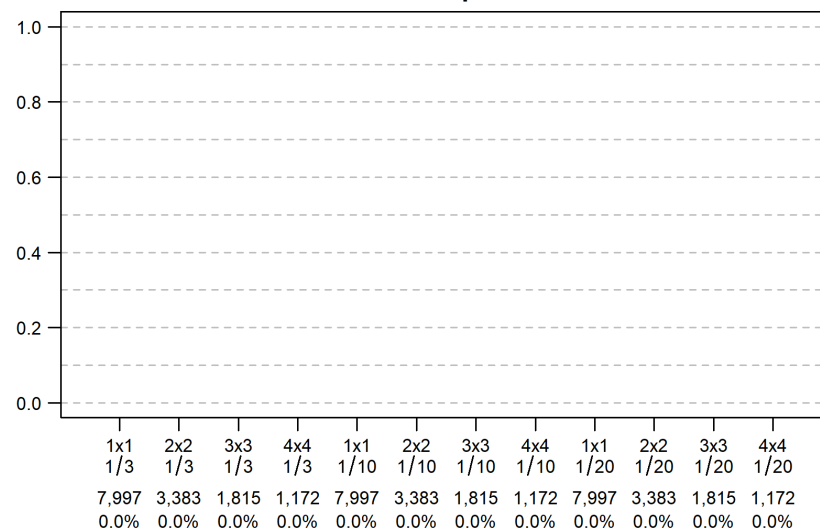
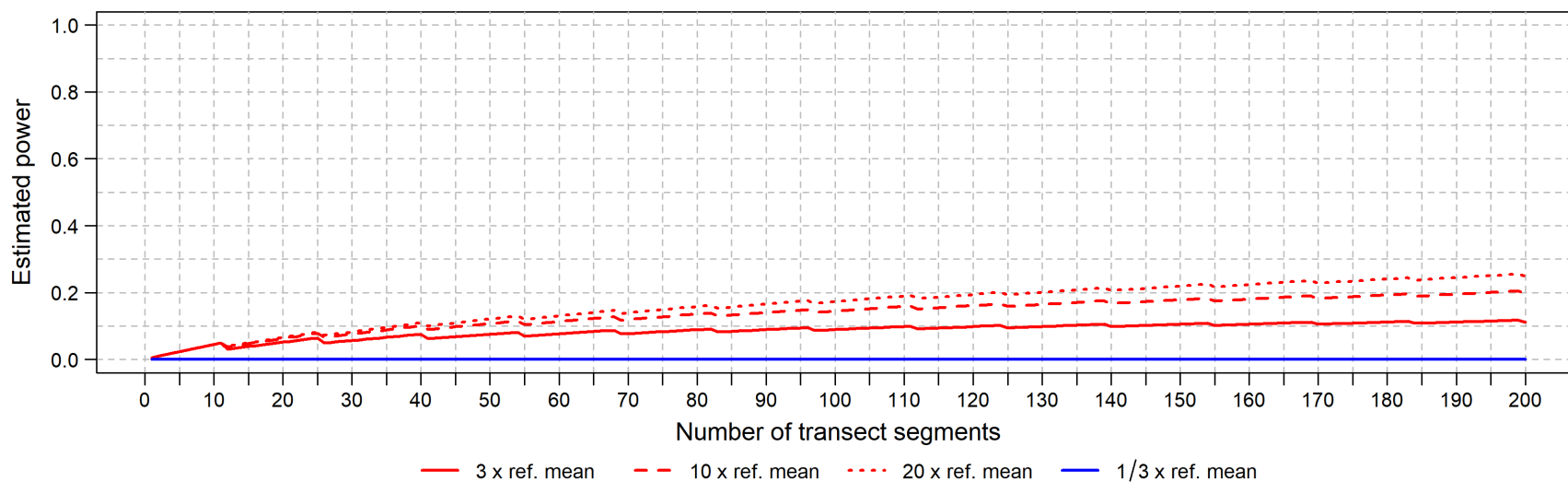


Figure E61. Power analysis results for Great Shearwater during winter based on the combined model (type I error rate = 0.05)

