Appendix C - Stochastic Model Results

The following spill scenarios have been defined for the offshore site. Results from the stochastic model platform and subsea blow-out cases are presented in this Appendix.

Release Type	Season	Flow Rate (m^3/day)	Duration	Total Release Volume (m^3)	Ice
Platform Blow-out	Summer	5,600	30 days	168,000	No
	Winter	5,600	30 days	168,000	No
	Winter	5,600	30 days	168,000	Yes
	Summer	5,600	100 days	560,000	No
	Winter	5,600	120 days	672,000	No
	Winter	5,600	120 days	672,000	Yes
Subsea Blow-out	Summer	3,200	100 days	320,000	No
	Winter	3,200	120 days	384,000	No
	Winter	3,200	120 days	384,000	Yes
Batch Transfer	Summer	-	Instantaneous	800	No
	Winter	-	Instantaneous	800	No
	Winter	-	Instantaneous	800	Yes
Batch OLS Transfer	Summer	208 m^3/hr	24 hours	5,000	No
	Winter	208 m^3/hr	24 hours	5,000	No
	Winter	208 m^3/hr	24 hours	5,000	Yes

The stochastic model is used to determine the probability of oiling the water surface, the shoreline and the water column based on specified thickness and concentration thresholds. The thresholds used for the stochastic model simulations in this study are as follows:

- Average thickness > 0.01 mm (10 µm)
- Average shoreline oil thickness > 0.01 mm (10 µm)
- Entrained oil (oil in water) average concentration > 10 ppb

The maps in Figures 1 through 48 show the probability for sea surface area oiling, shoreline oiling (including minimum time to reach the shoreline) and entrained oil exceeding the above thresholds for the platform and seafloor blow-outs in the winter and summer seasons. Figures 49 through 60 show the probability for sea surface area oiling and entrained oil exceeding the above thresholds for the batch transfer spills in the winter and summer seasons. **It should be noted that the maps do not show that oil will cover the entire area depicted, only the probability that surface oil will enter the area in excess of the given threshold.**

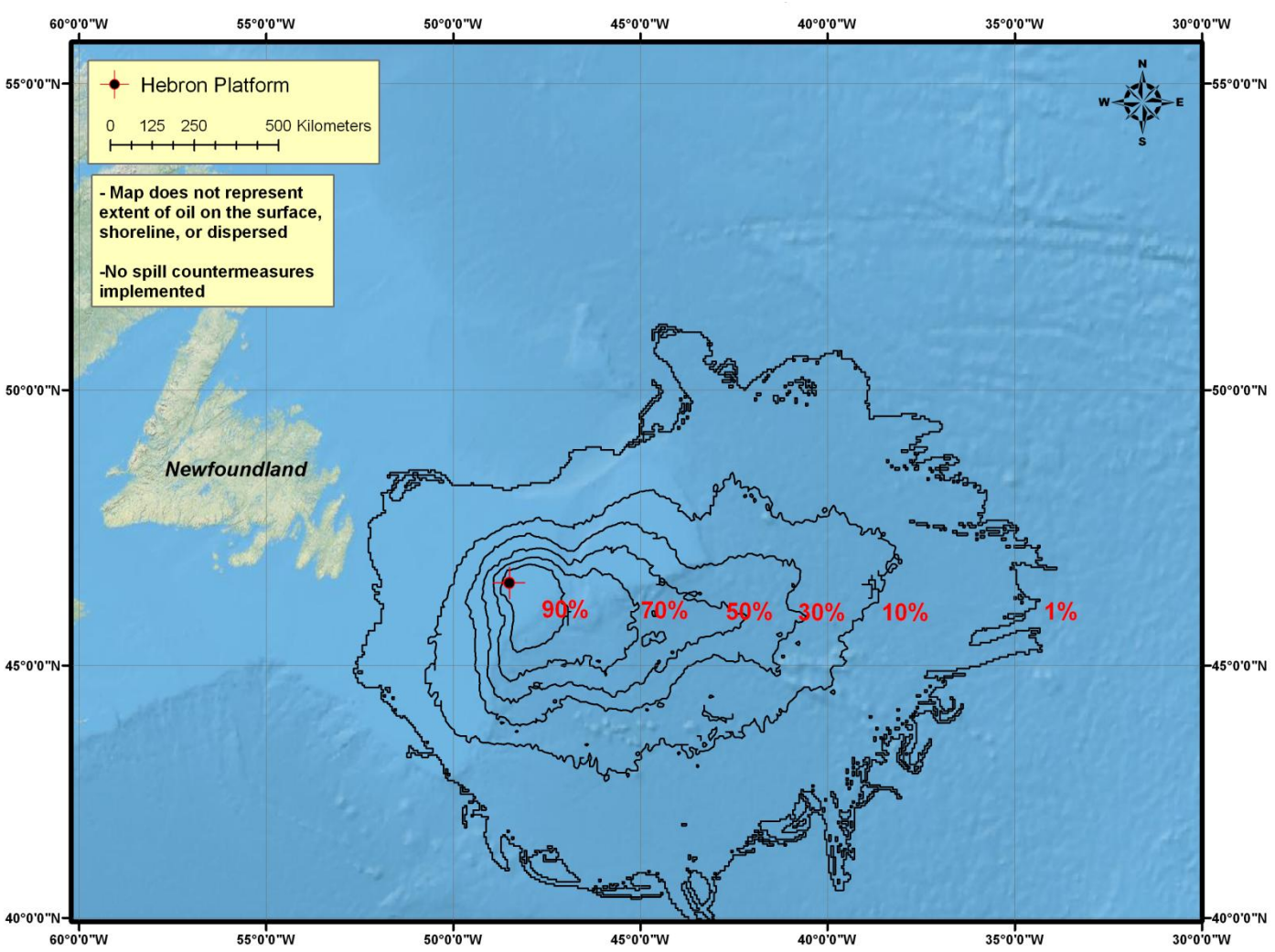


Figure 1. Surface oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the summer.

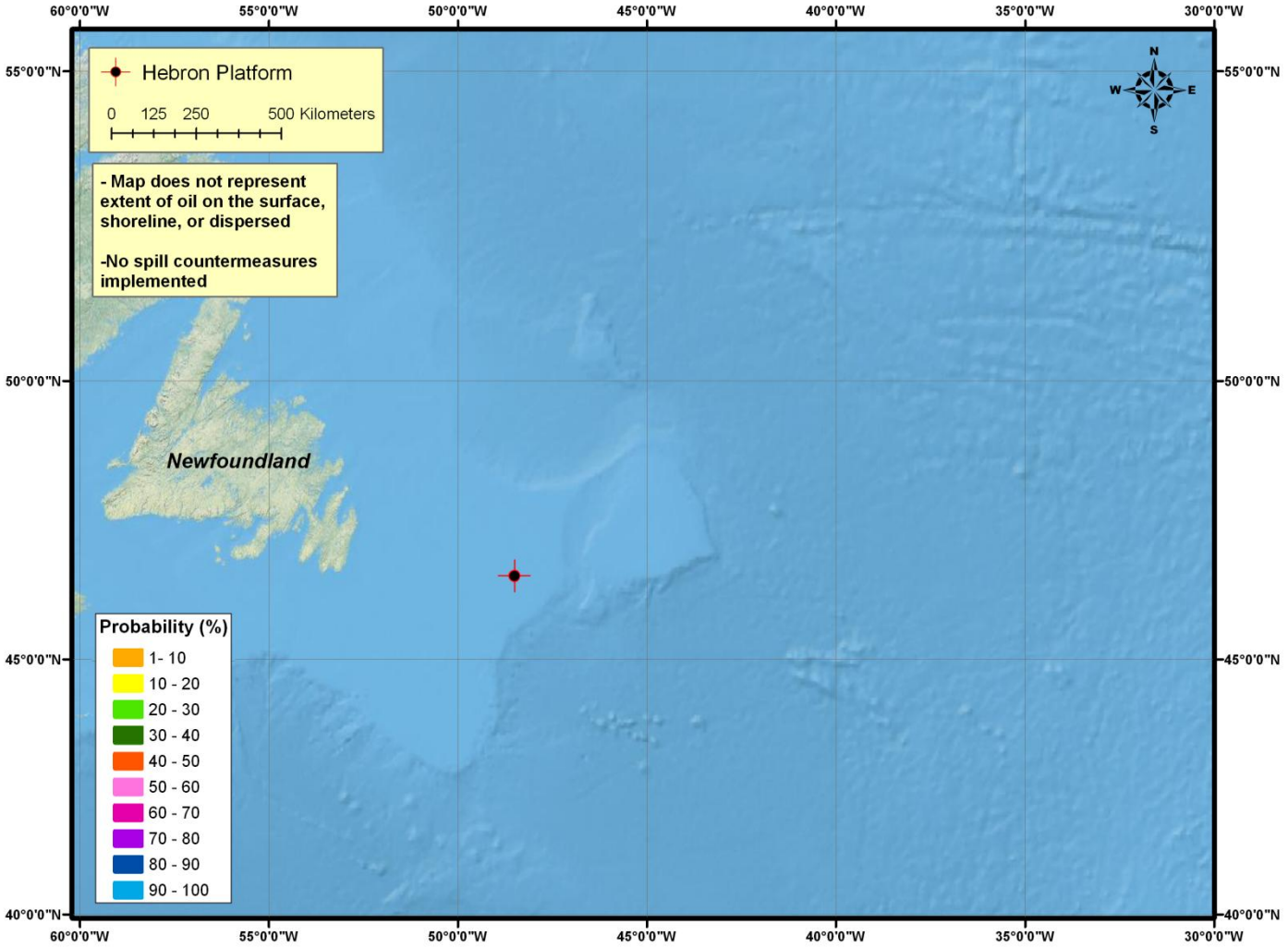


Figure 2. Shoreline oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the summer.

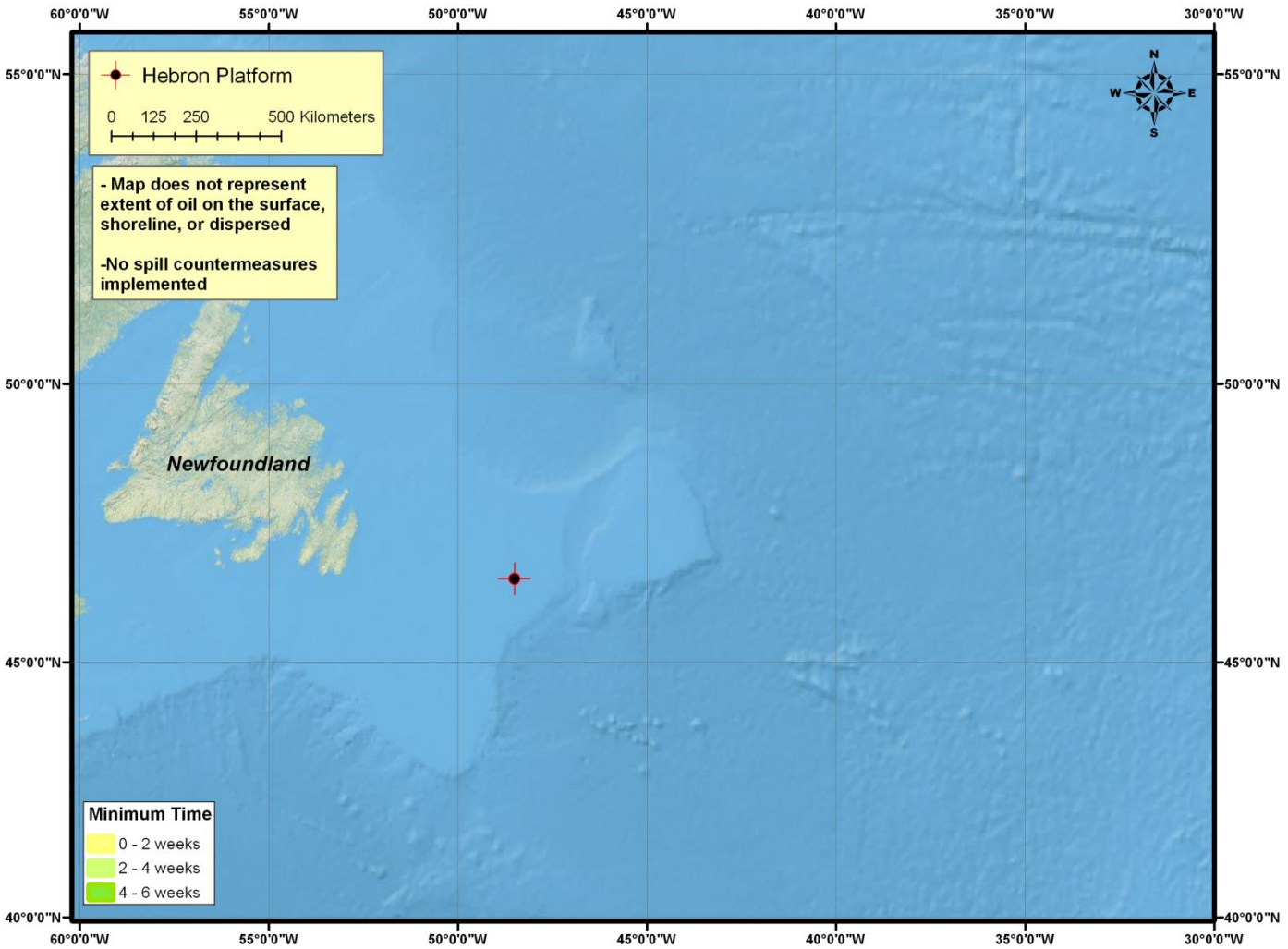


Figure 3. Minimum time to shoreline oiling from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the summer.

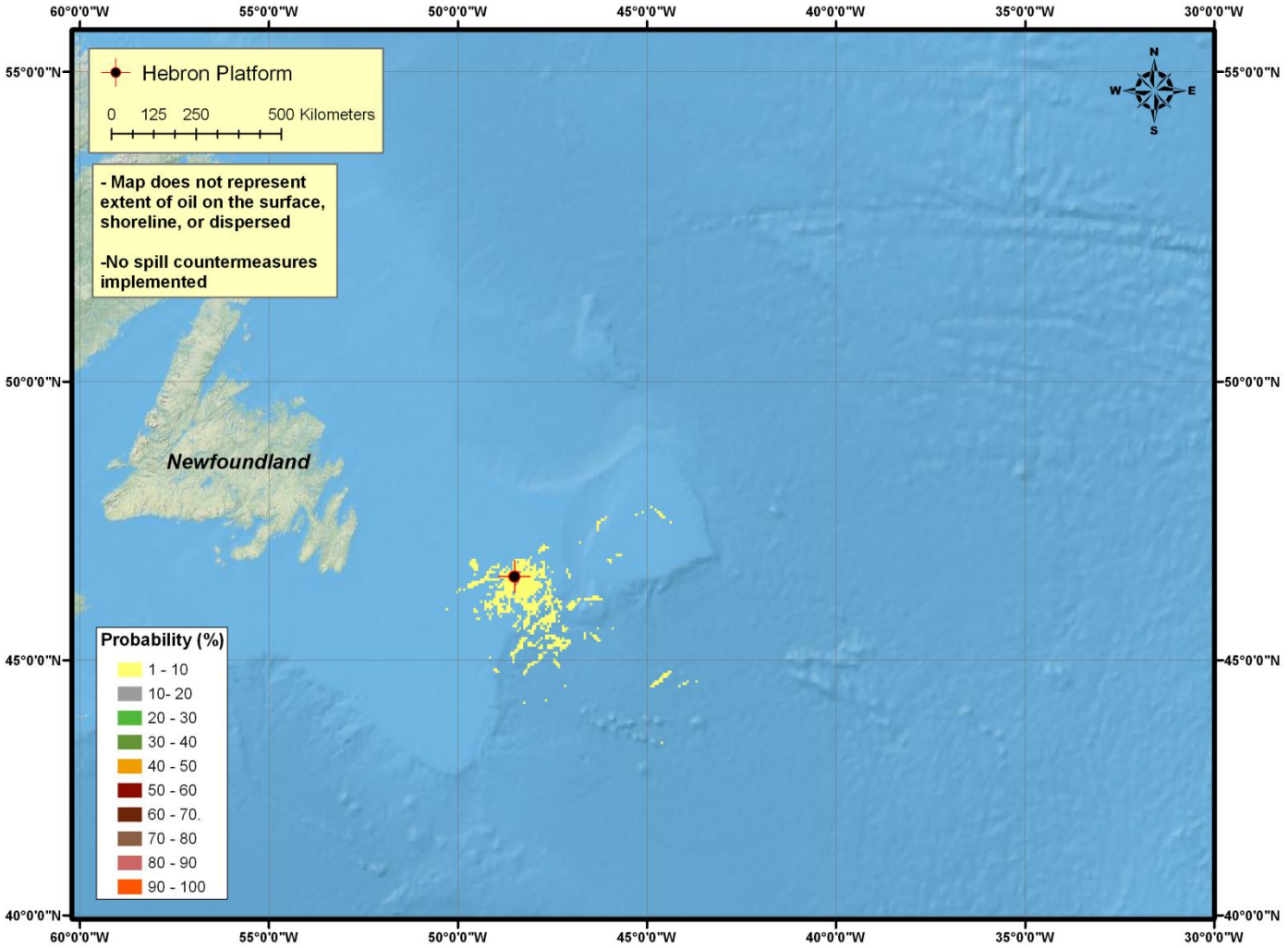


Figure 4. Entrained oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the summer.

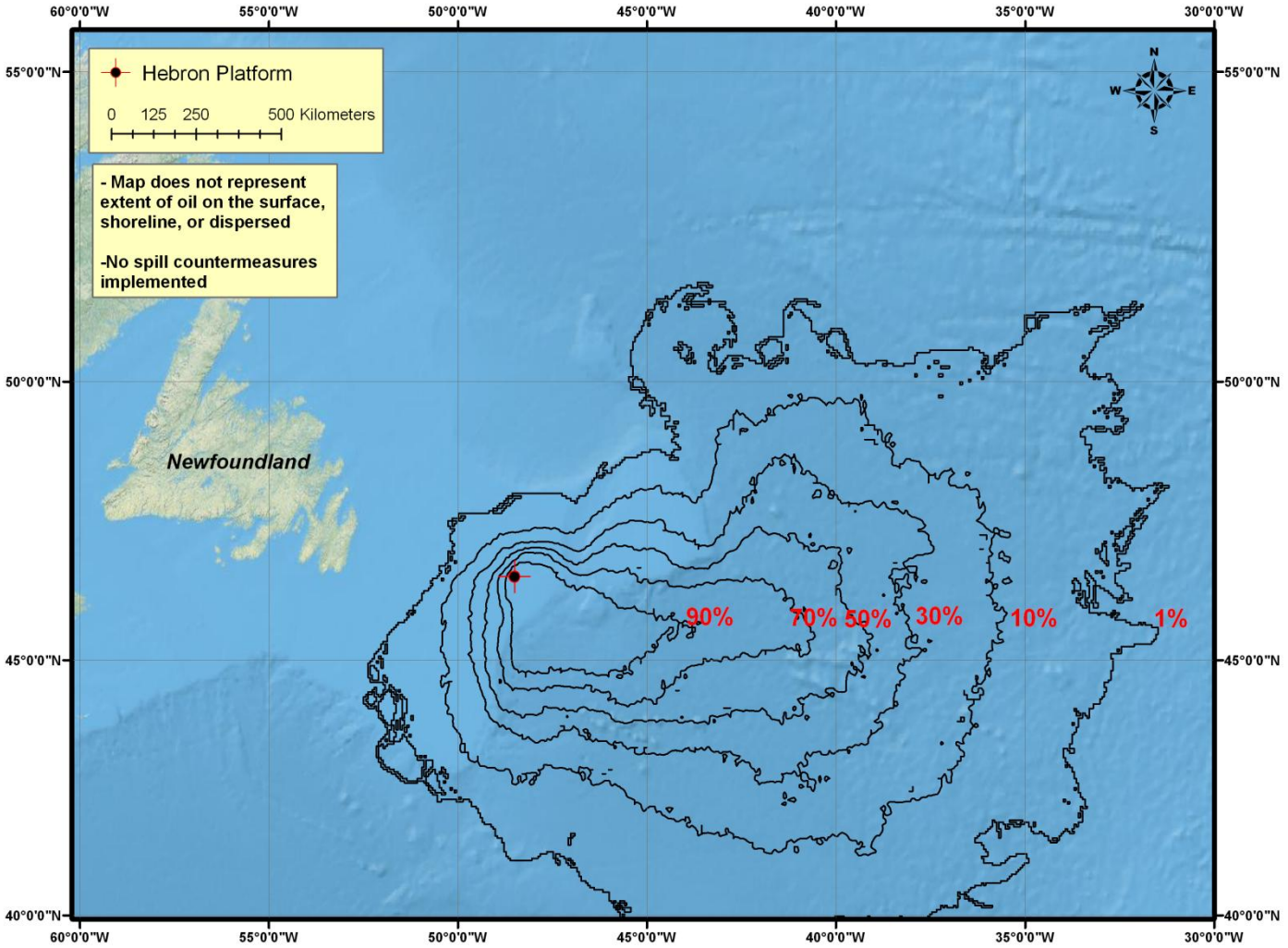


Figure 5. Surface oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter.