Audubon's Shearwater: spring



Hotspot

Coldspot

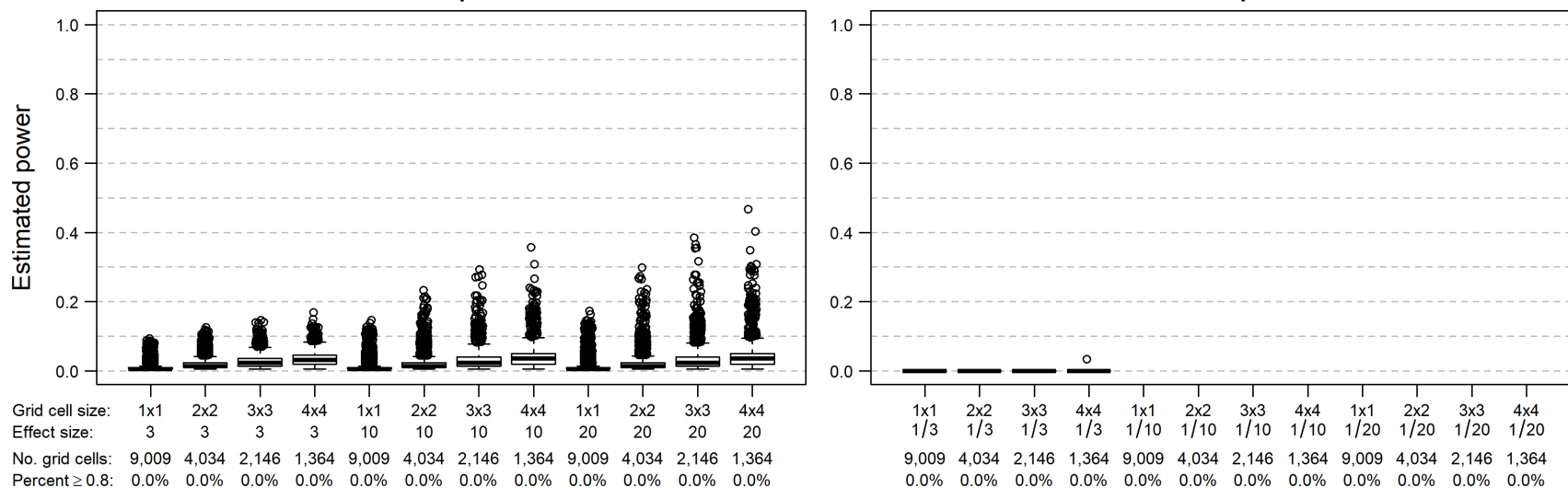
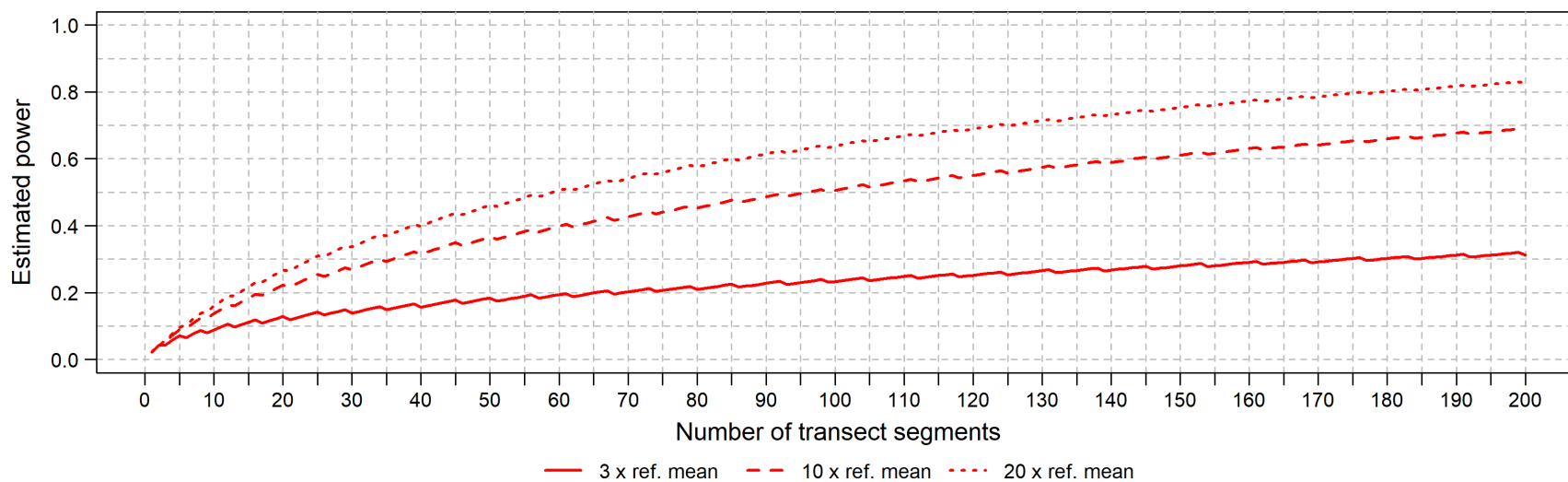


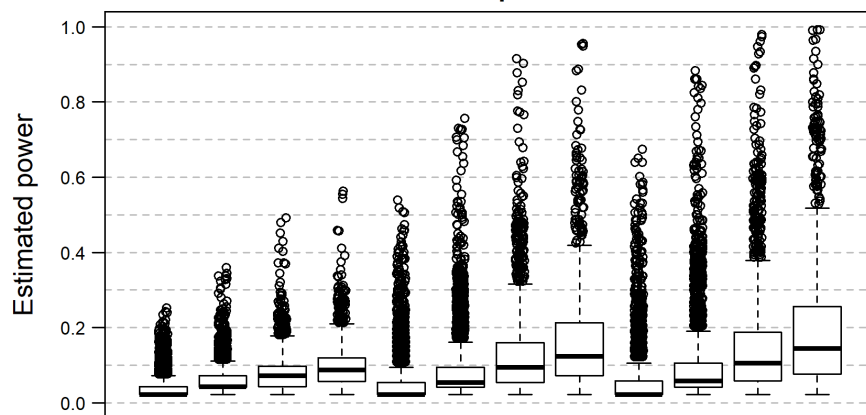
Figure E62. Power analysis results for Audubon's Shearwater during spring based on the combined model (type I error rate = 0.05)