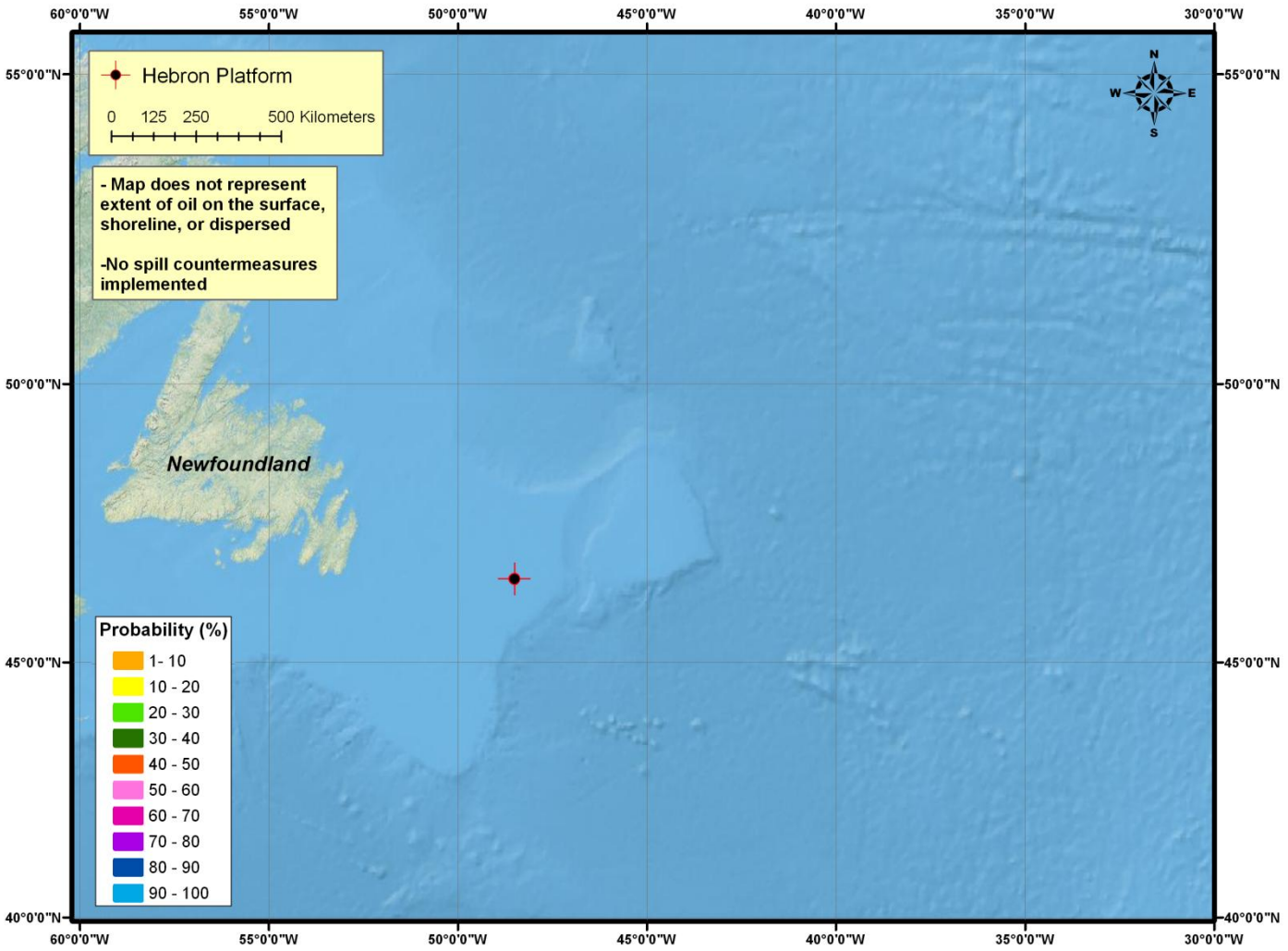


Figure 6. Shoreline oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter.

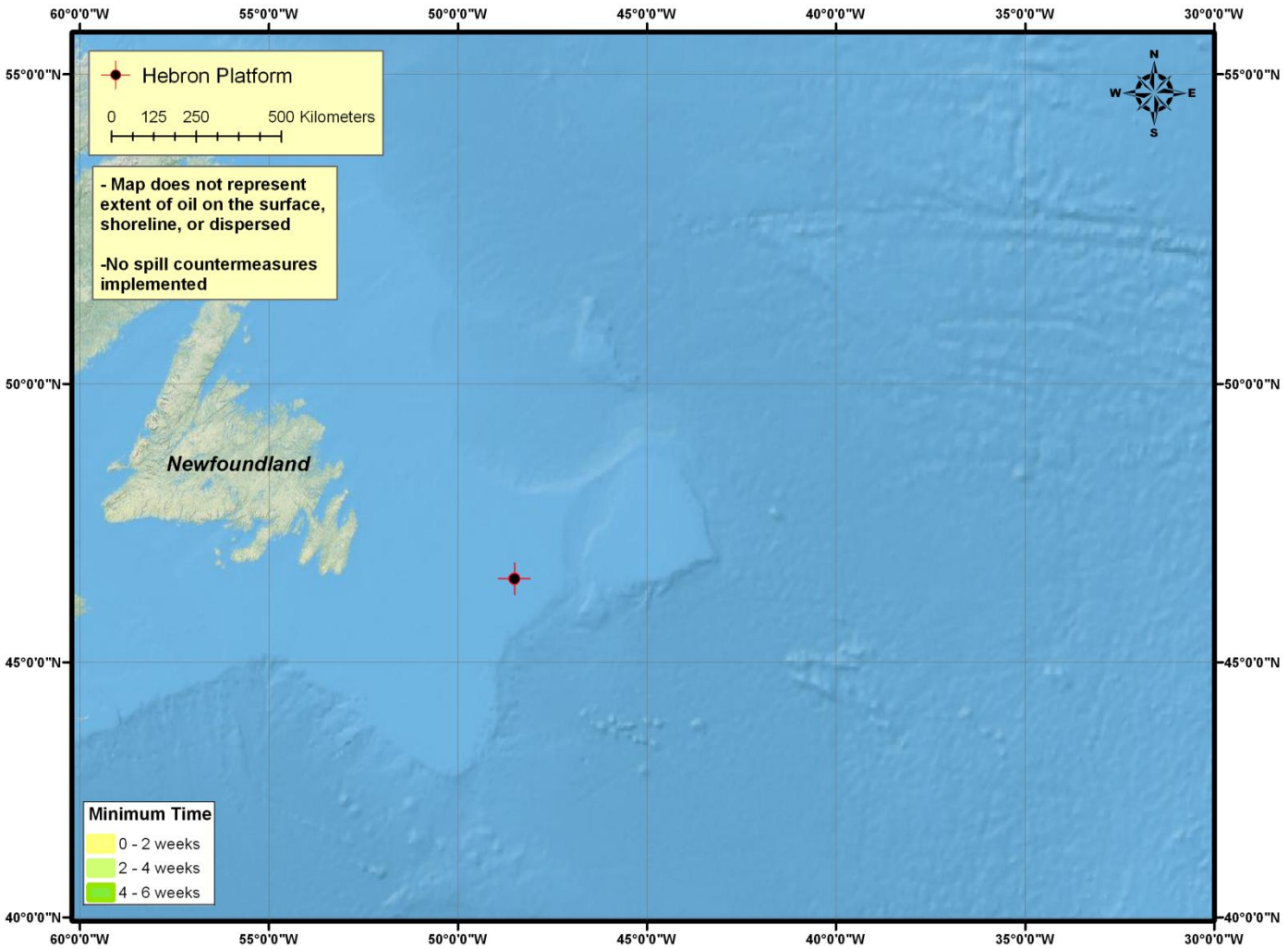


Figure 7. Minimum time to shoreline oiling from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter.

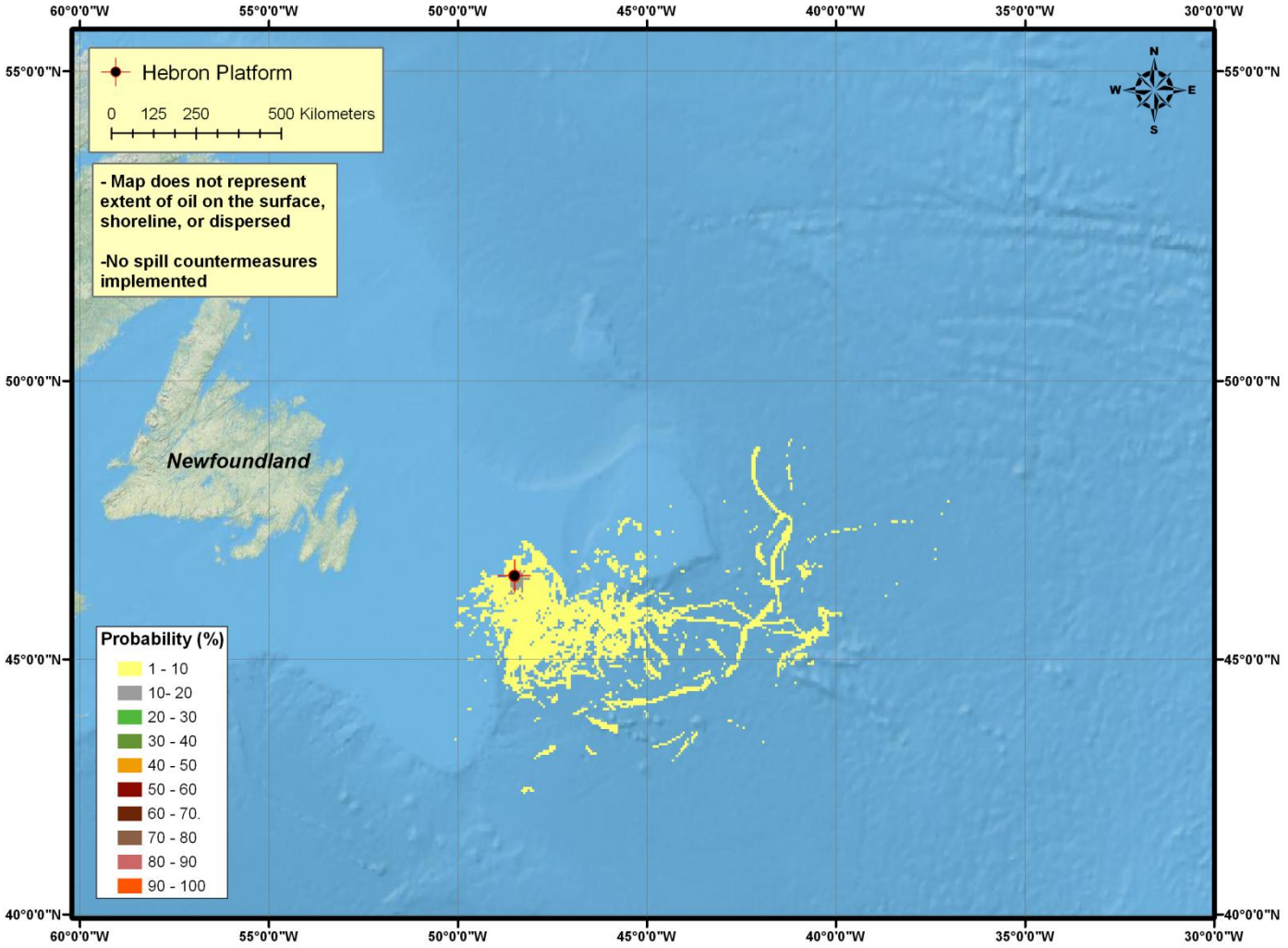


Figure 8. Entrained oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter.

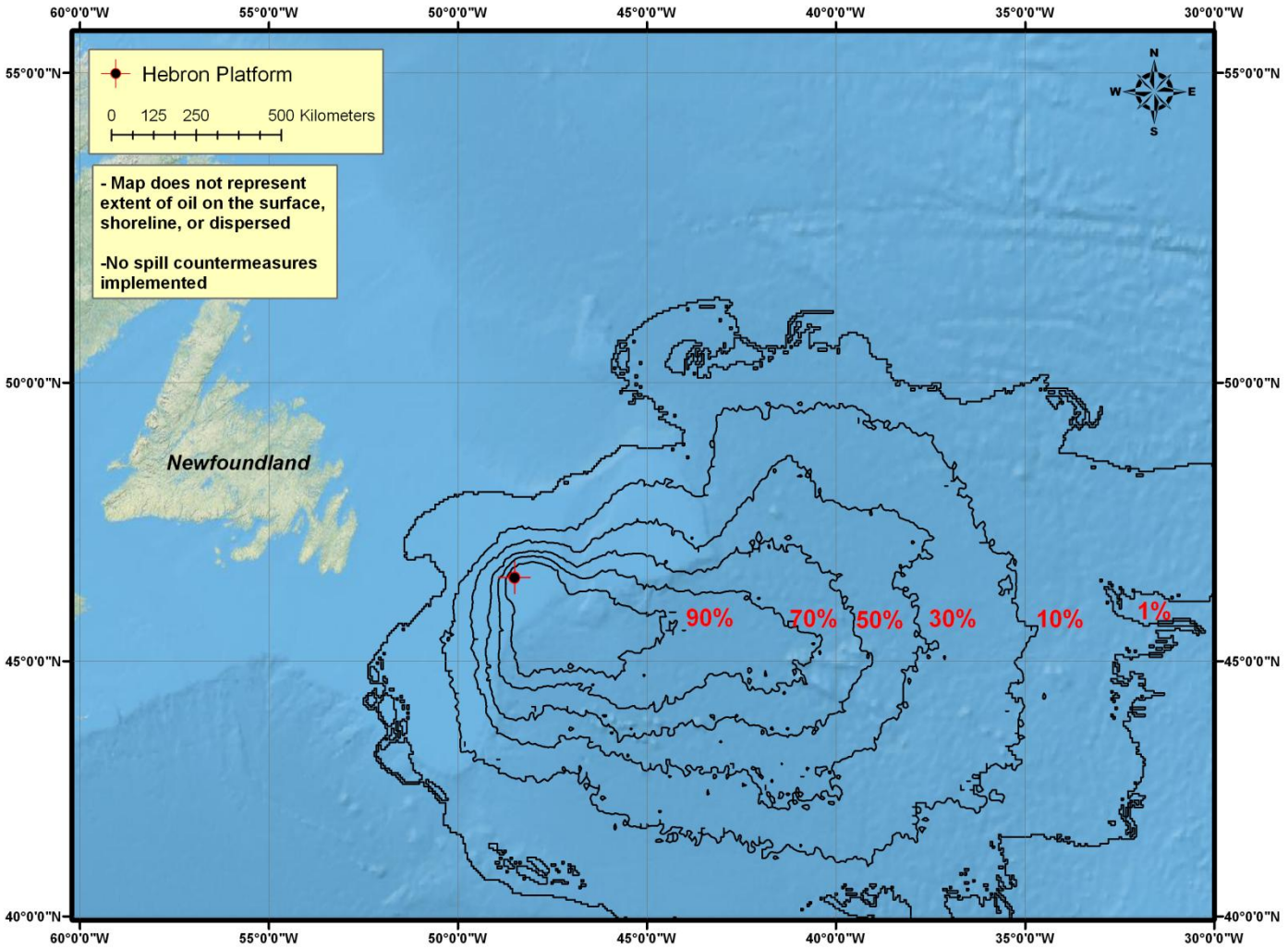


Figure 9. Surface oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter with ice present.

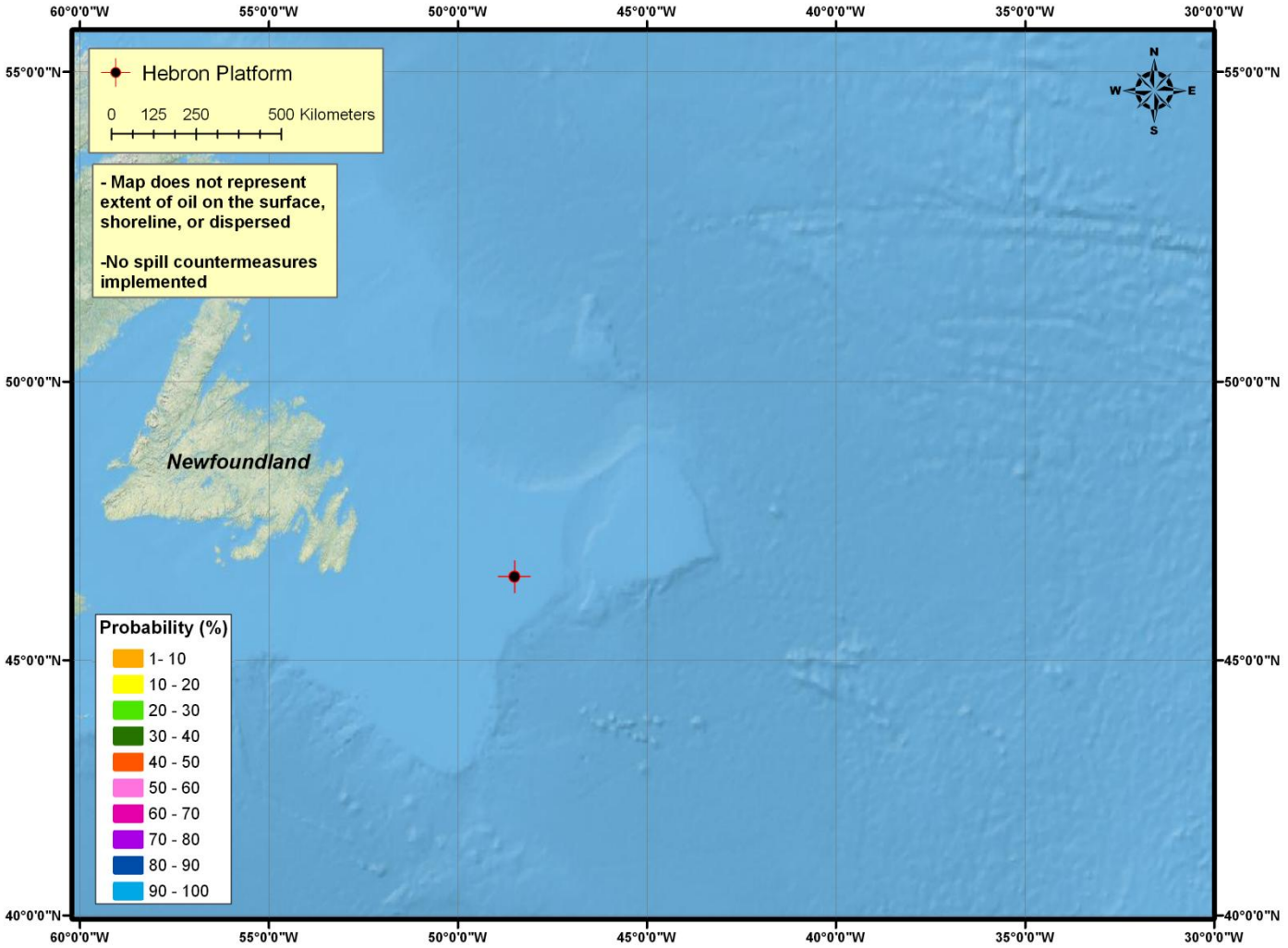


Figure 10. Shoreline oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter with ice present.

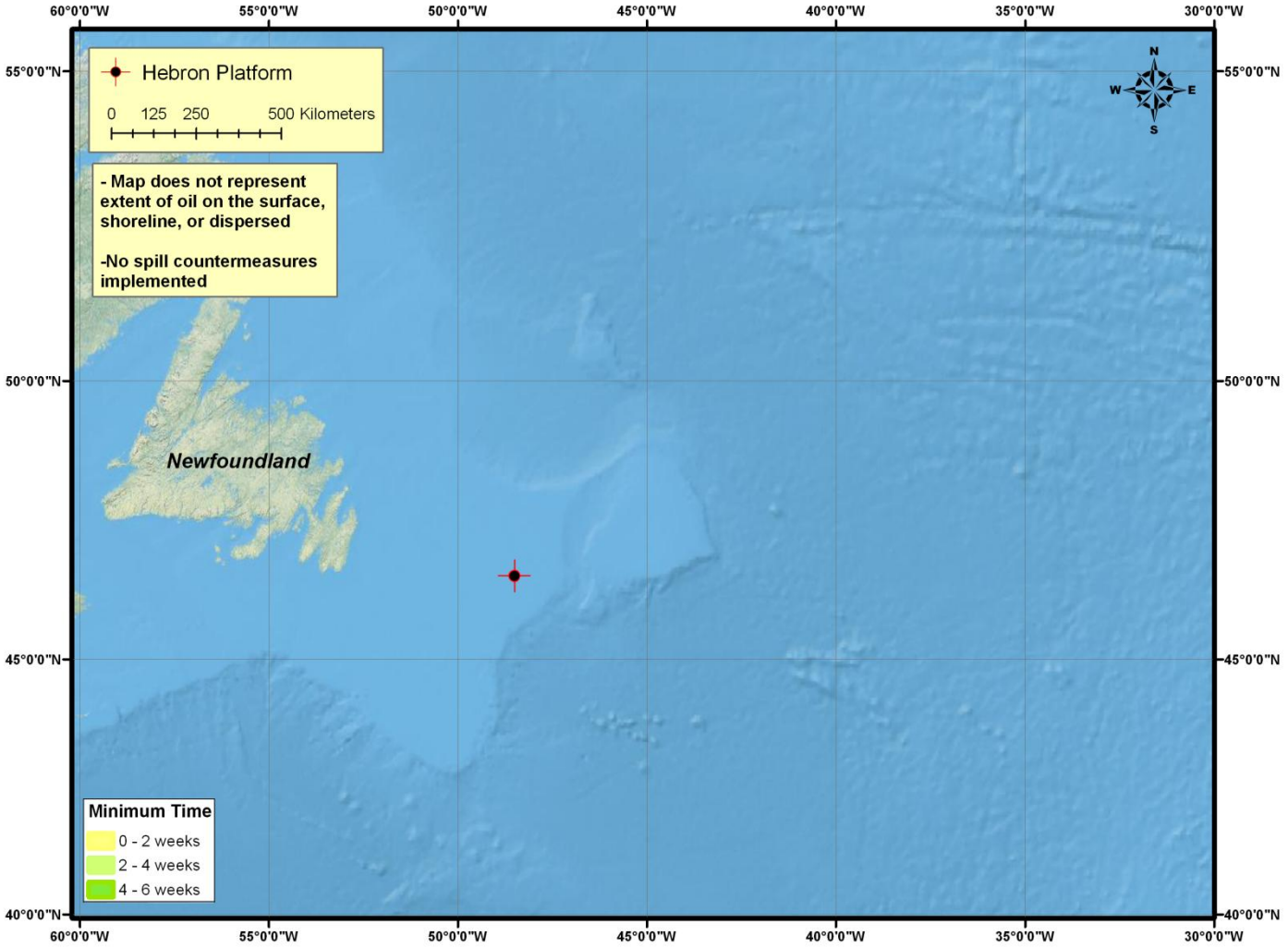


Figure 11. Minimum time to shoreline oiling from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter with ice present.

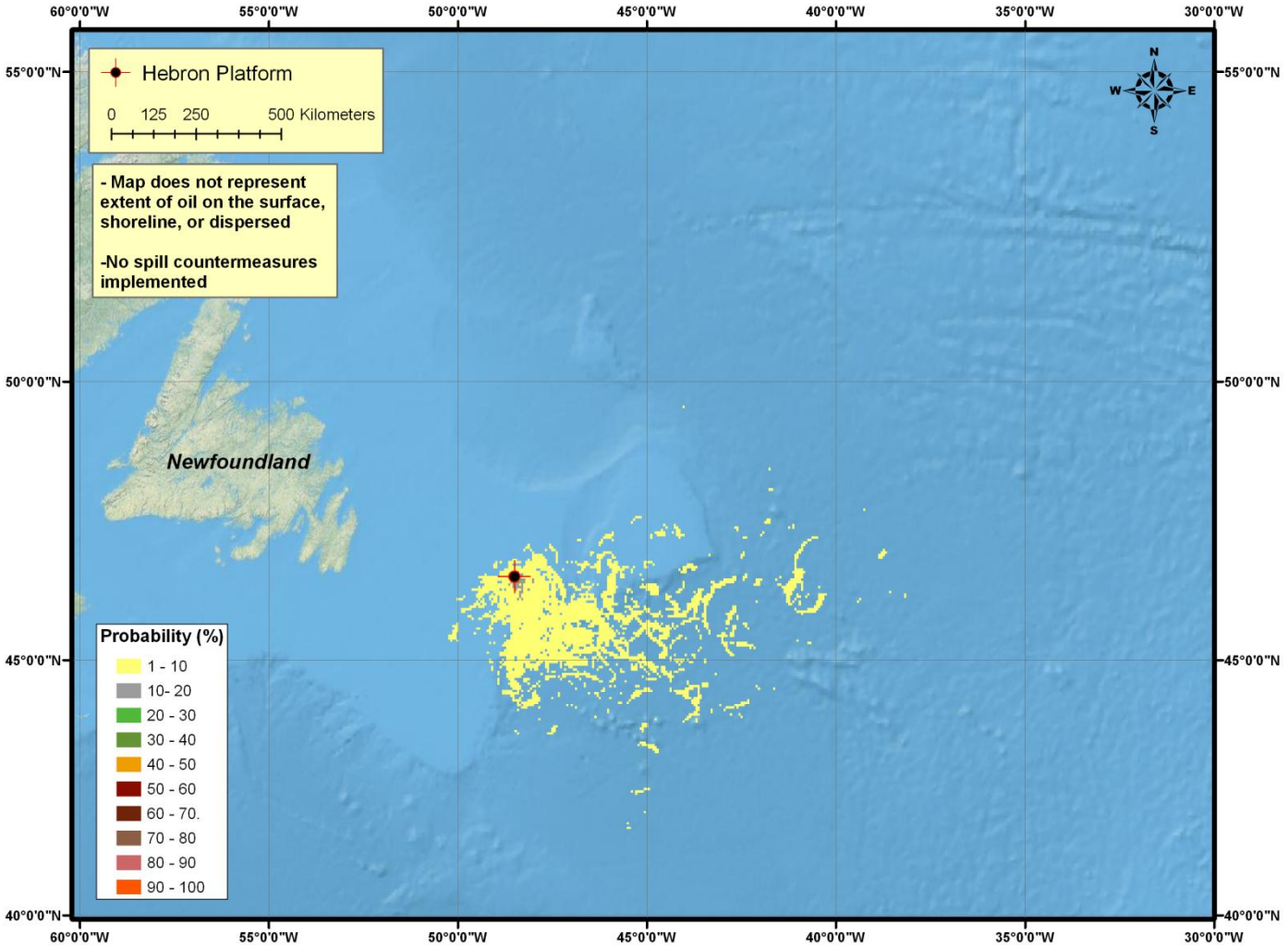


Figure 12. Entrained oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter with ice present.

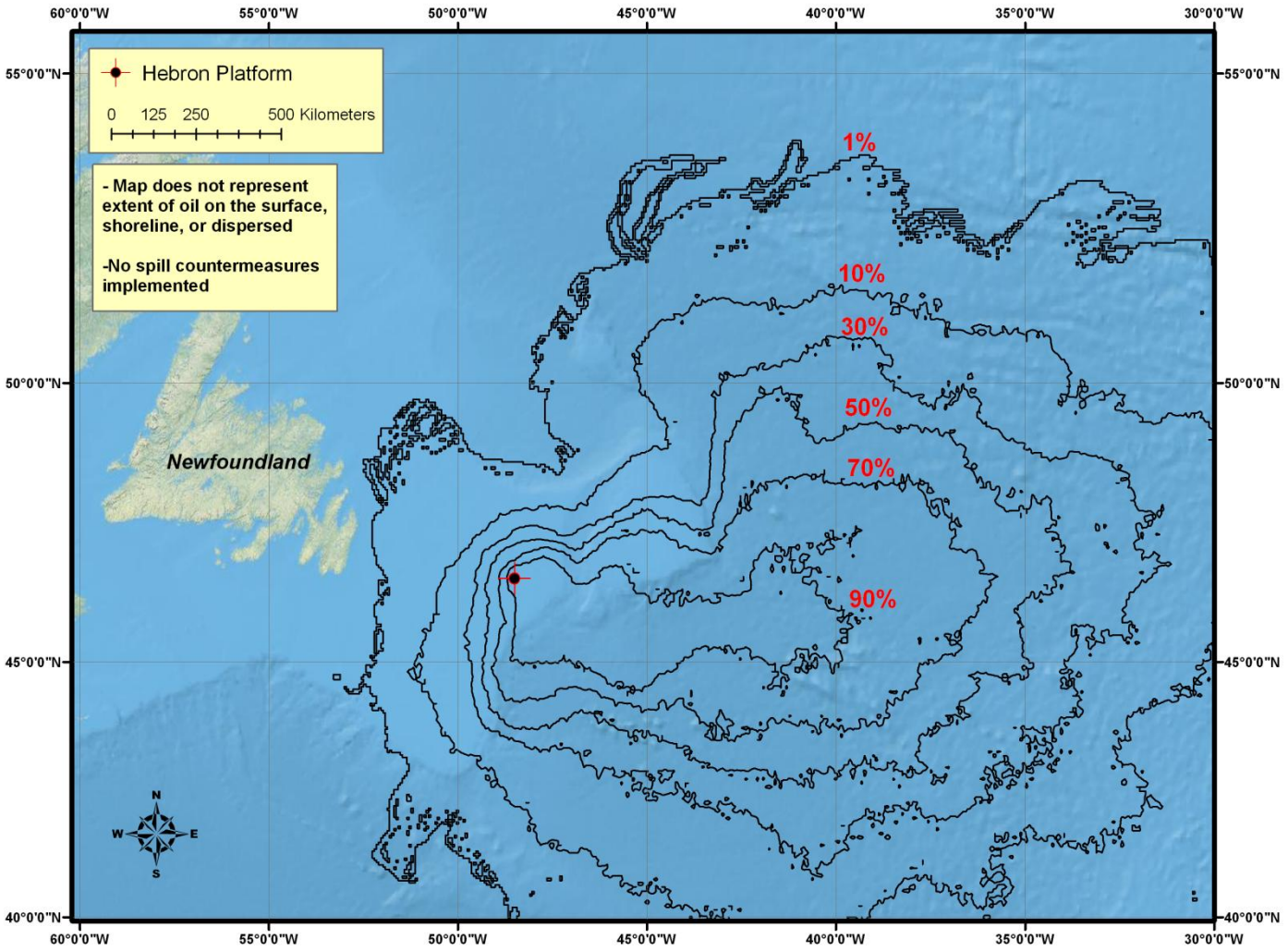


Figure 13. Surface oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the summer run for 60 days.

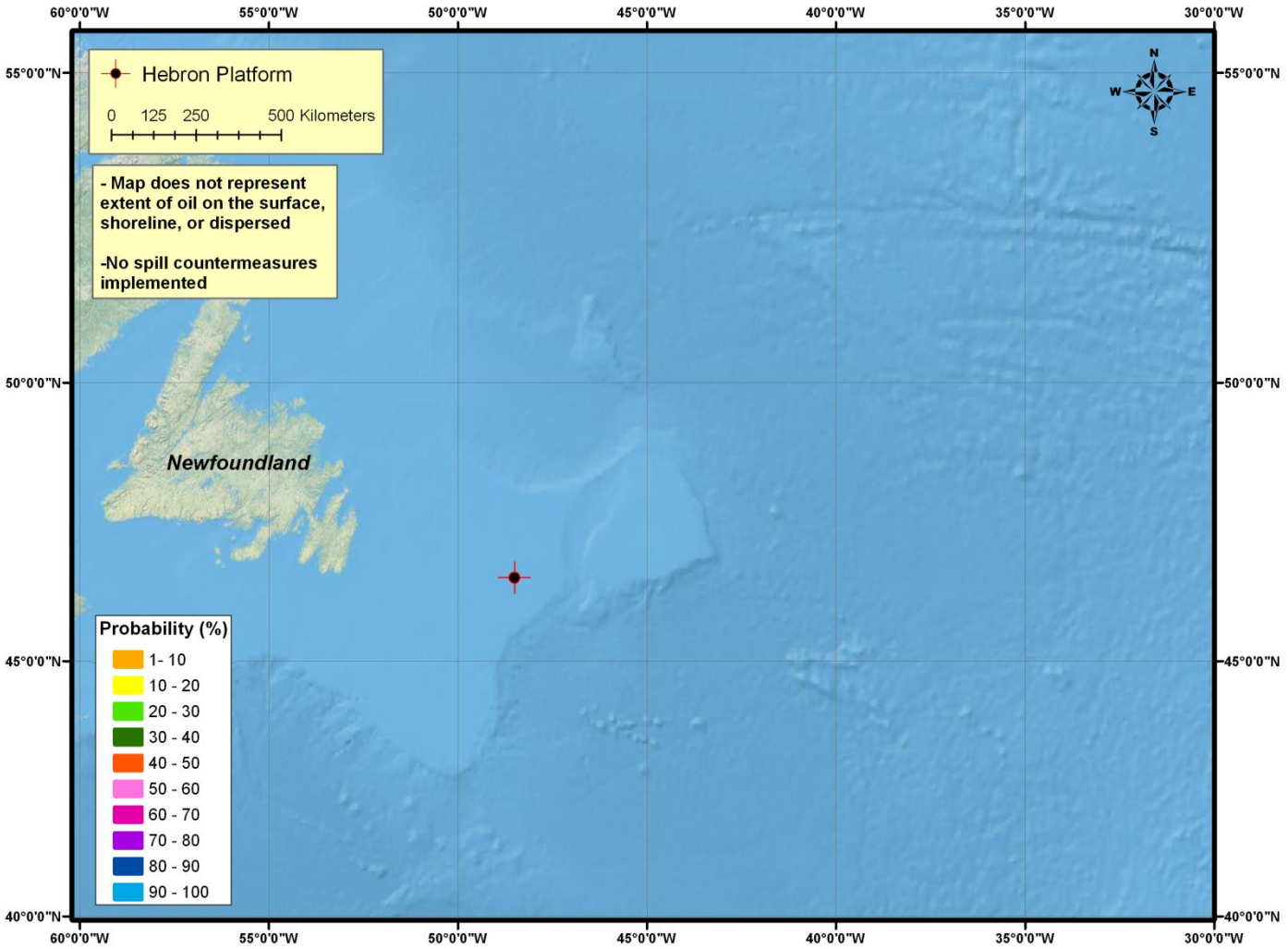


Figure 14. Shoreline oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the summer run for 60 days.

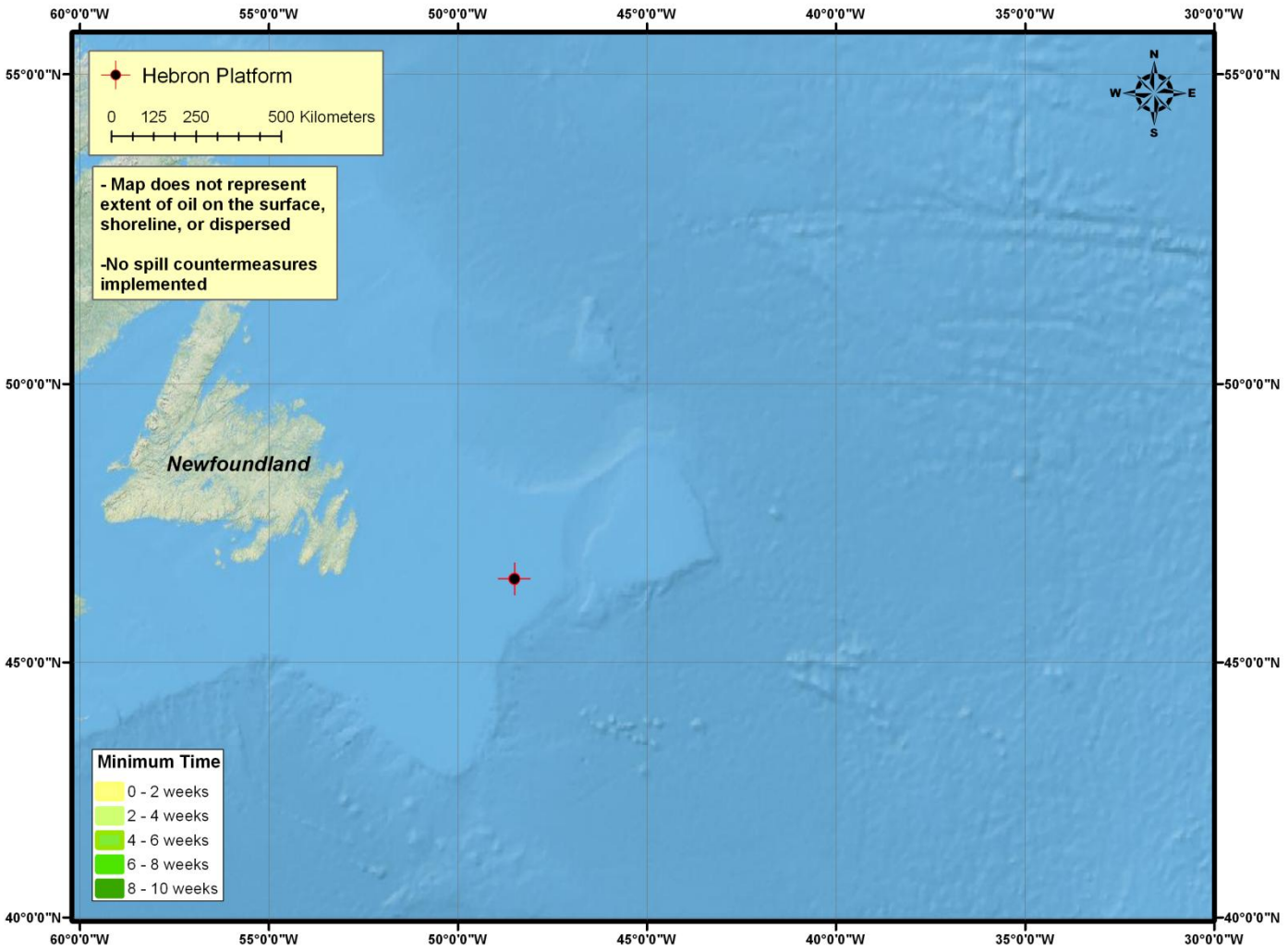


Figure 15. Minimum time to shoreline oiling from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the summer run for 60 days.

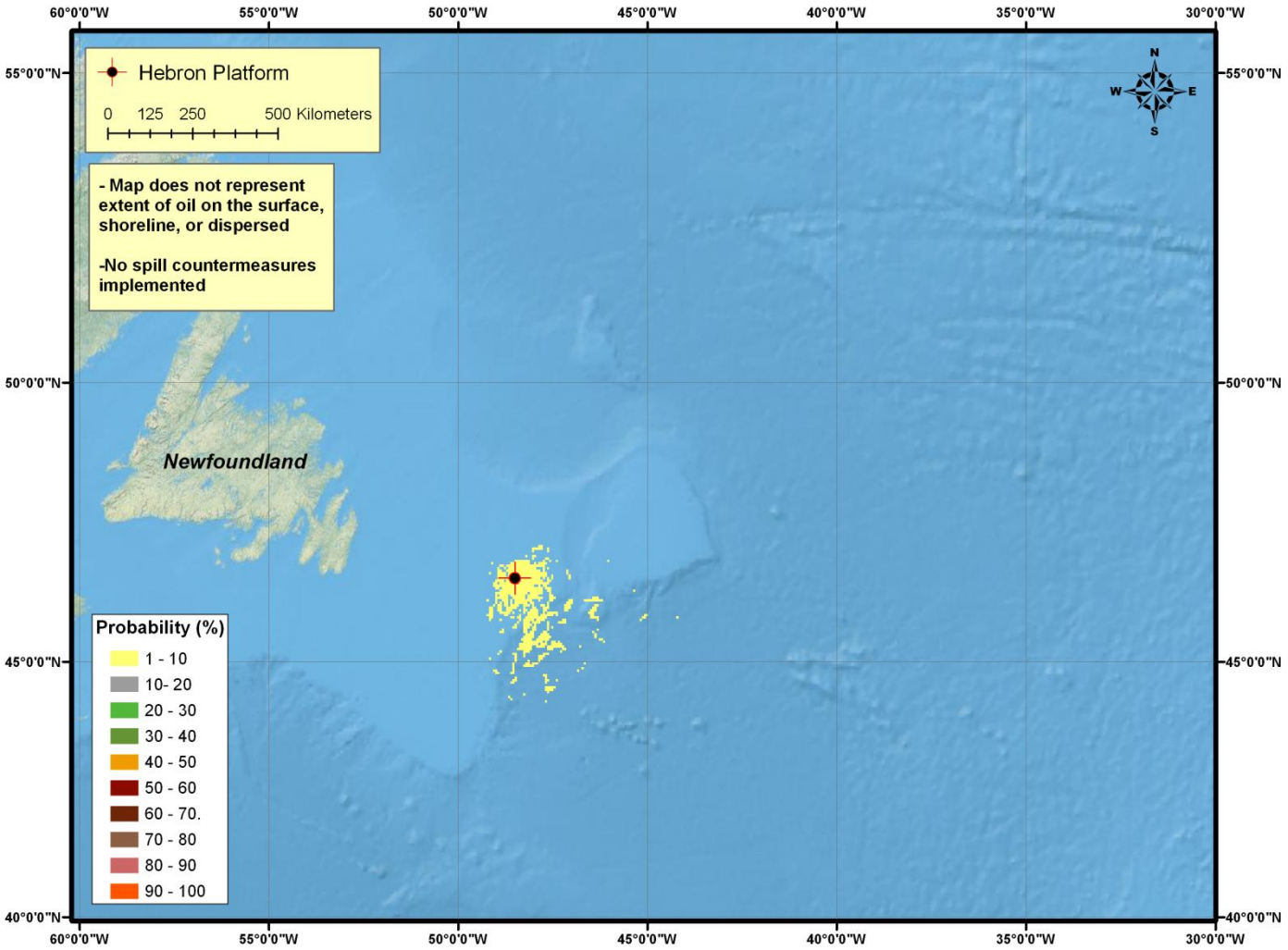


Figure 16. Entrained oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the summer run for 60 days.

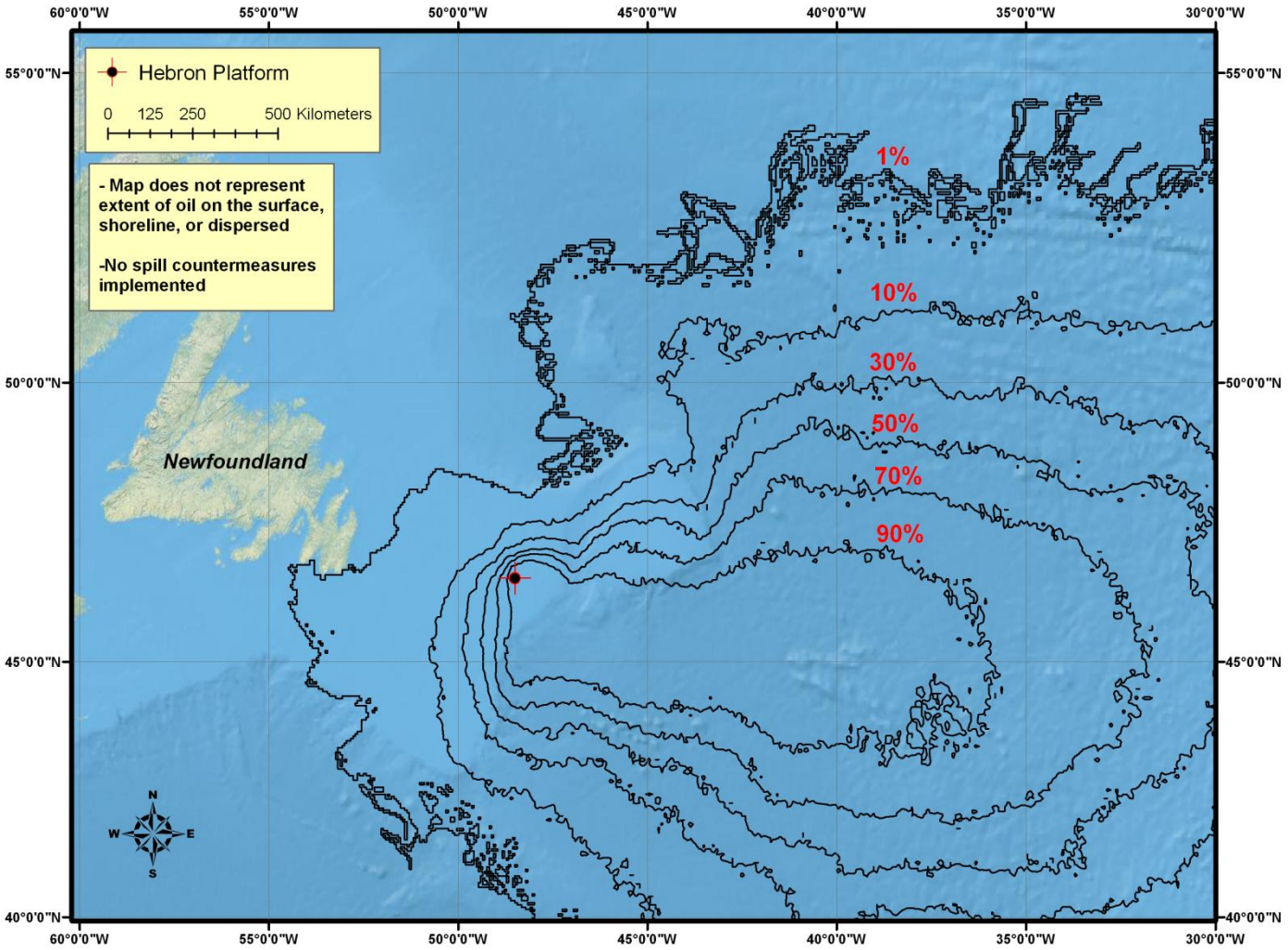


Figure 17. Surface oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter run for 60 days.