Audubon's Shearwater: summer

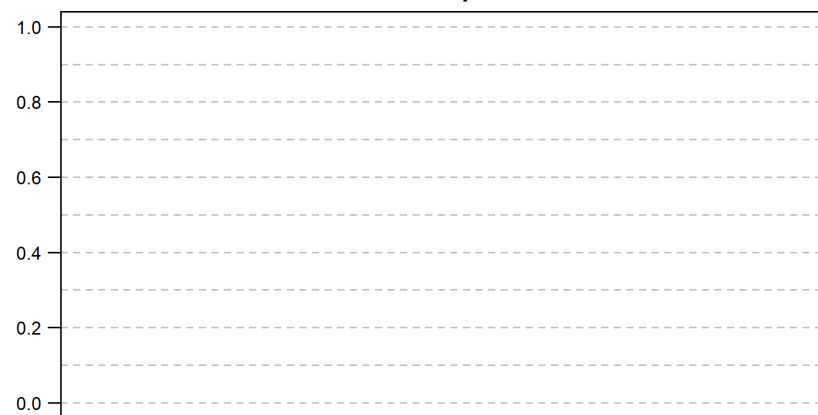


E-67

Hotspot



Coldspot

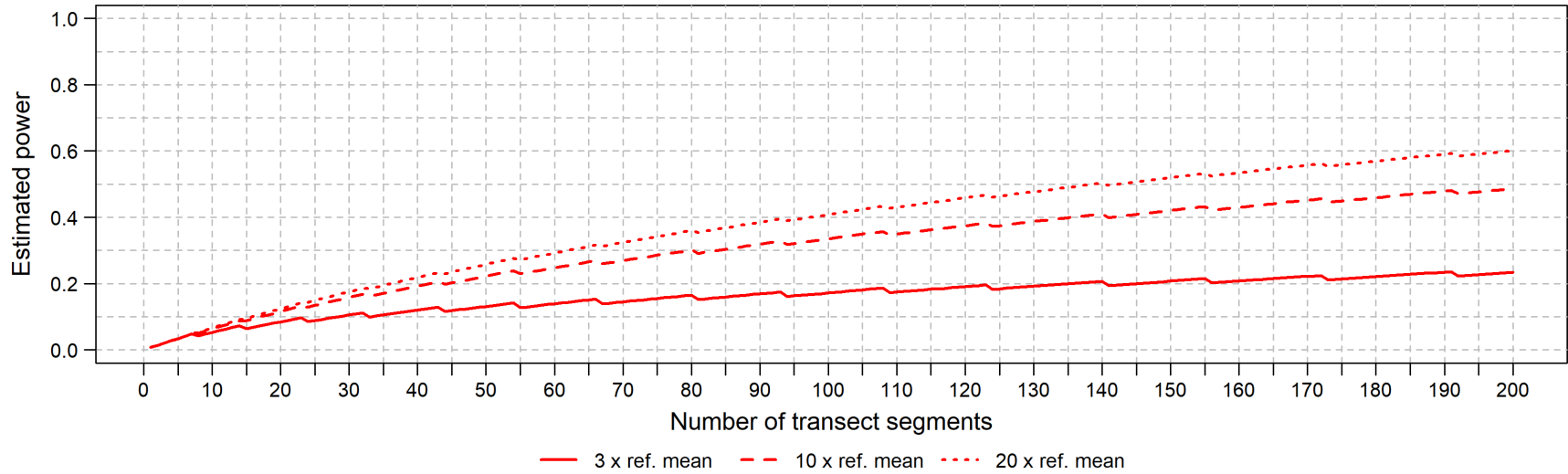


Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	3	3	3	3	10	10	10	10	20	20	20	20
No. grid cells:	14,218	6,076	3,300	2,098	14,218	6,076	3,300	2,098	14,218	6,076	3,300	2,098
Percent ≥ 0.8 :	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.3%	0.0%	0.1%	0.4%	0.8%

Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	1/3	1/3	1/3	1/3	1/10	1/10	1/10	1/10	1/20	1/20	1/20	1/20
No. grid cells:	14,218	6,076	3,300	2,098	14,218	6,076	3,300	2,098	14,218	6,076	3,300	2,098
Percent ≥ 0.8 :	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Figure E63. Power analysis results for Audubon's Shearwater during summer based on the combined model (type I error rate = 0.05)

Audubon's Shearwater: fall



E-68

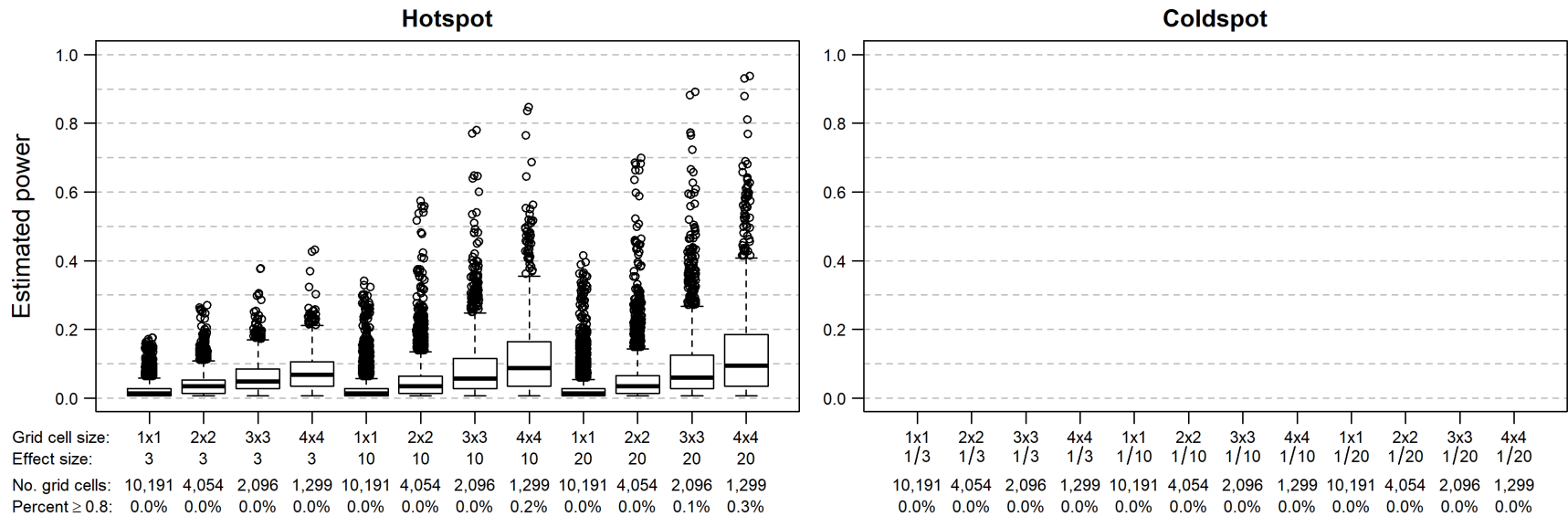
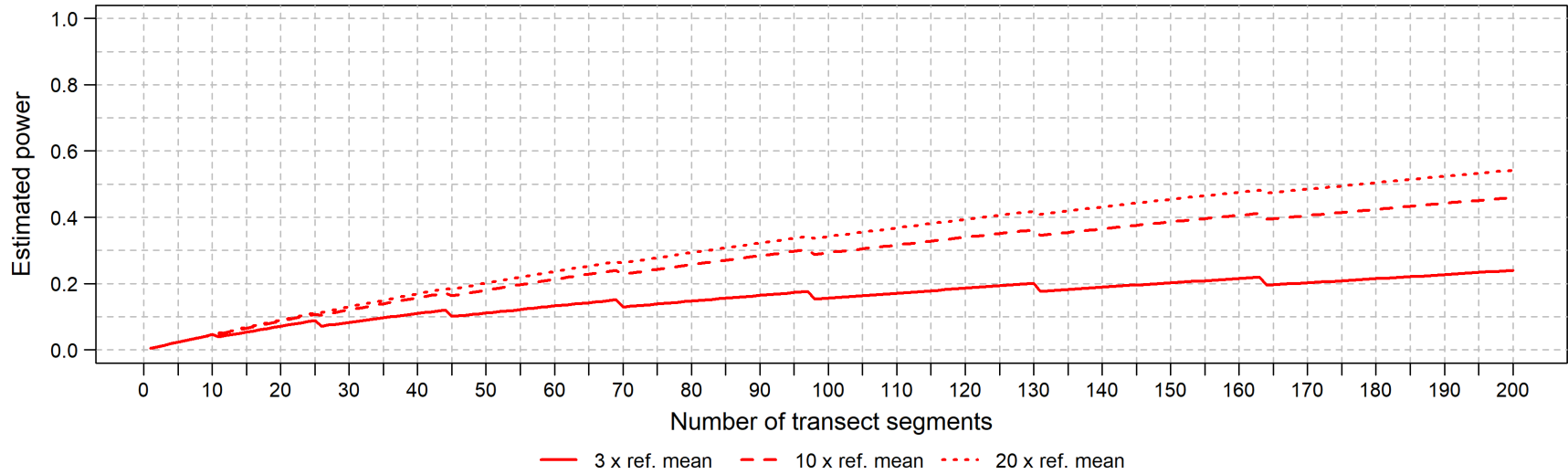


Figure E64. Power analysis results for Audubon's Shearwater during fall based on the combined model (type I error rate = 0.05)