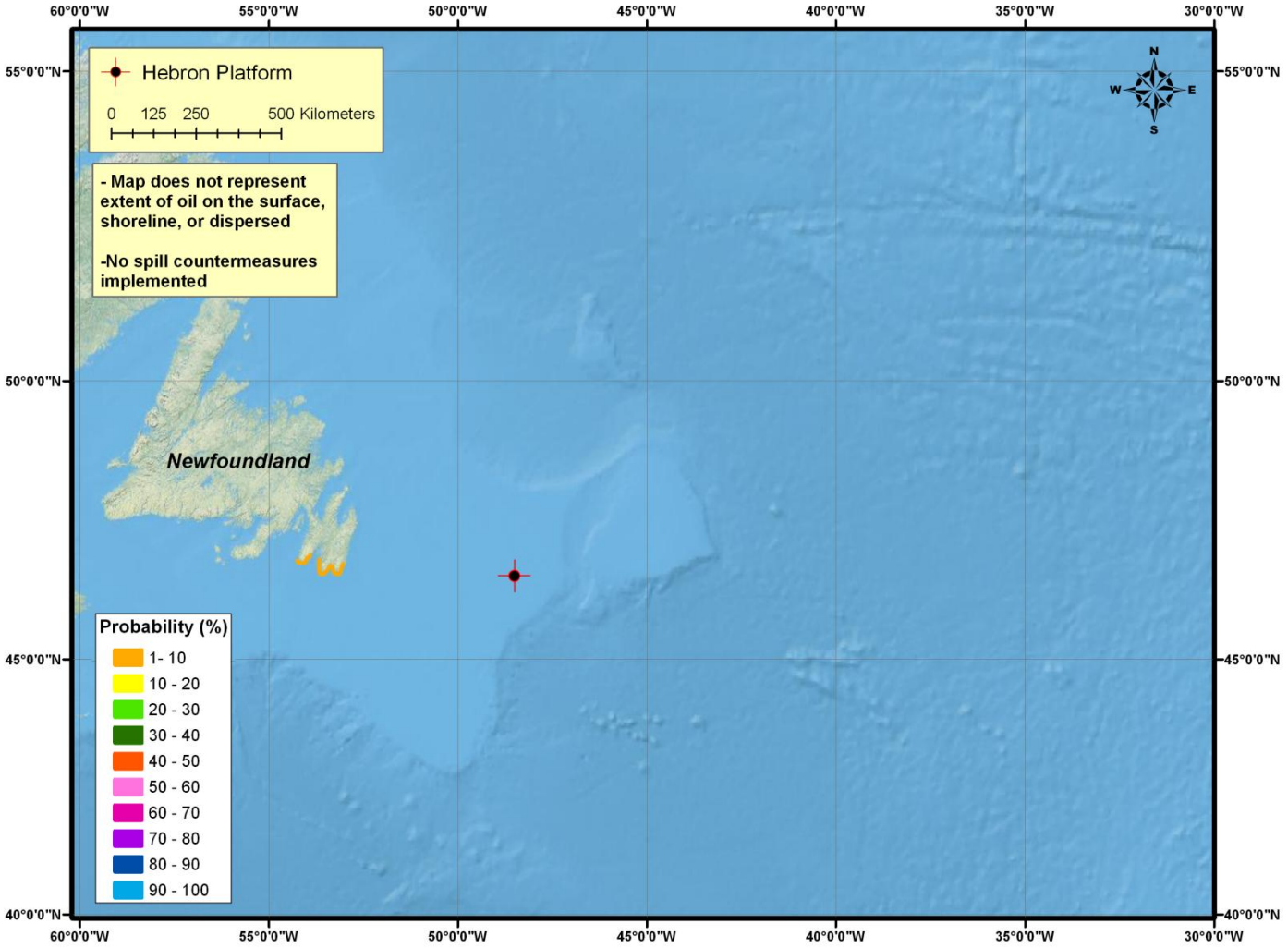


Figure 18. Shoreline oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter run for 60 days.

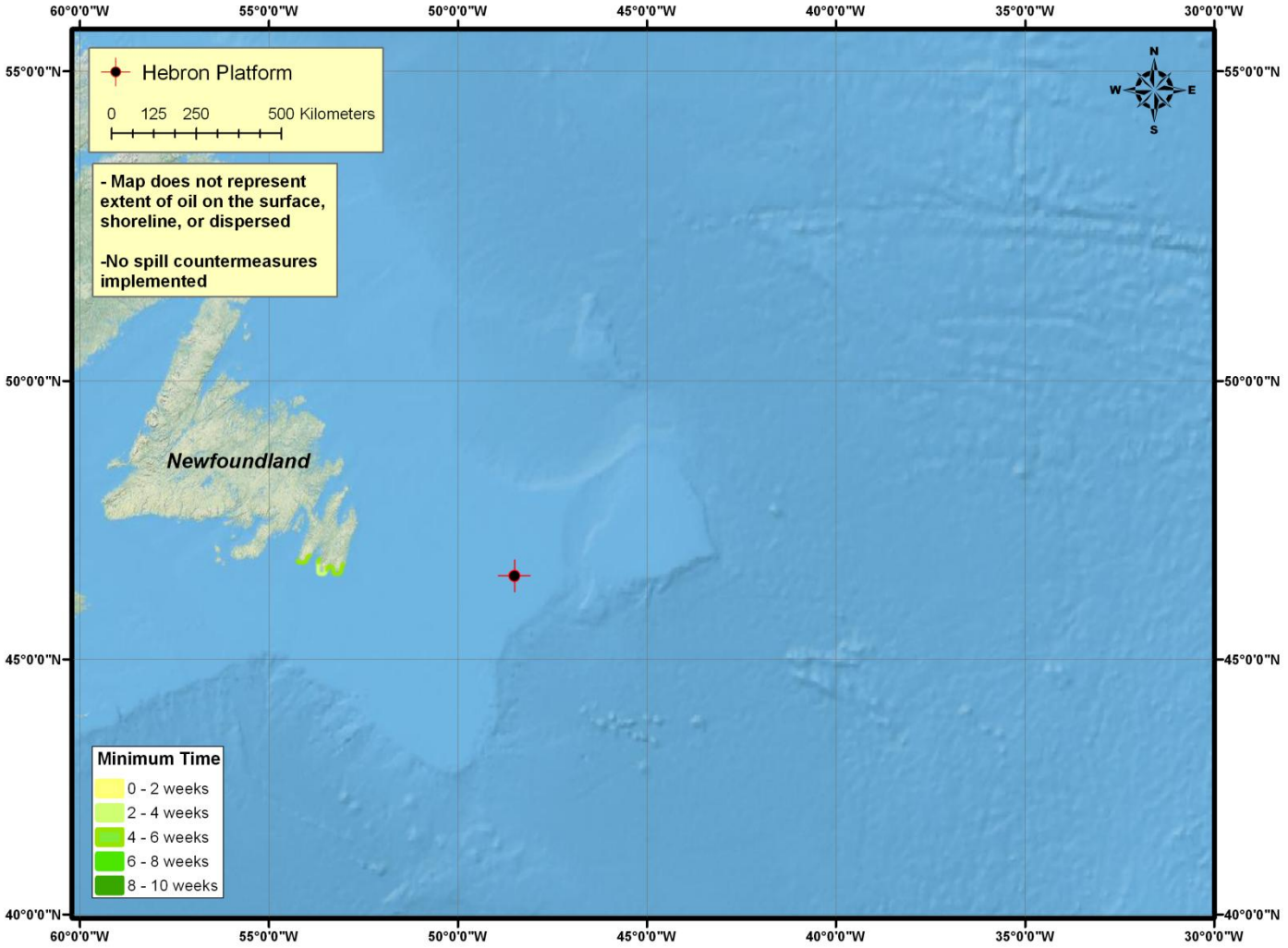


Figure 19. Minimum time to shoreline oiling from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter run for 60 days.

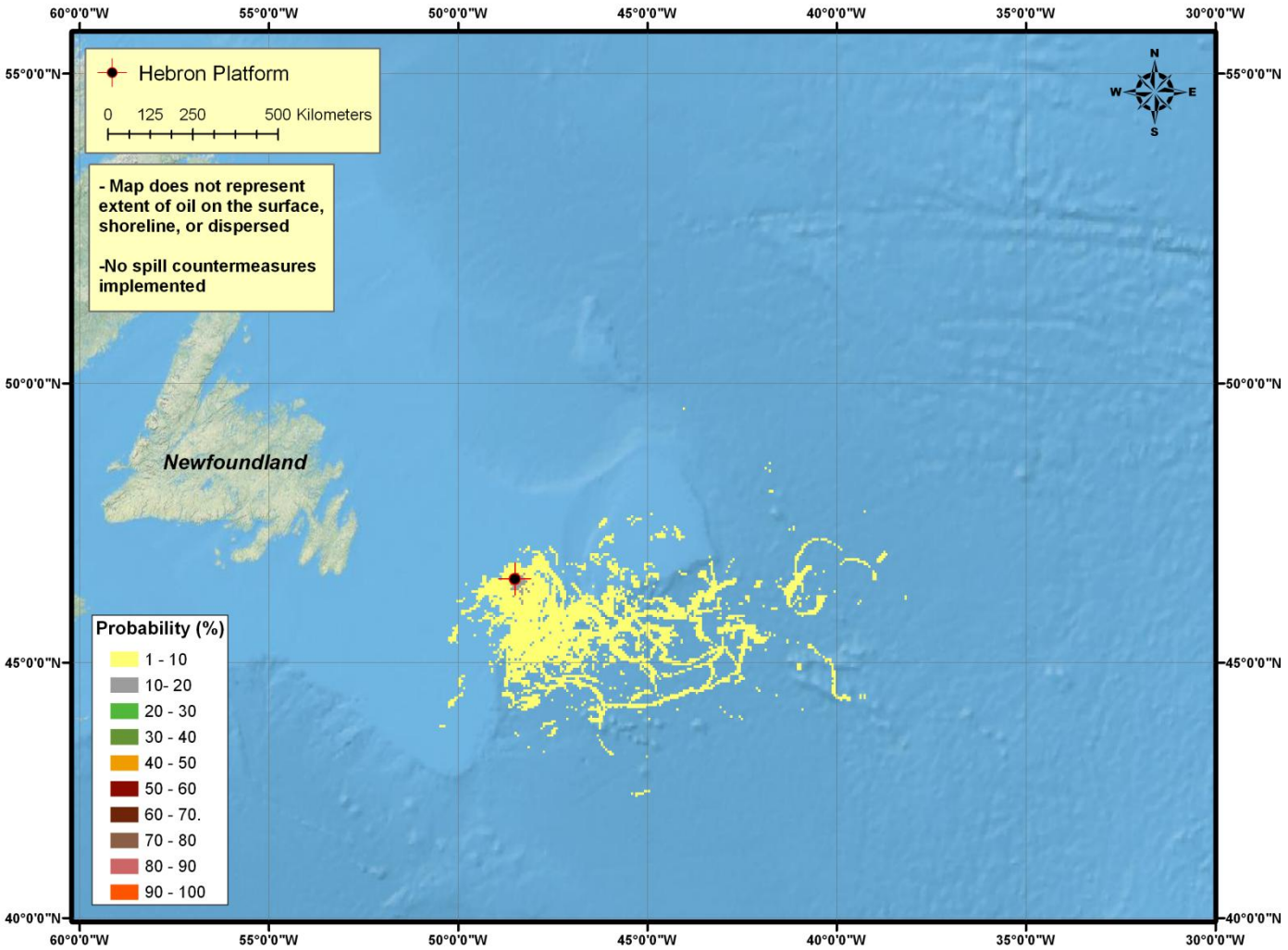


Figure 20. Entrained oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter run for 60 days.

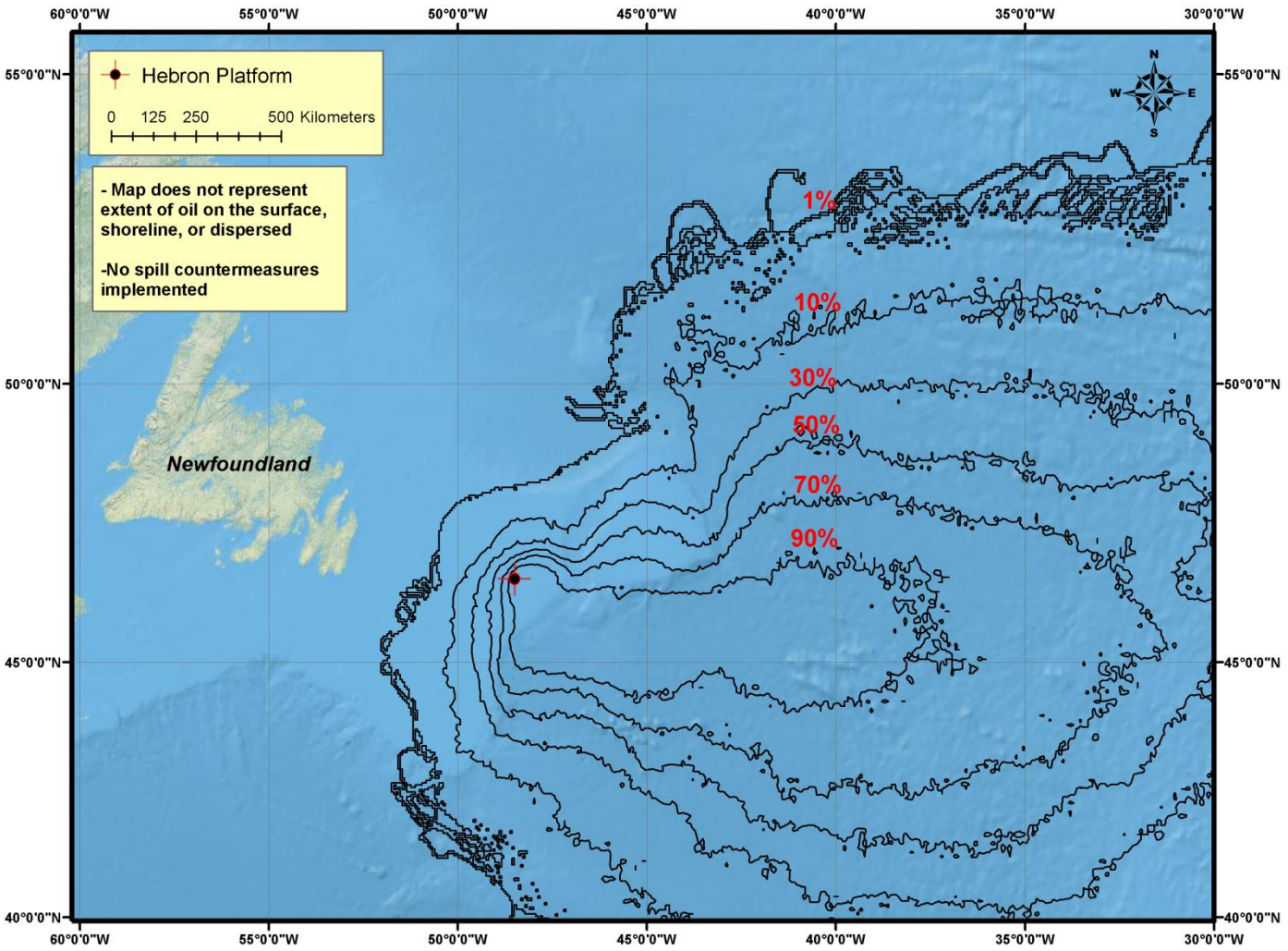


Figure 21. Surface oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter run for 60 days with ice present.

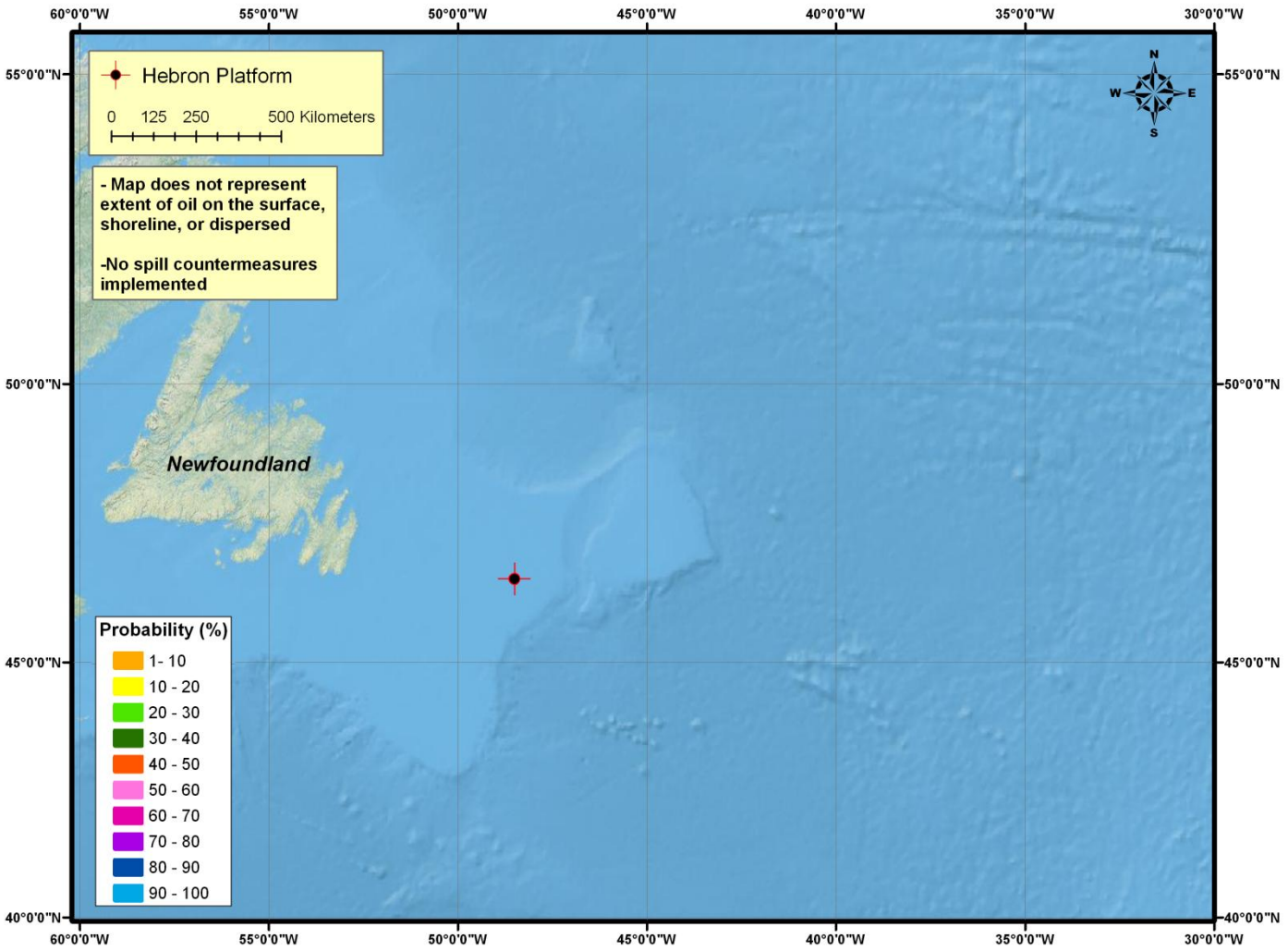


Figure 22. Shoreline oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter run for 60 days with ice present.

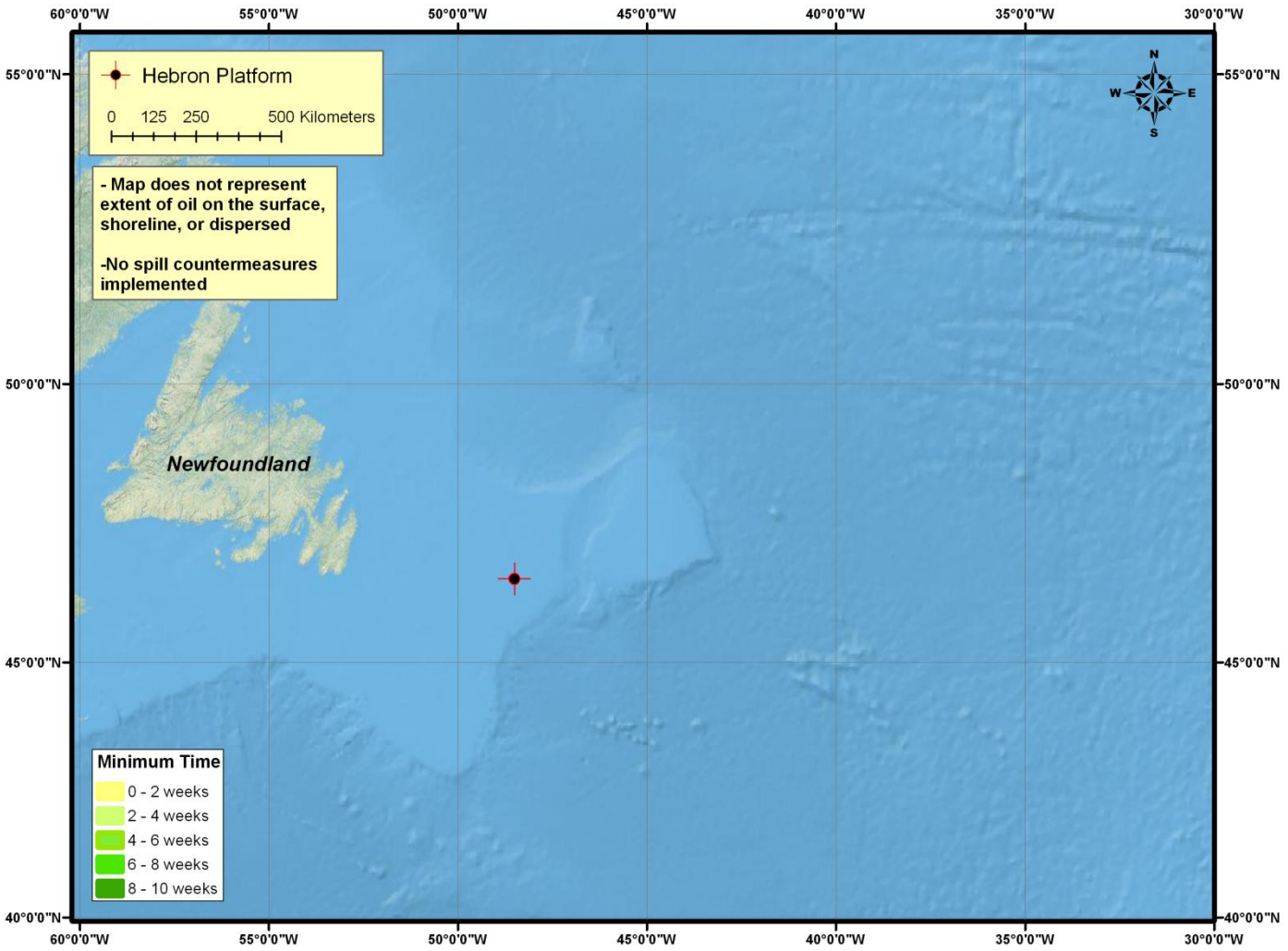


Figure 23. Minimum time to shoreline oiling from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter run for 60 days with ice present.

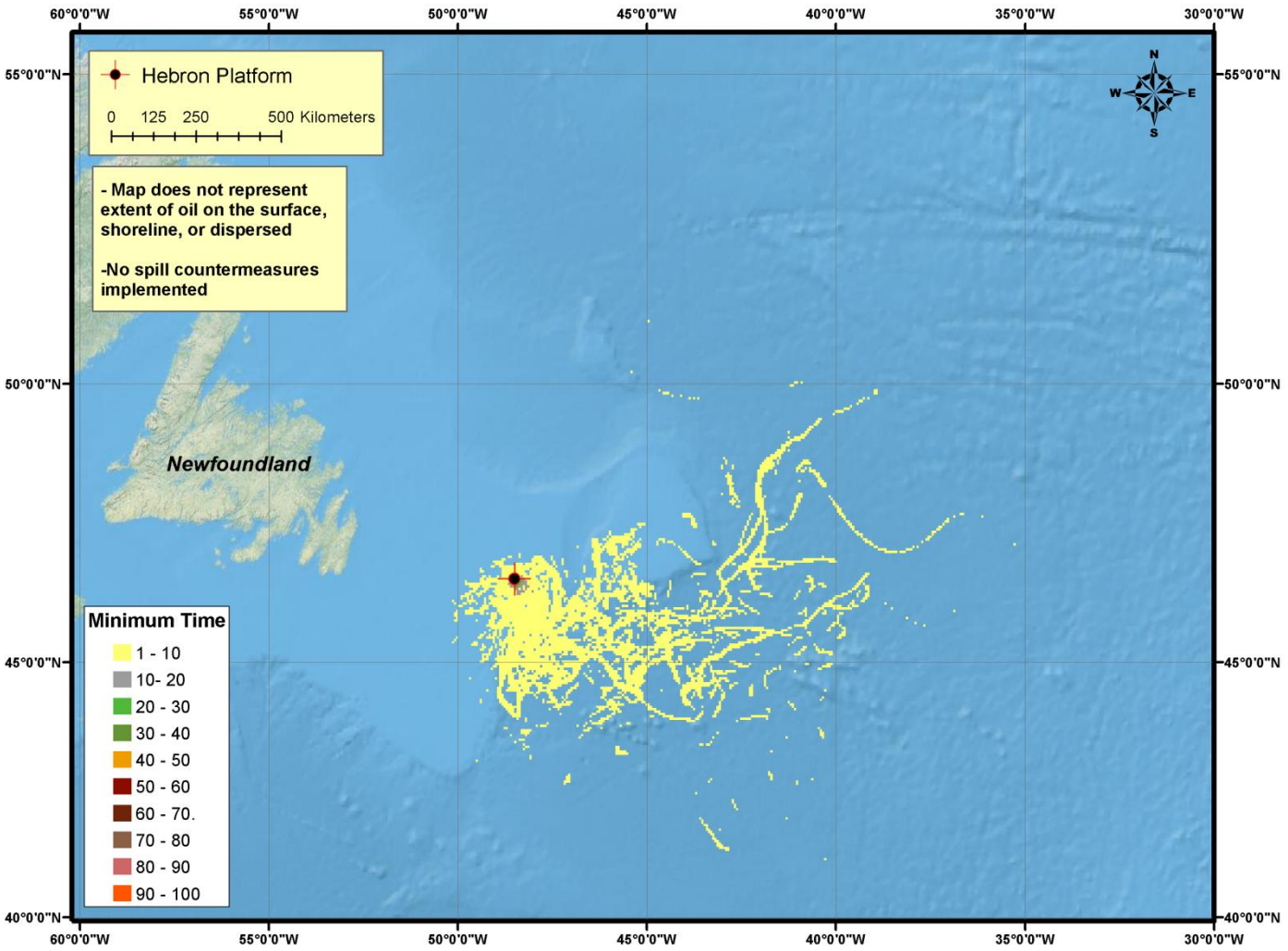


Figure 24. Entrained oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 30-day period during the winter run for 60 days with ice present.

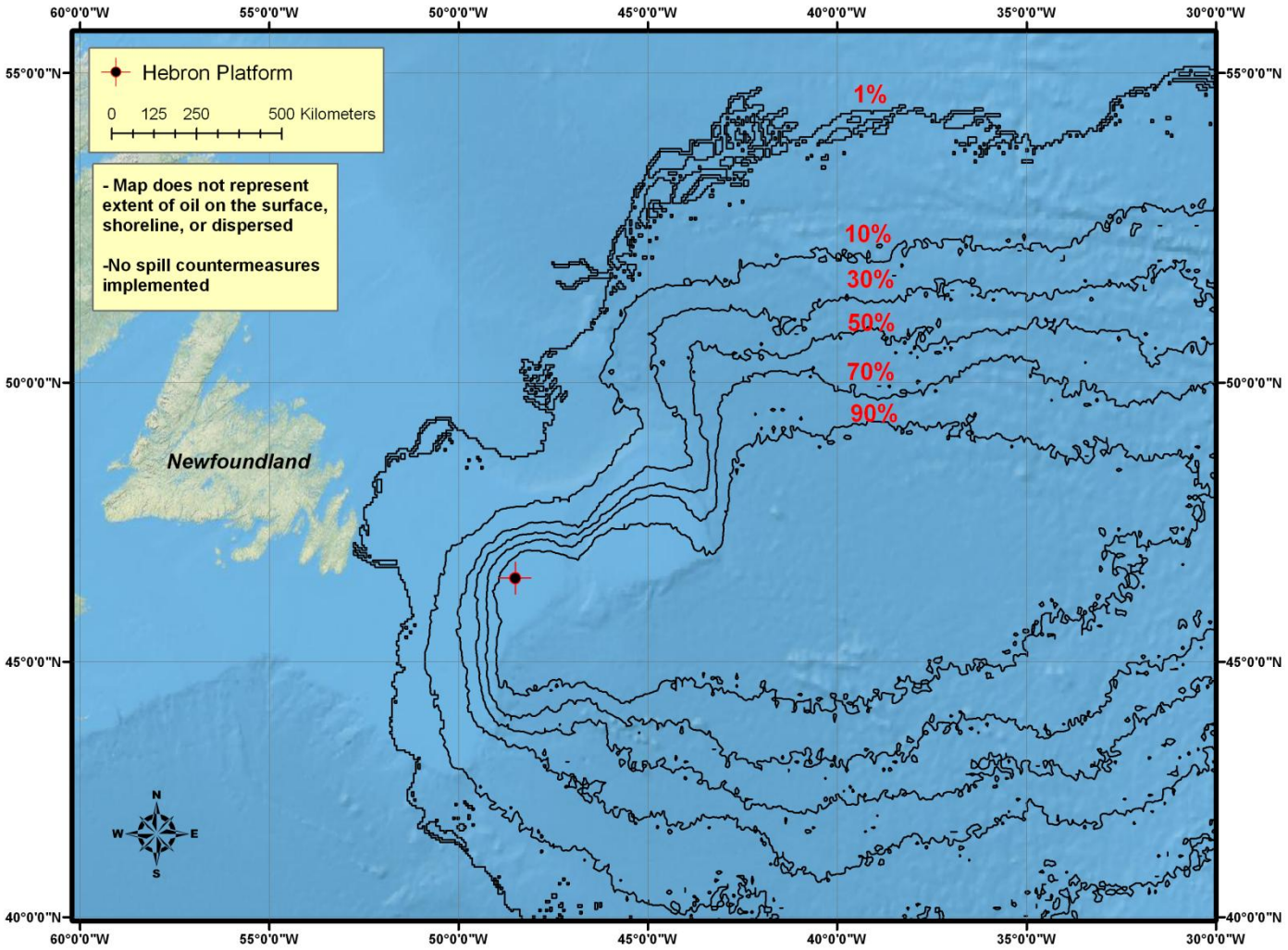


Figure 25. Surface oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 100-day period during the summer.

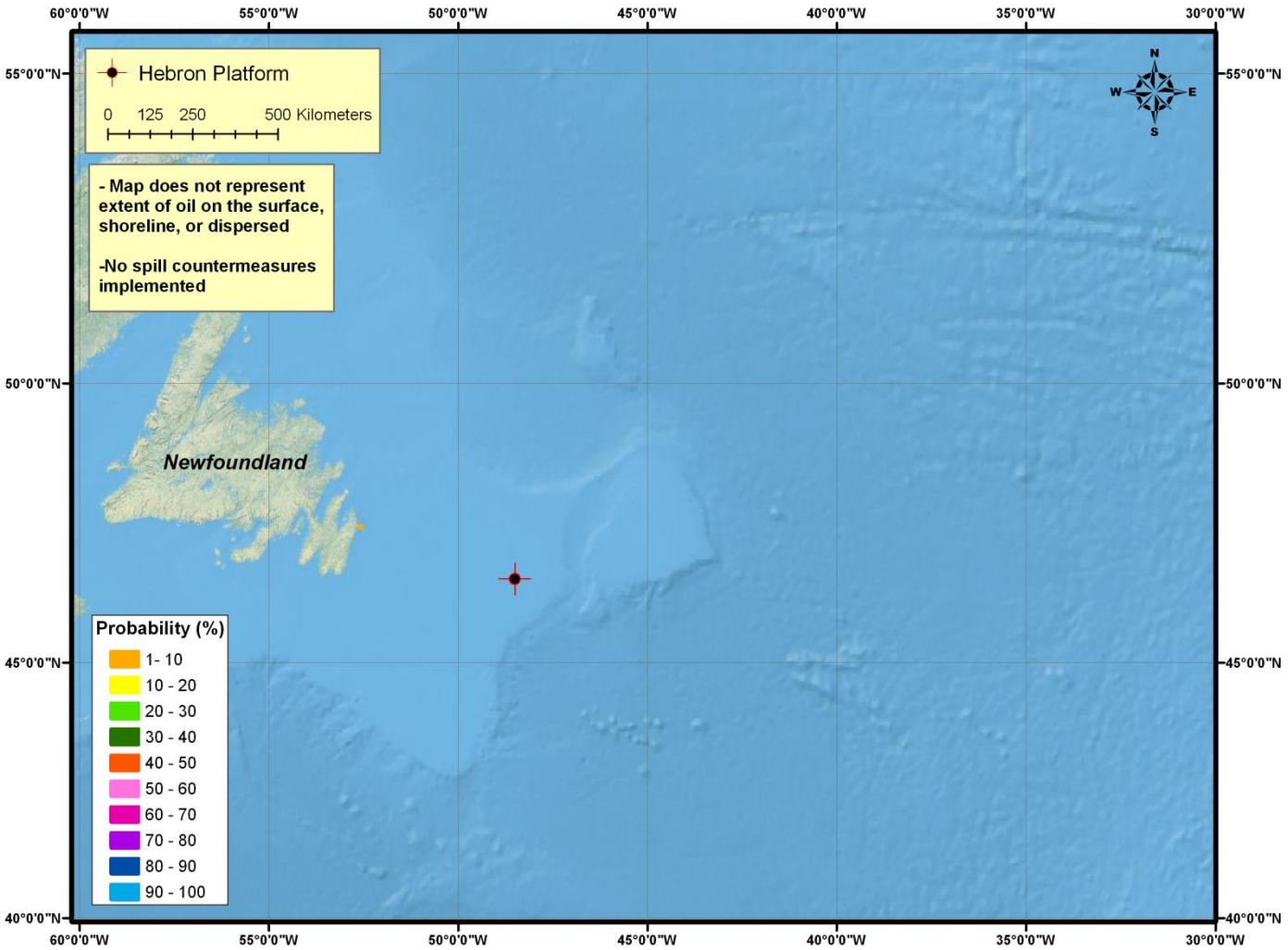


Figure 26. Shoreline oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 100-day period during the summer.

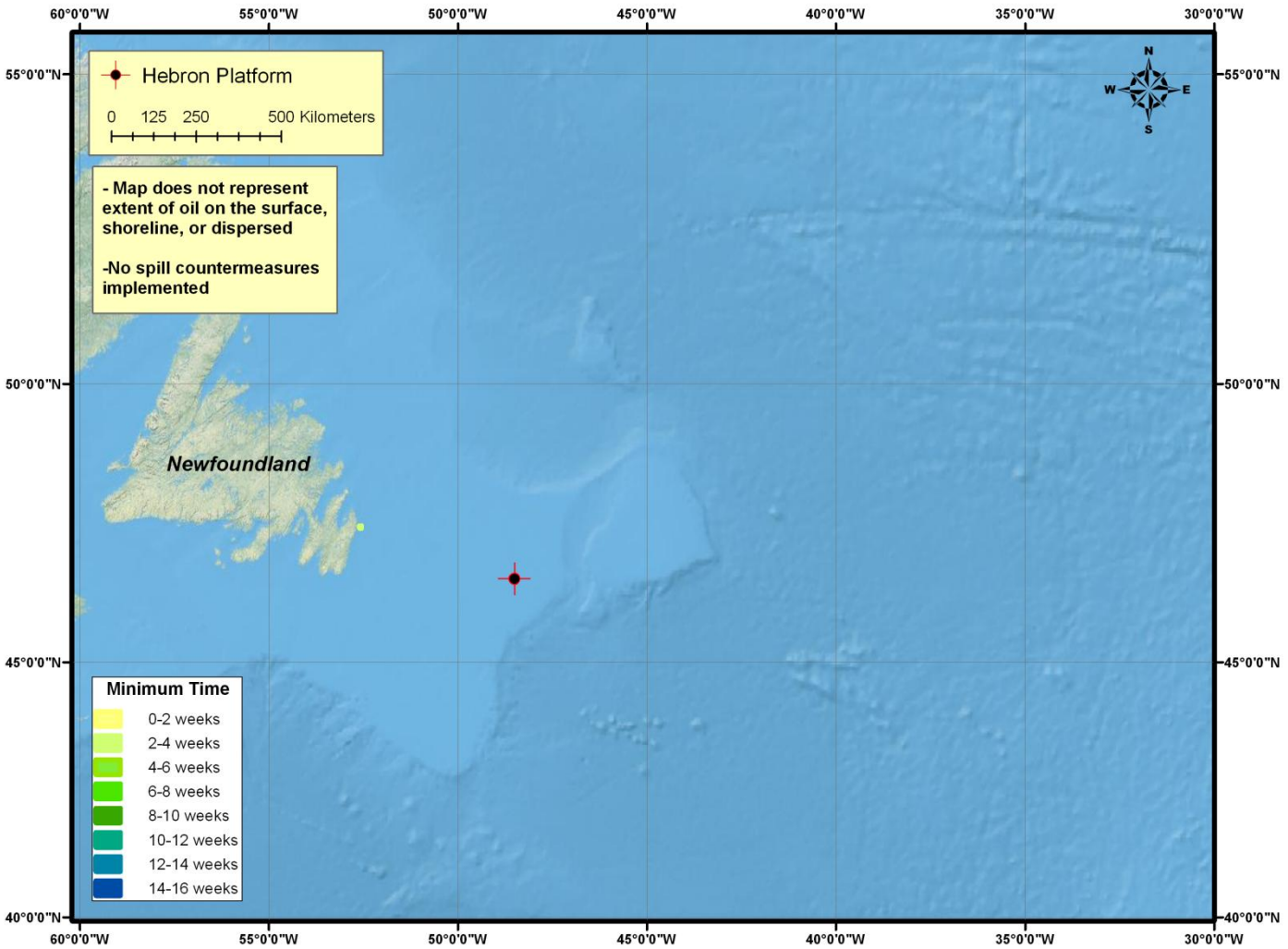


Figure 27. Minimum time to shoreline oiling from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 100-day period during the summer.

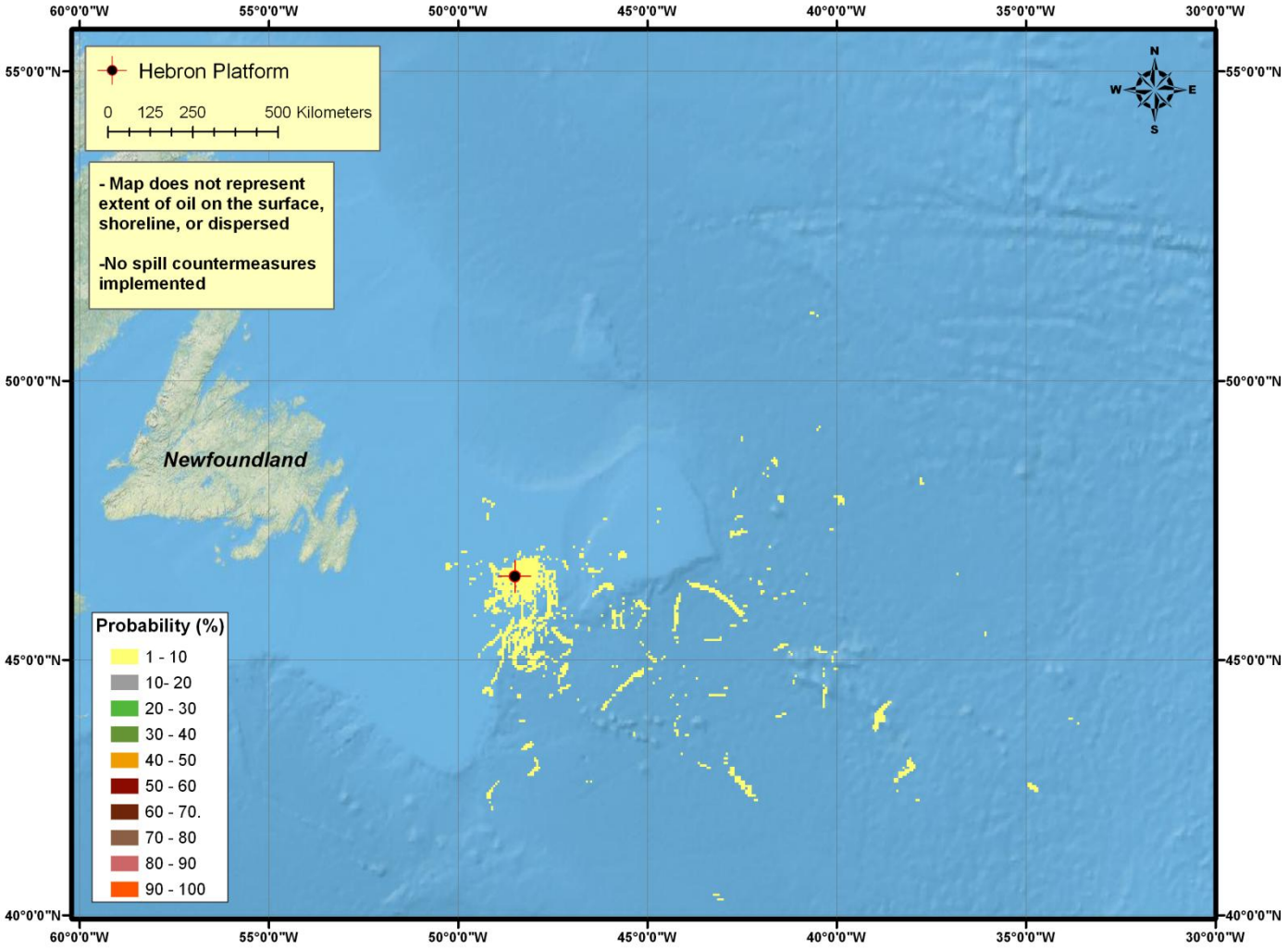


Figure 28. Entrained oil probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 100-day period during the summer.