Audubon's Shearwater: winter



E-69

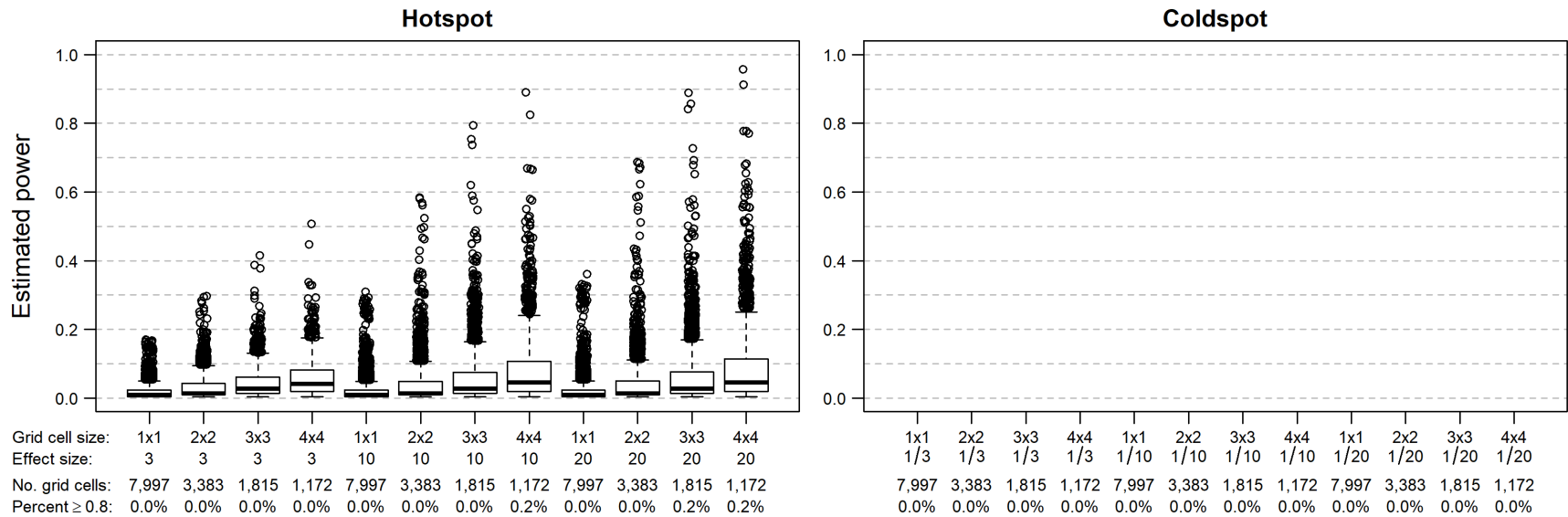
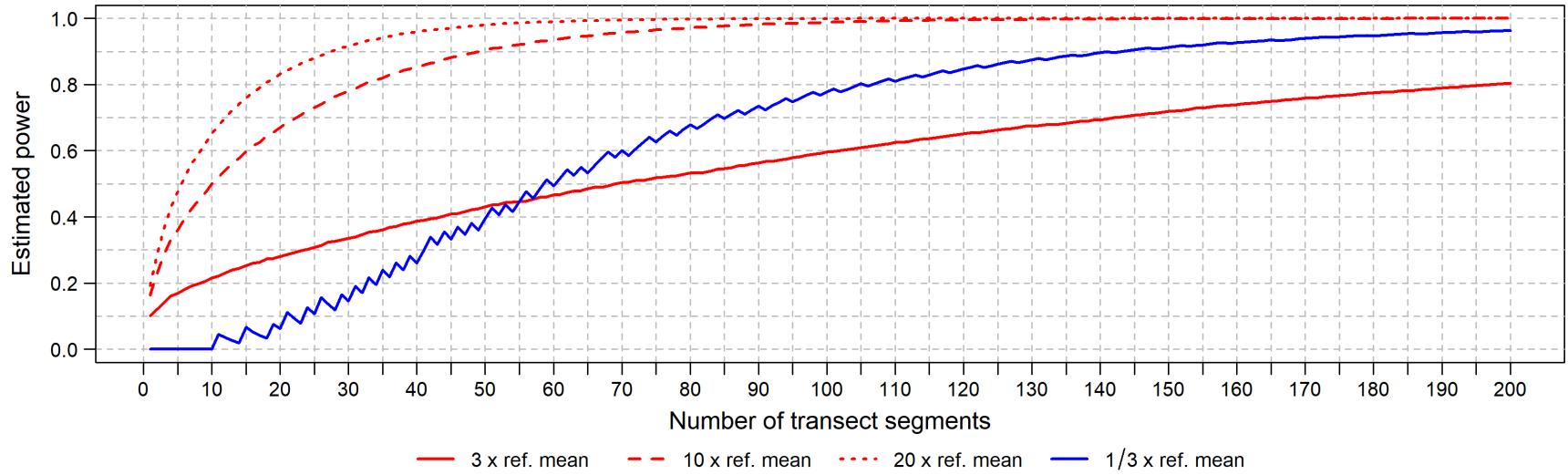
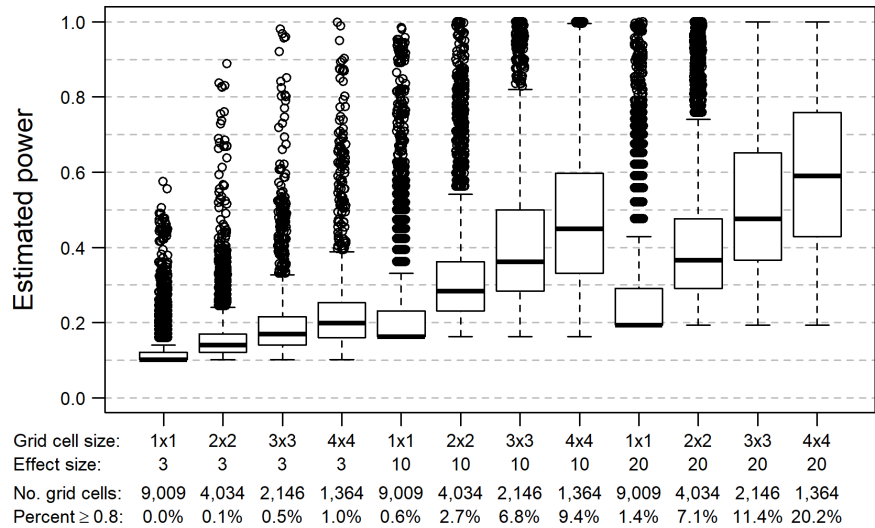


Figure E65. Power analysis results for Audubon's Shearwater during winter based on the combined model (type I error rate = 0.05)