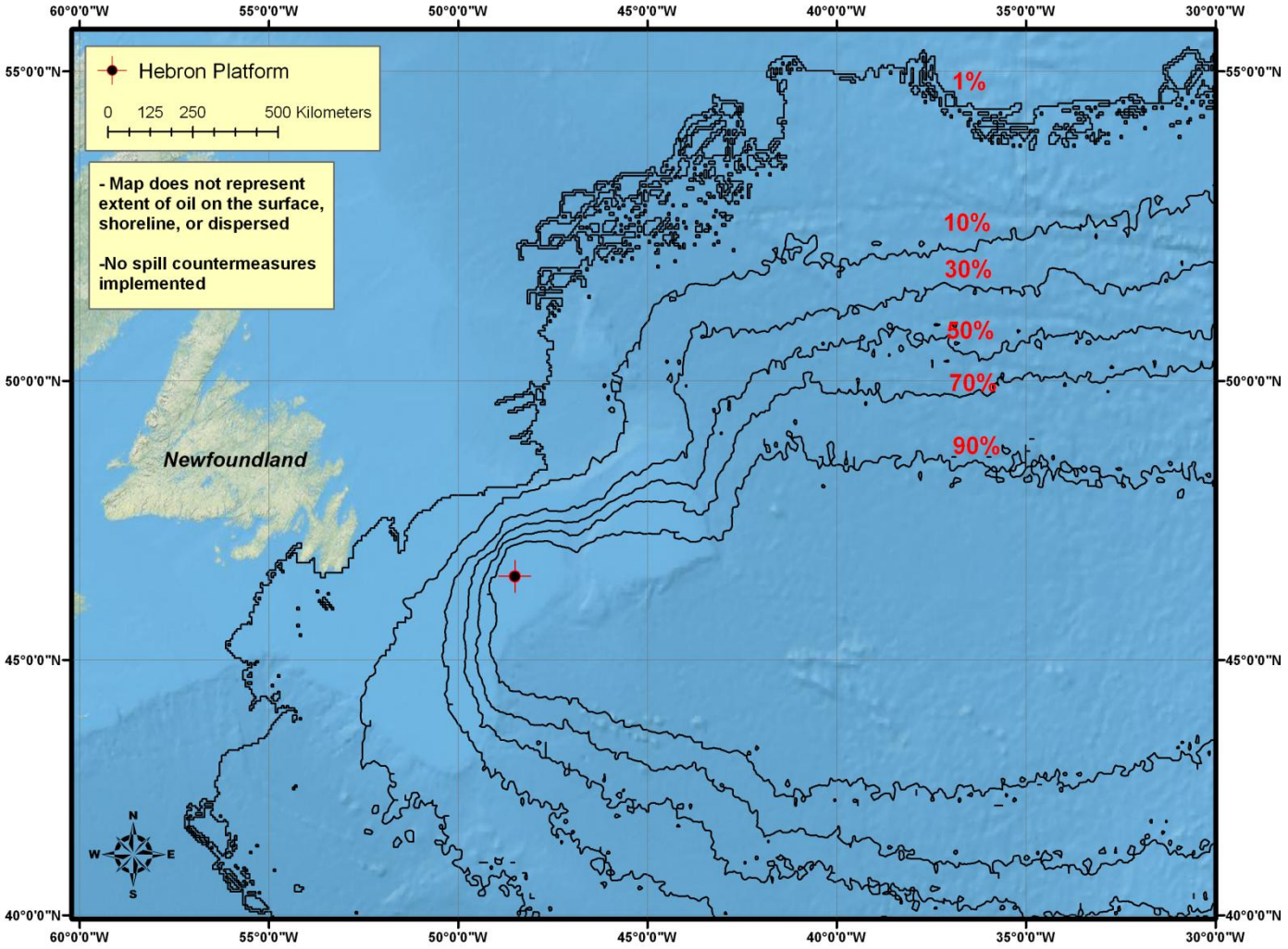


Figure 29. Surface oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 120-day period during the winter.

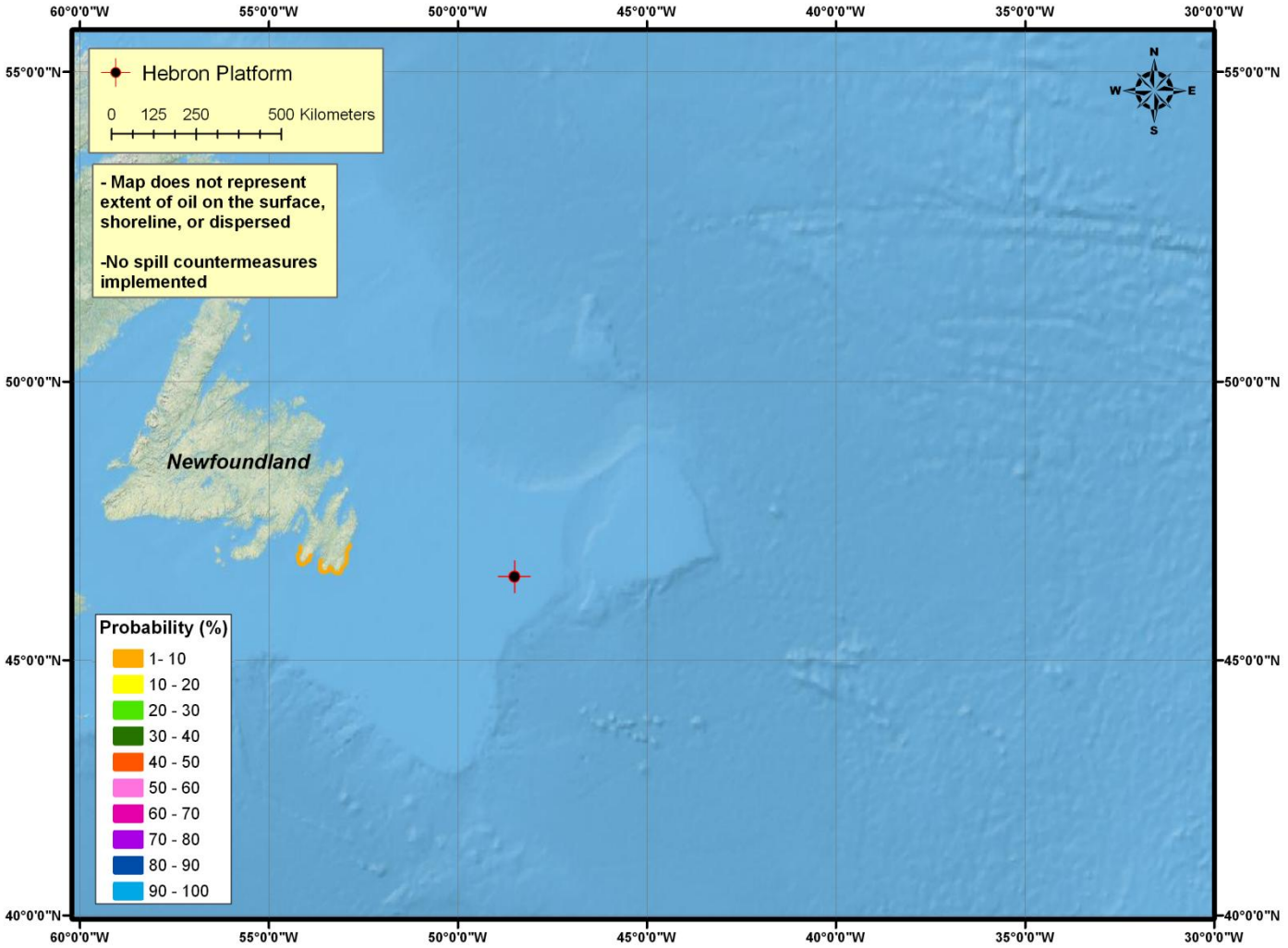


Figure 30. Shoreline oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 120-day period during the winter.

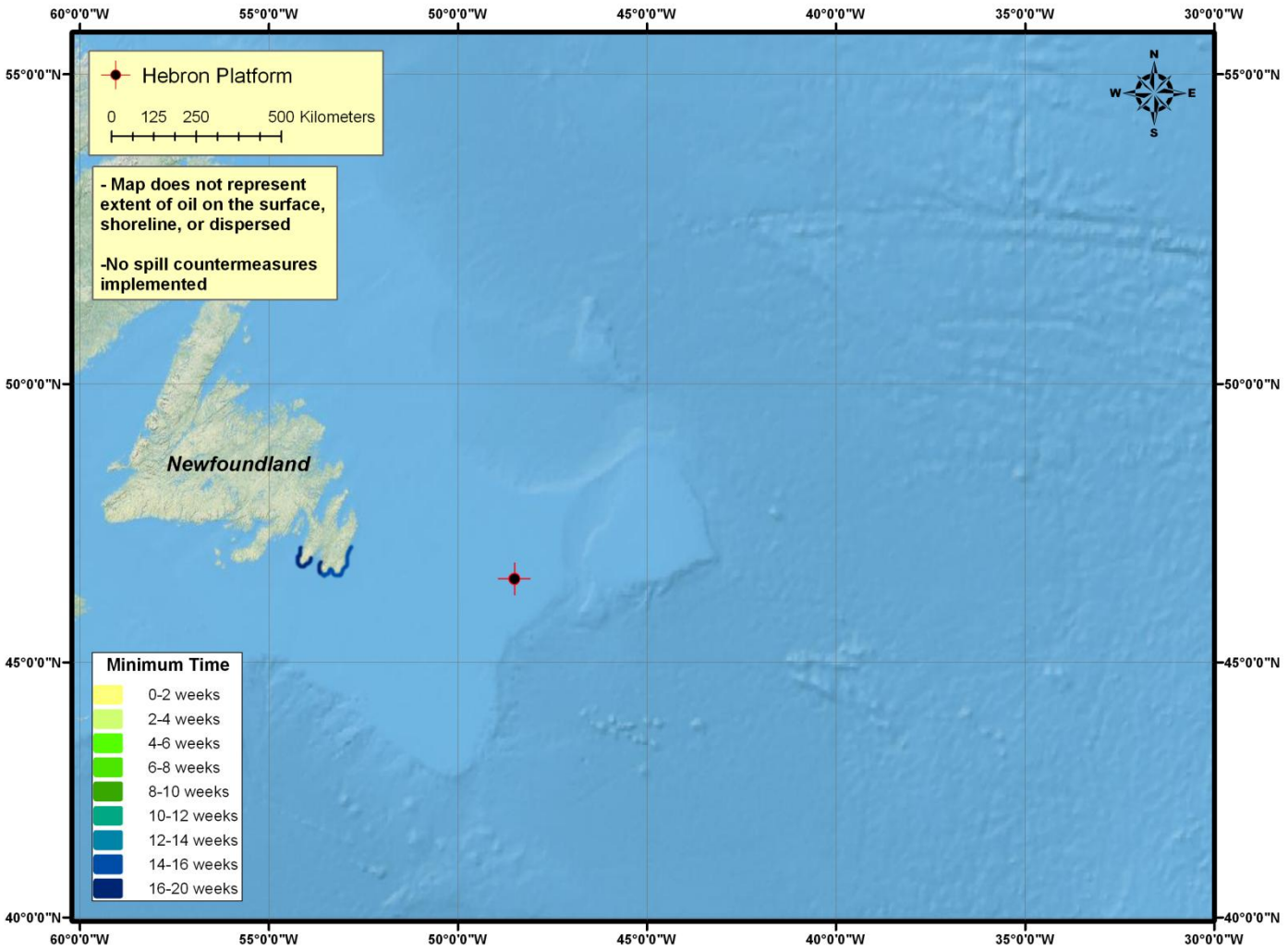


Figure 31. Minimum time to shoreline oiling from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 120-day period during the winter.

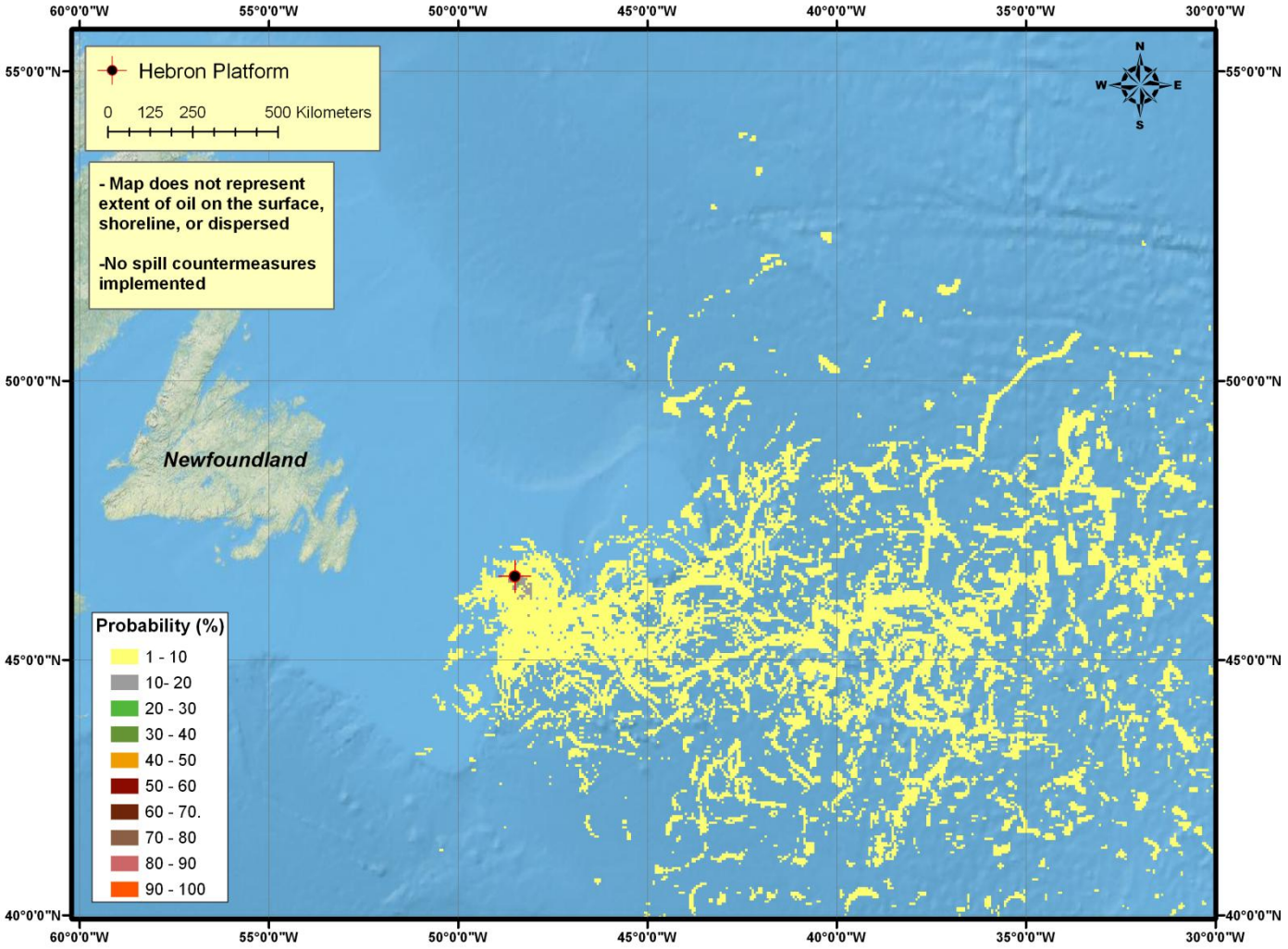


Figure 32. Entrained oil probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 120-day period during the winter.

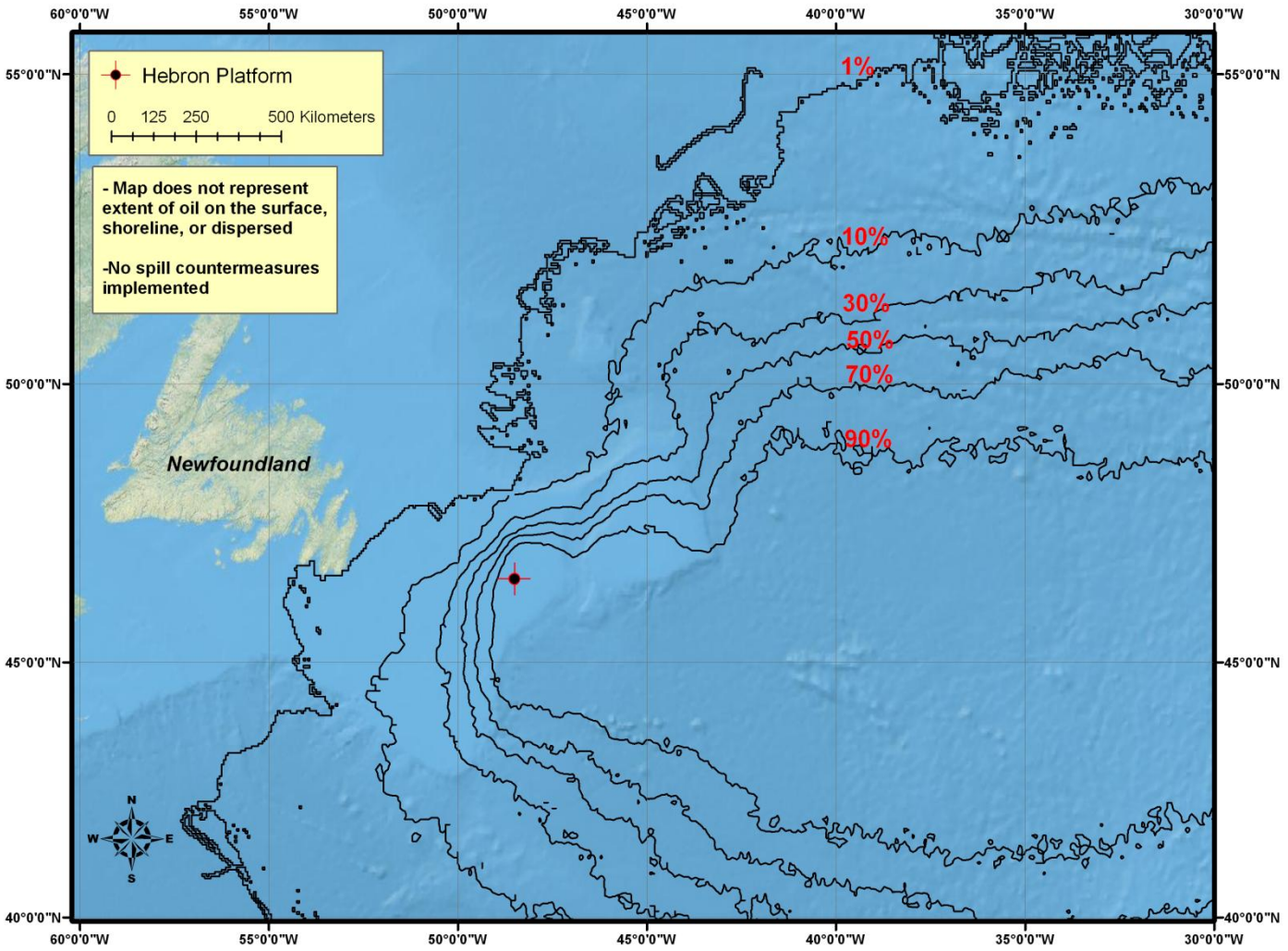


Figure 33. Surface oiling probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 120-day period during the winter with sea ice present.

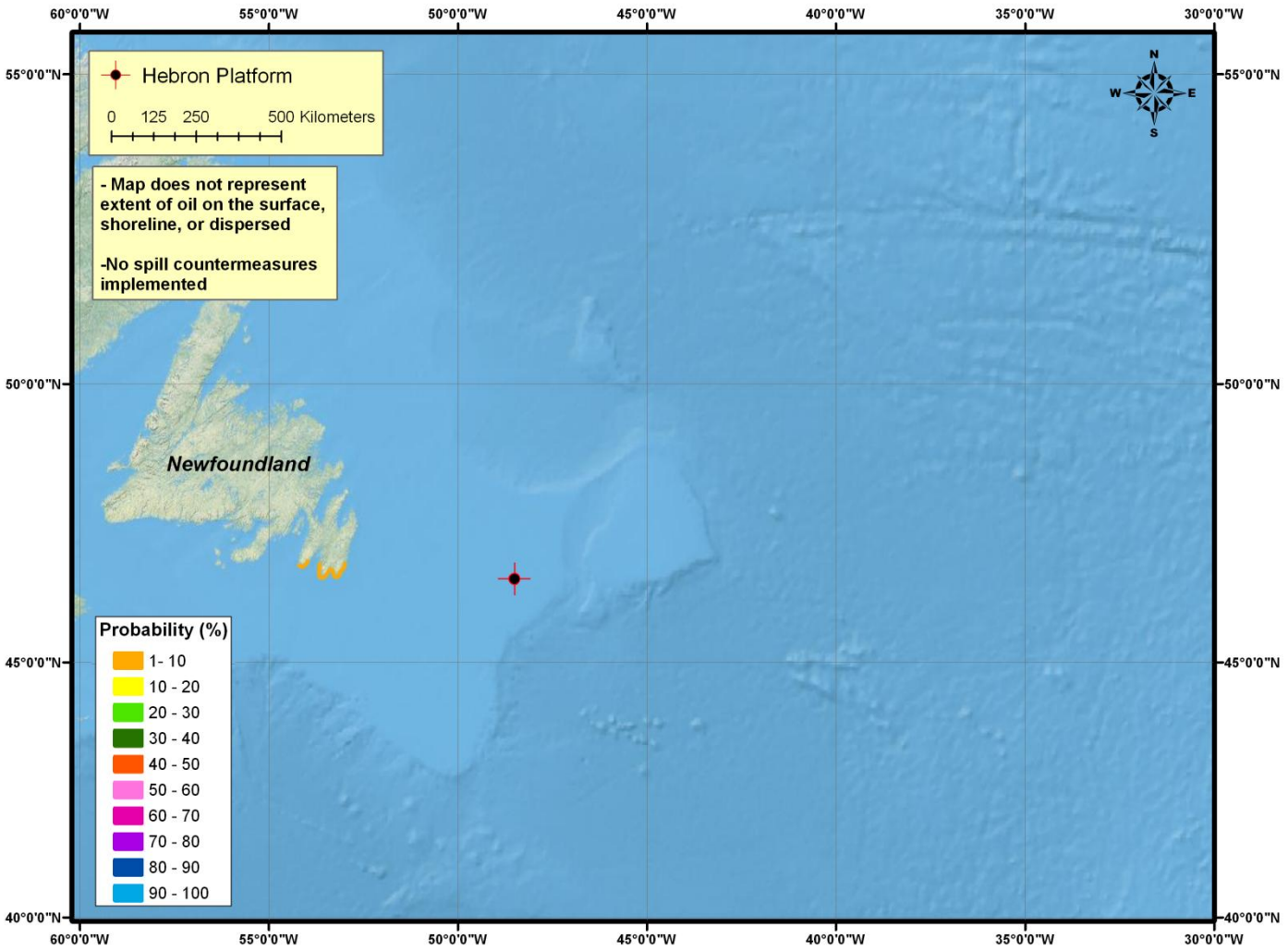


Figure 34. Shoreline oiling probabilities from a surface blow-out of 5,600 m^3/day of Hebron D-94 over a 120-day period during the winter with ice present.

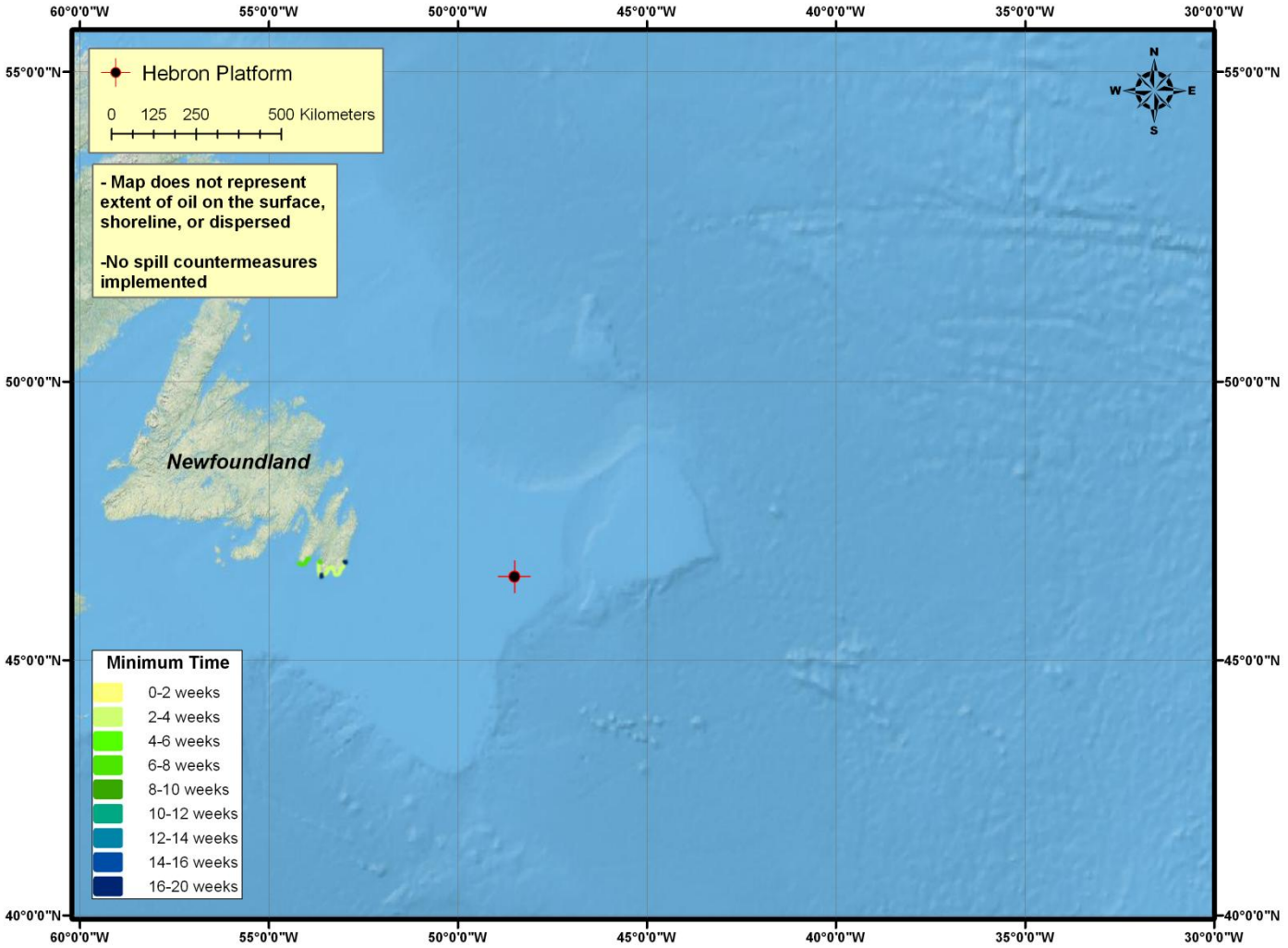


Figure 35. Minimum time to shoreline oiling from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 120-day period during the winter with sea ice present.

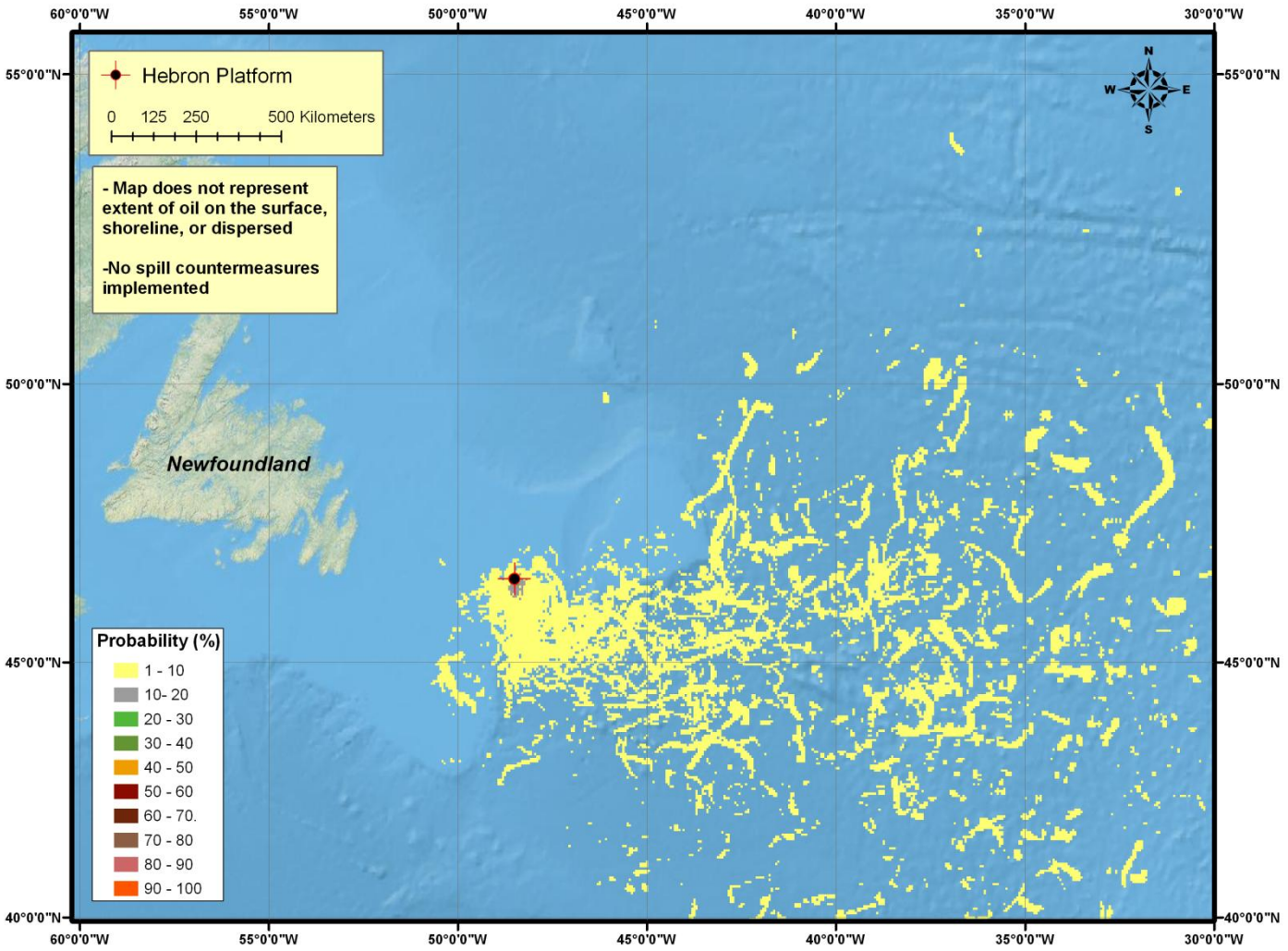


Figure 36. Entrained oil probabilities from a platform blow-out of 5,600 m^3/day of Hebron D-94 over a 120-day period during the winter with sea ice present.

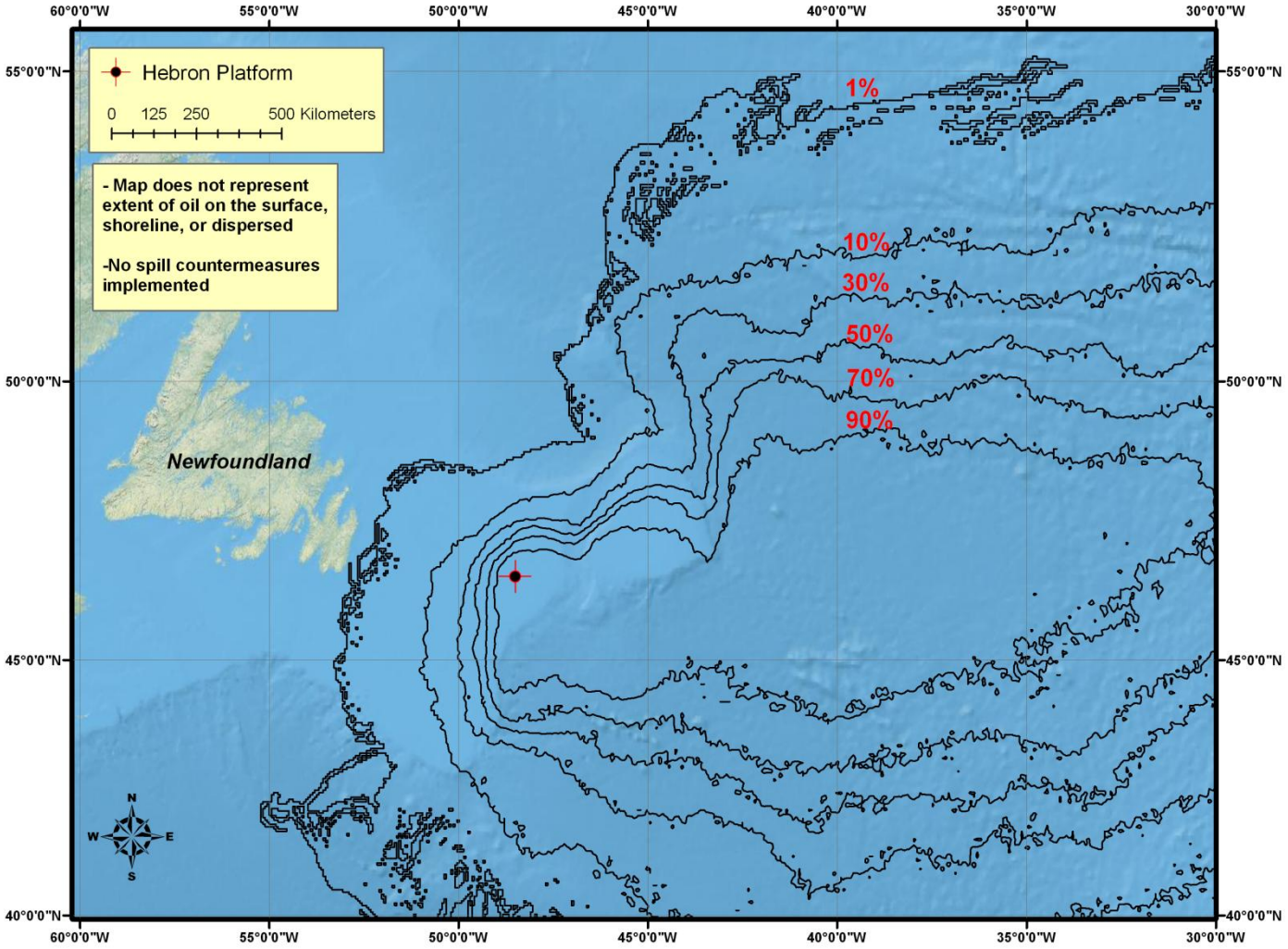


Figure 37. Surface oiling probabilities for a subsea blow-out of 3,200 m^3/day of Ben Nevis Well L55 oil over a 100-day period during the summer.

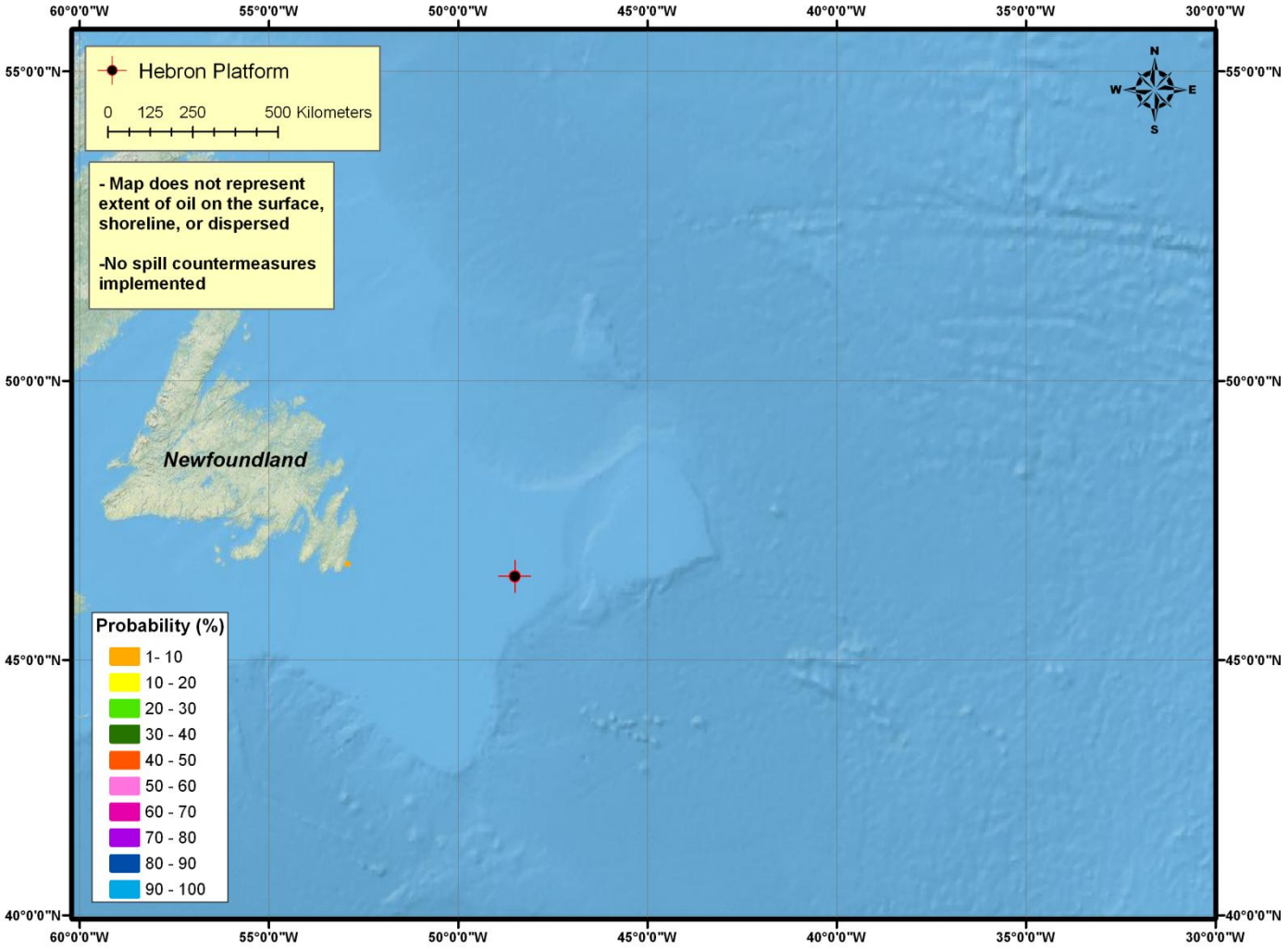


Figure 38. Shoreline oiling probabilities for a subsea blow-out of 3,200 m^3/day of Ben Nevis Well L55 oil over a 100-day period during the summer.

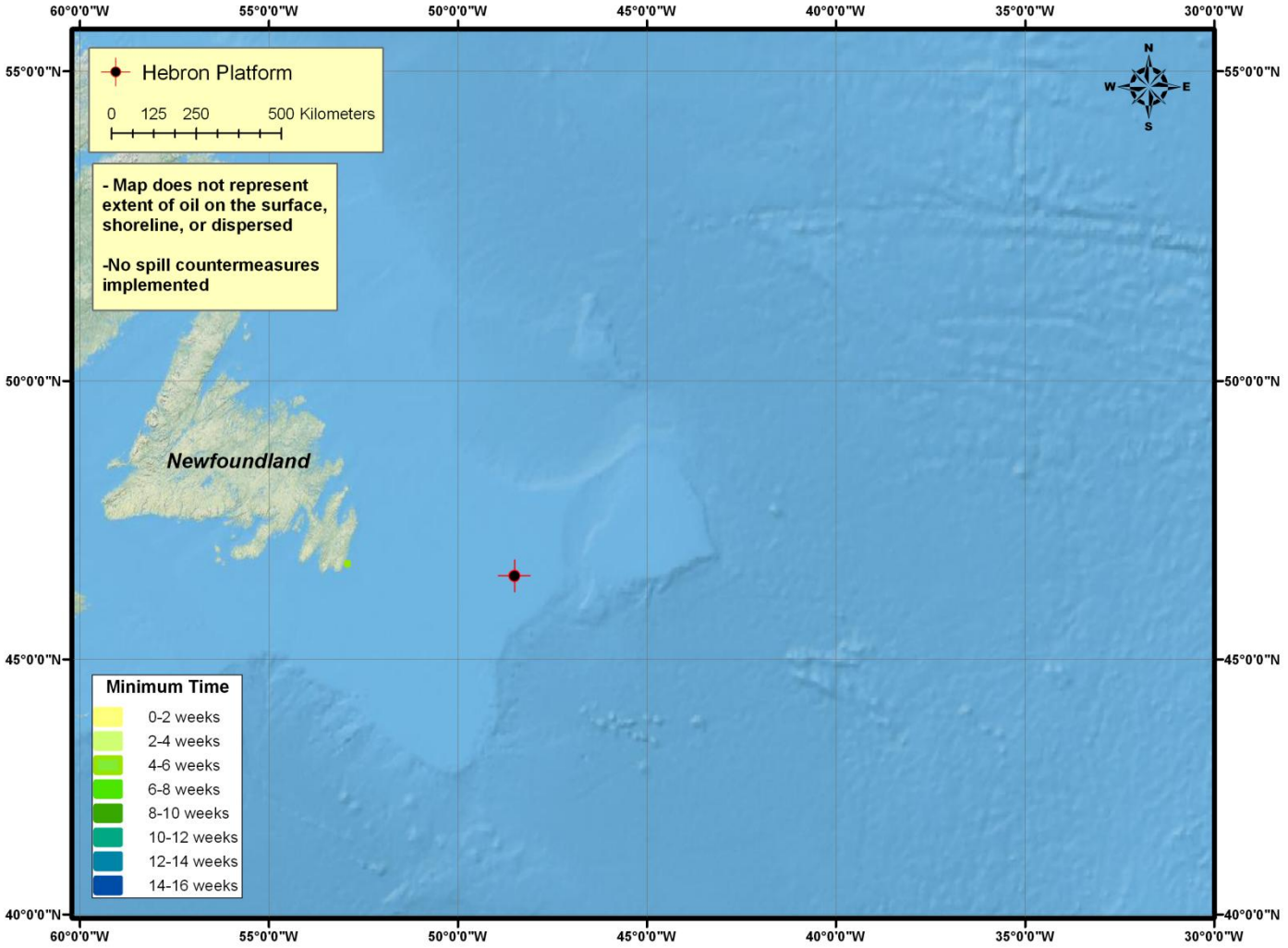


Figure 39. Minimum time to shoreline oiling from a subsea blow-out of 3,200 m^3/day of Ben Nevis Well L55 oil over a 100-day period during the summer.