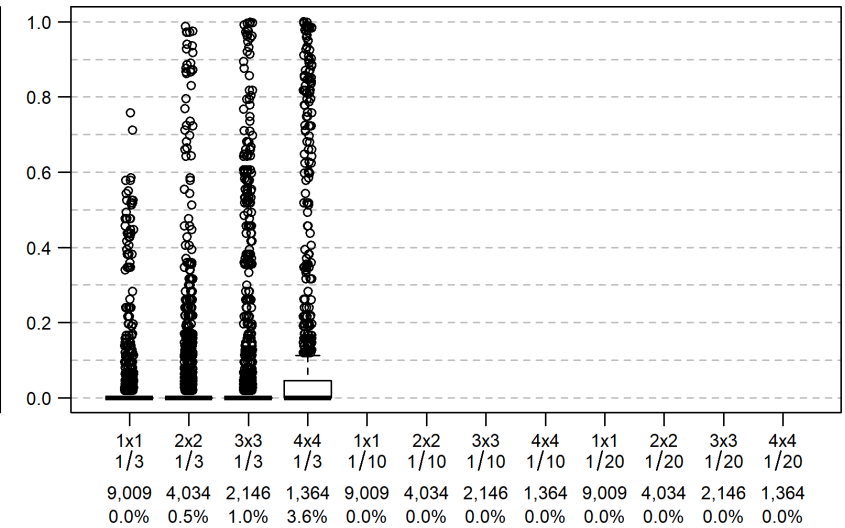
Northern Gannet: spring



Hotspot



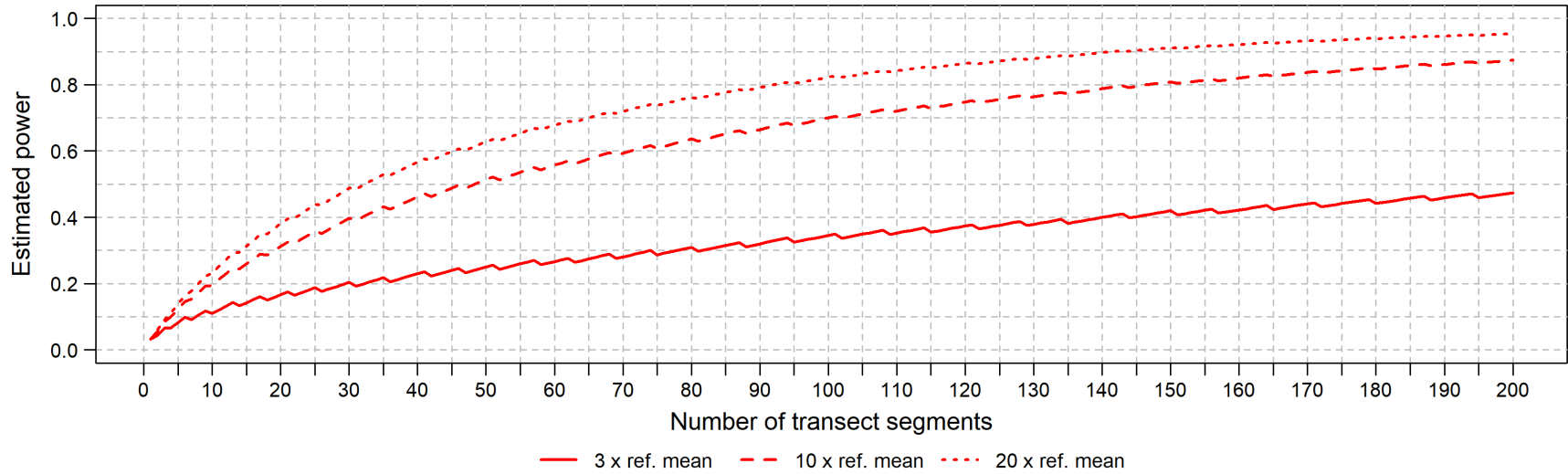
Coldspot



E-70

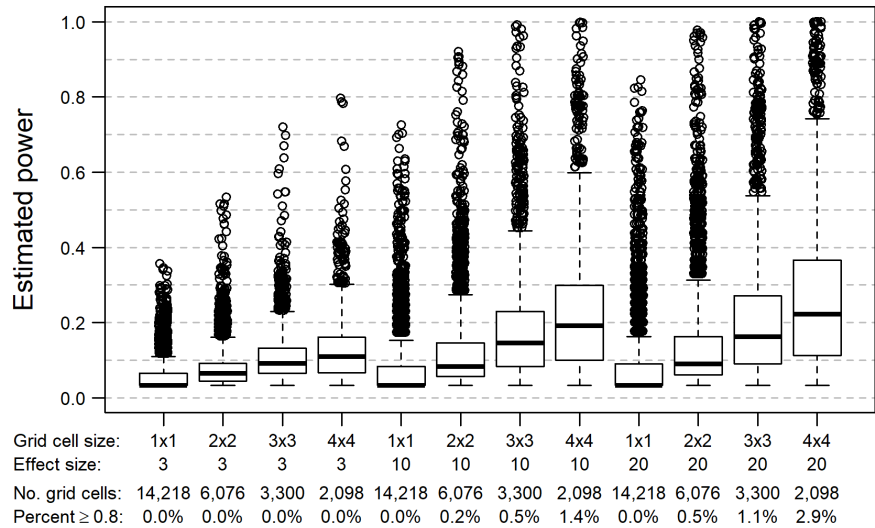
Figure E66. Power analysis results for Northern Gannet during spring based on the combined model (type I error rate = 0.05)

Northern Gannet: summer



E-71

Hotspot



Coldspot

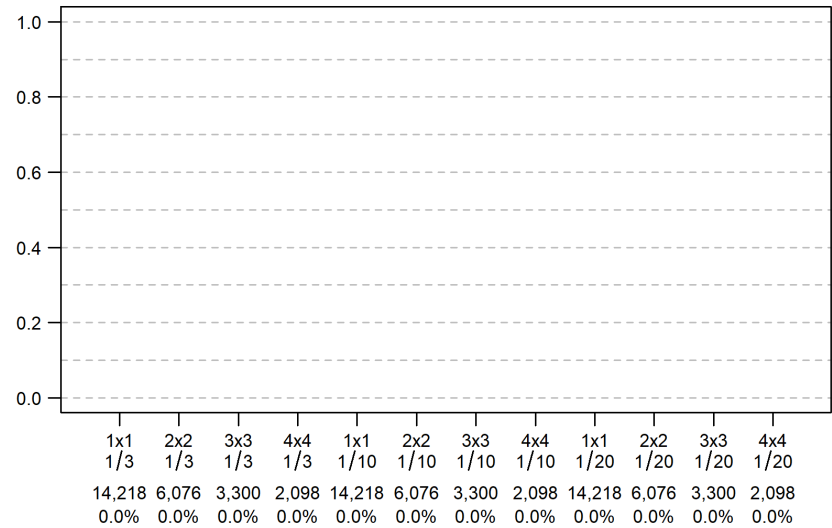
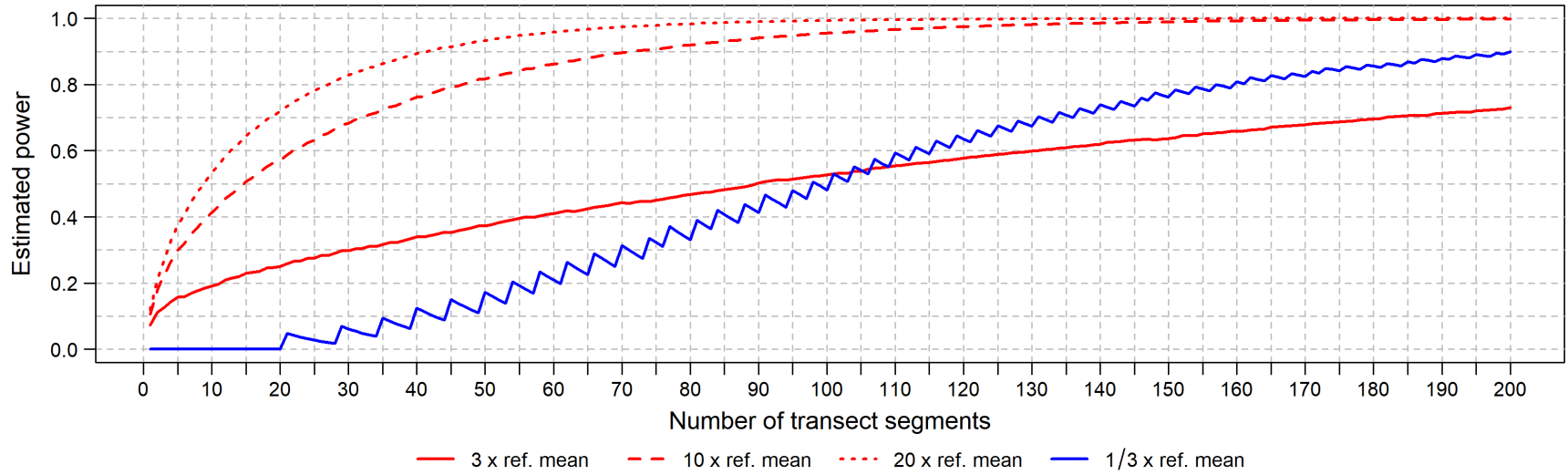


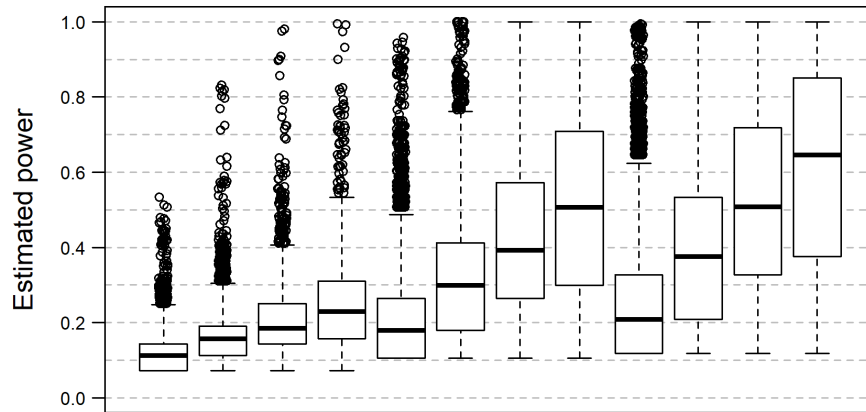
Figure E67. Power analysis results for Northern Gannet during summer based on the combined model (type I error rate = 0.05)

Northern Gannet: fall



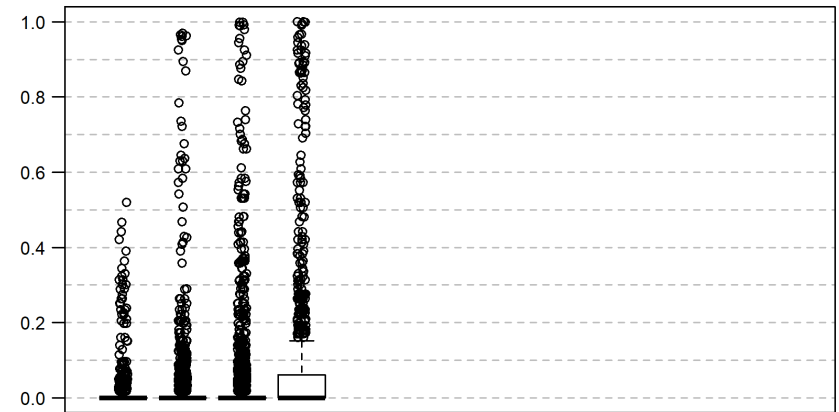
— 3 x ref. mean - - 10 x ref. mean ··· 20 x ref. mean — 1/3 x ref. mean

Hotspot



Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	3	3	3	3	10	10	10	10	20	20	20	20
No. grid cells:	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299
Percent ≥ 0.8 :	0.0%	0.1%	0.3%	0.6%	0.4%	2.0%	6.6%	15.6%	1.0%	5.9%	17.8%	32.0%

Coldspot

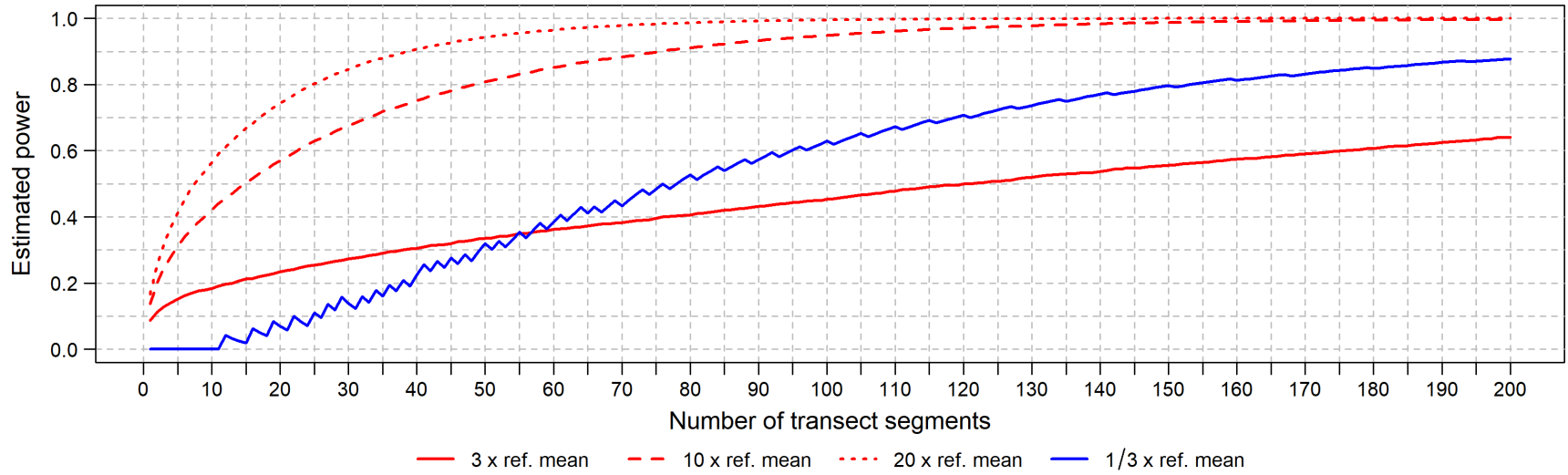


Grid cell size:	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4	1x1	2x2	3x3	4x4
Effect size:	1/3	1/3	1/3	1/3	1/10	1/10	1/10	1/10	1/20	1/20	1/20	1/20
No. grid cells:	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299	10,191	4,054	2,096	1,299
Percent ≥ 0.8 :	0.0%	0.2%	0.7%	2.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

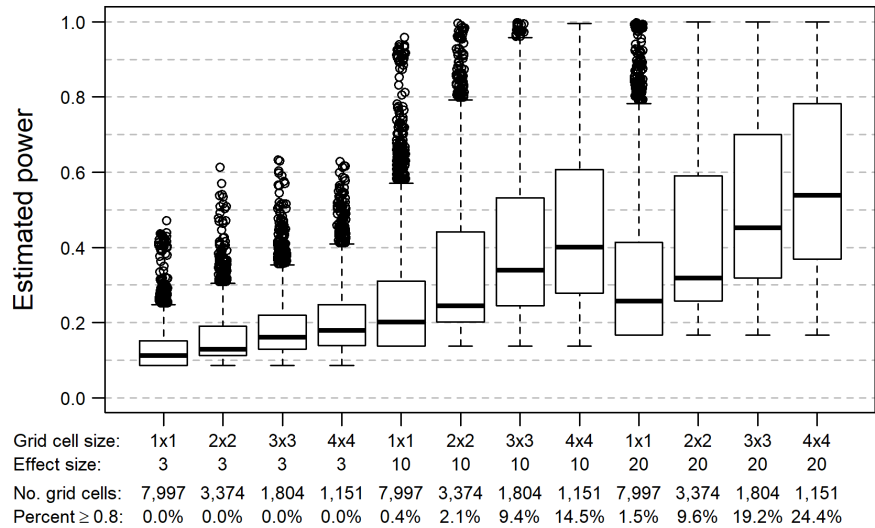
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Figure E68. Power analysis results for Northern Gannet during fall based on the combined model (type I error rate = 0.05)

Northern Gannet: winter



Hotspot



Coldspot

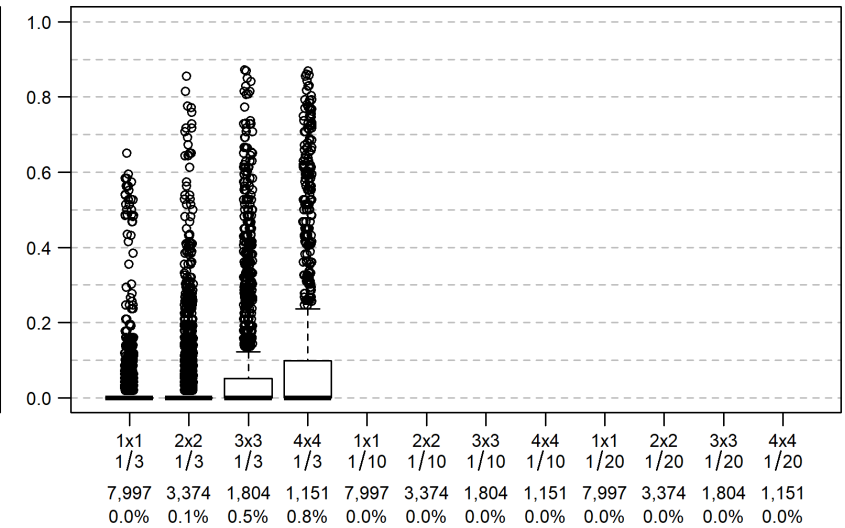


Figure E69. Power analysis results for Northern Gannet during winter based on the combined model (type I error rate = 0.05)