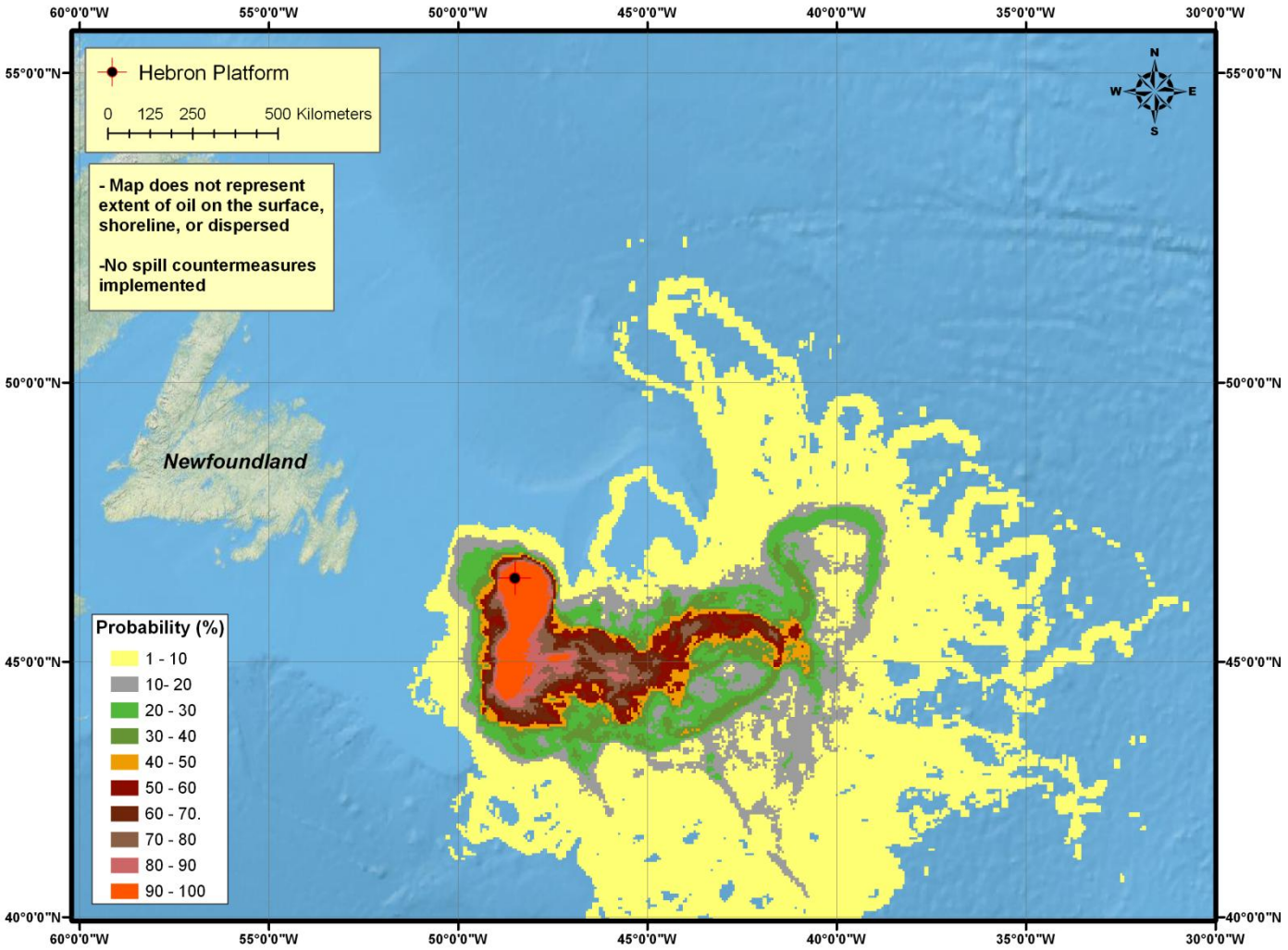


Figure 40. Entrained oil probabilities for a subsea blow-out of 3,200 m^3/day of Ben Nevis Well L55 oil over a 100-day period during the summer.

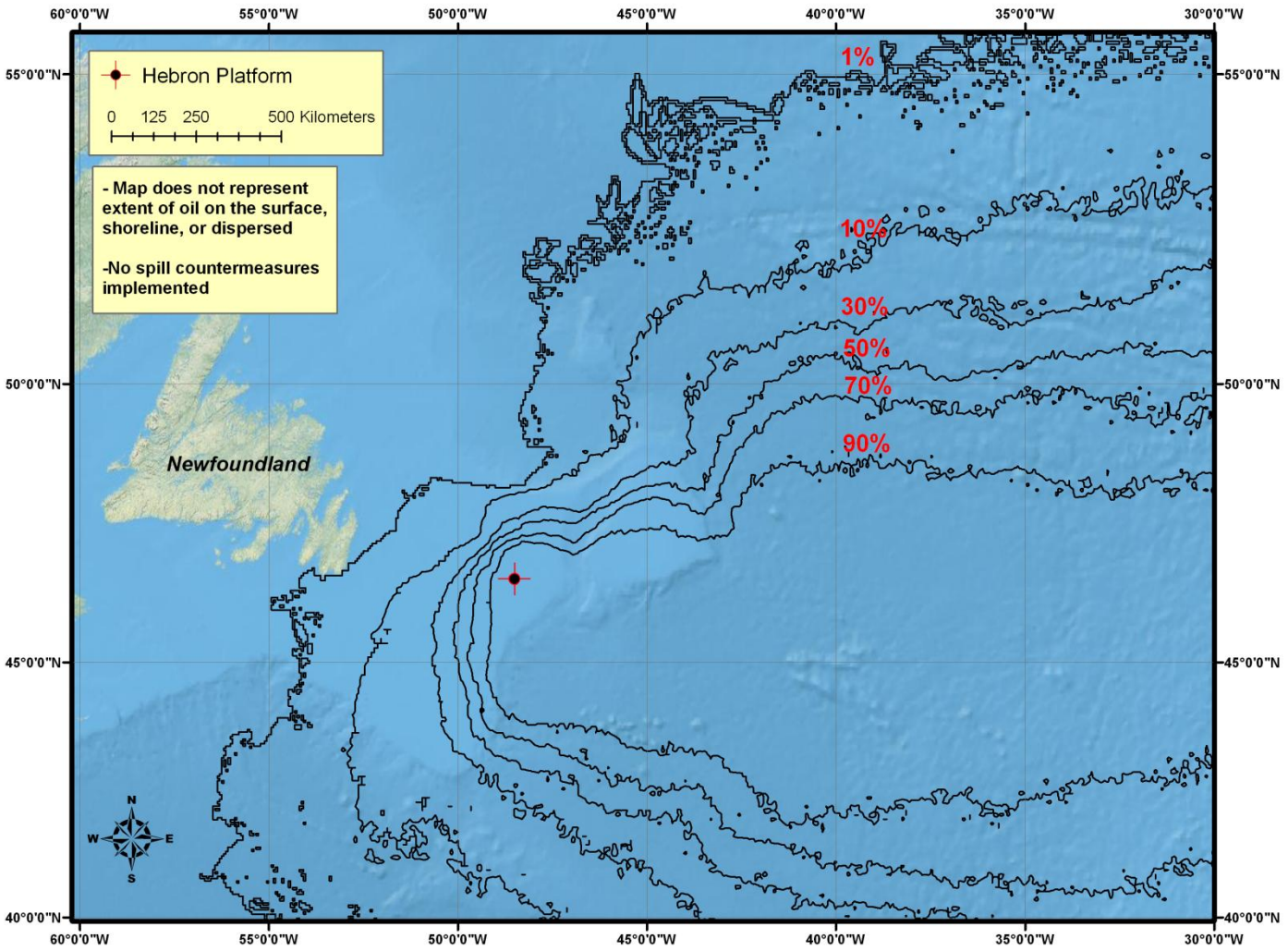


Figure 41. Surface oiling probabilities for a subsea blow-out of 3,200 m^3/day of Ben Nevis Well L55 oil over a 120-day period during the winter.

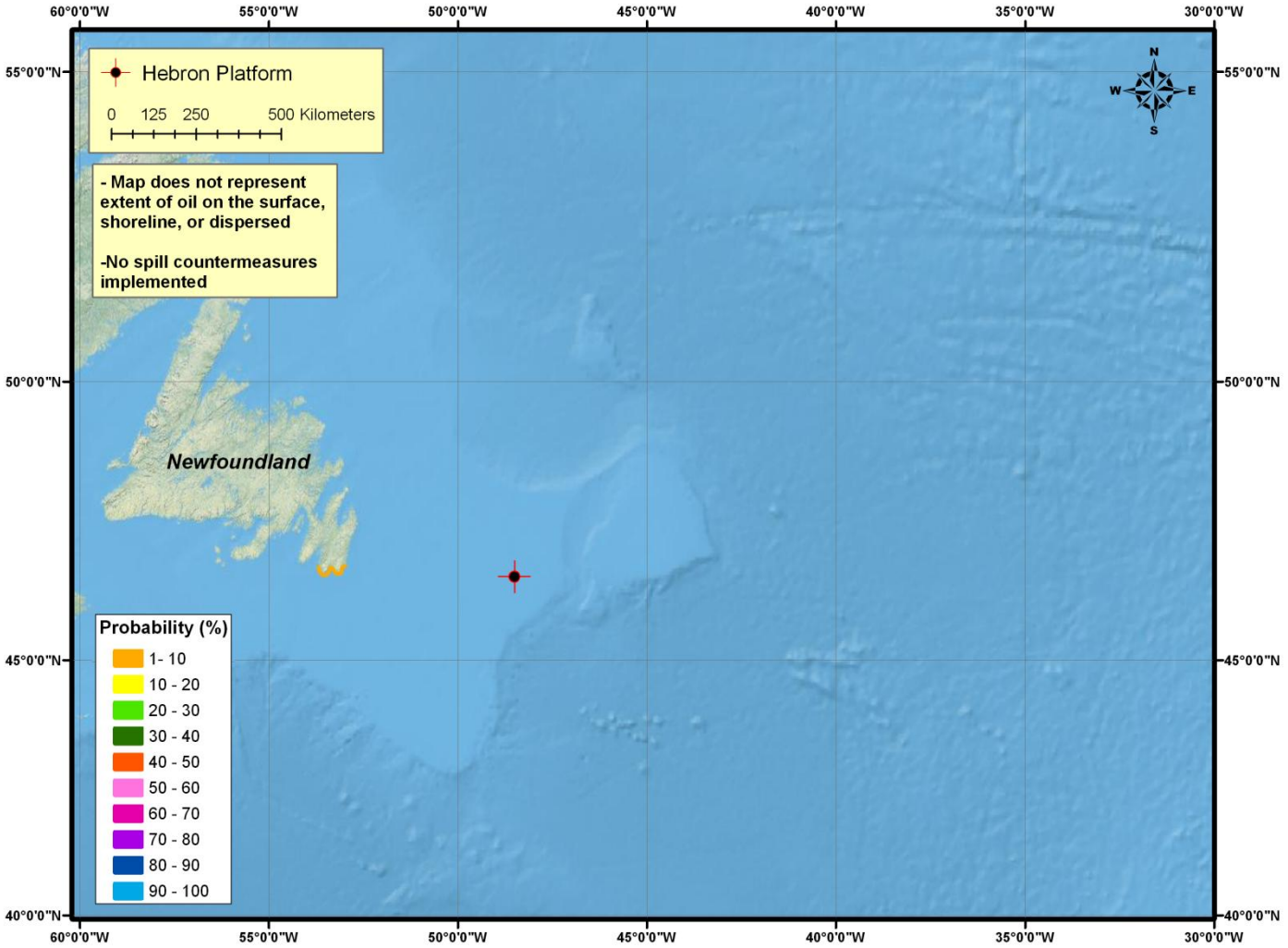


Figure 42. Shoreline oiling probabilities for a subsea blow-out of 3,200 m^3/day of Ben Nevis Well L55 oil over a 120-day period during the winter.

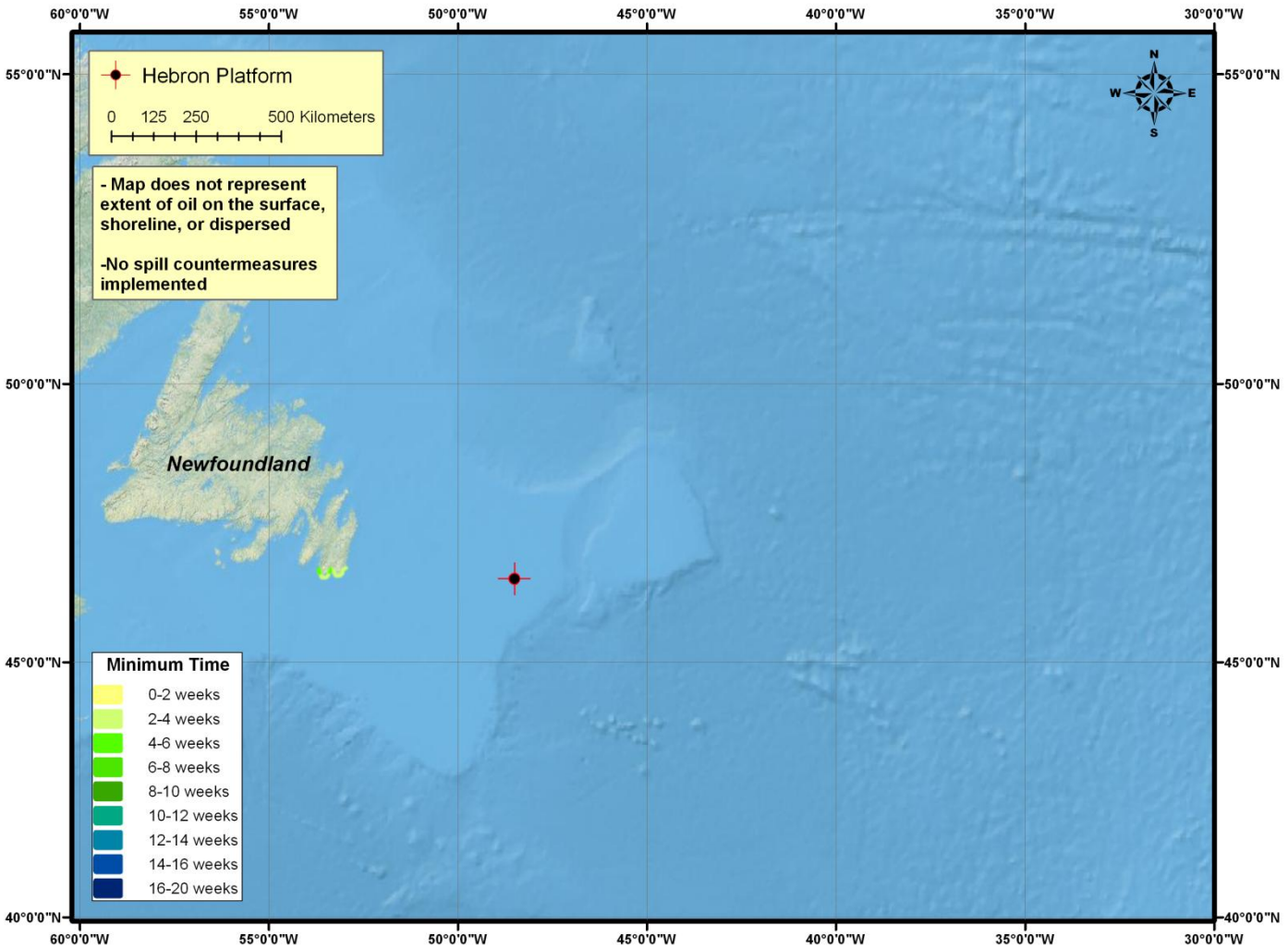


Figure 43. Minimum time to shoreline oiling from a subsea blow-out of 3,200 m^3/day of Ben Nevis Well L55 oil over a 120-day period during the winter.

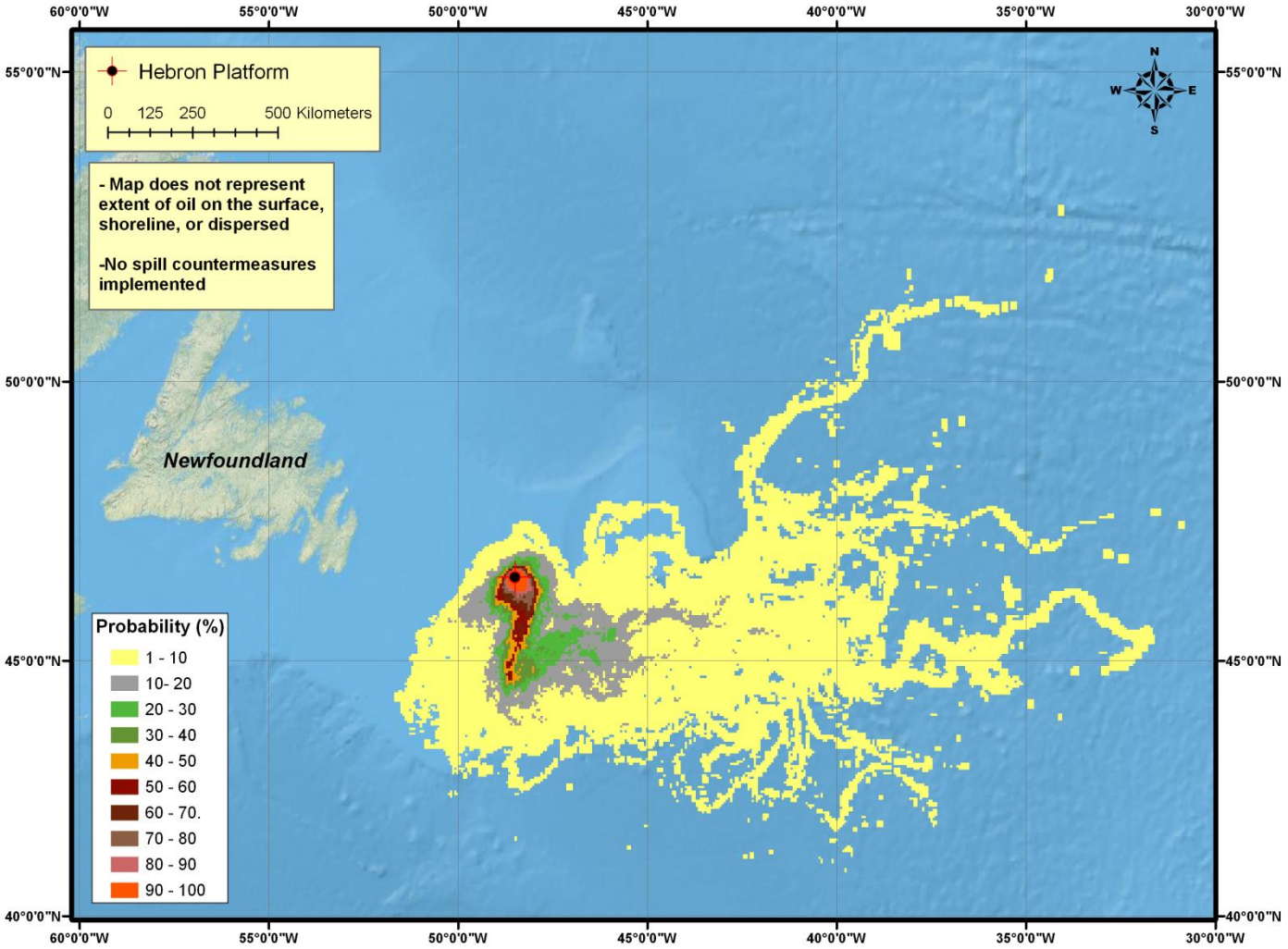


Figure 44. Entrained oil probabilities for a subsea blow-out of 3,200 m^3/day of Ben Nevis Well L55 oil over a 120-day period during the winter.

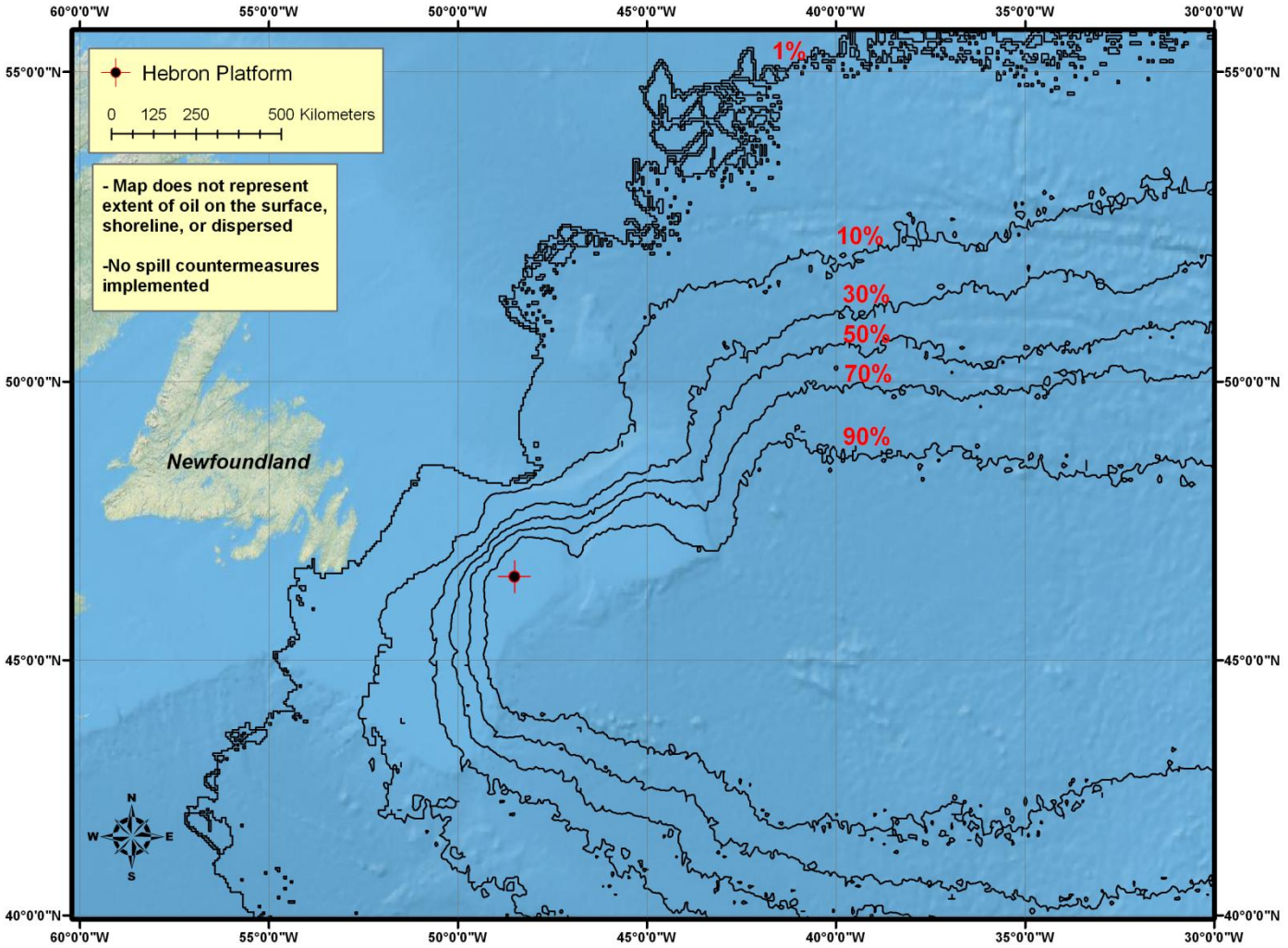


Figure 45. Surface oiling probabilities for a subsea blow-out of 3,200 m^3/day of Ben Nevis Well L55 oil over a 120-day period during the winter with ice present.

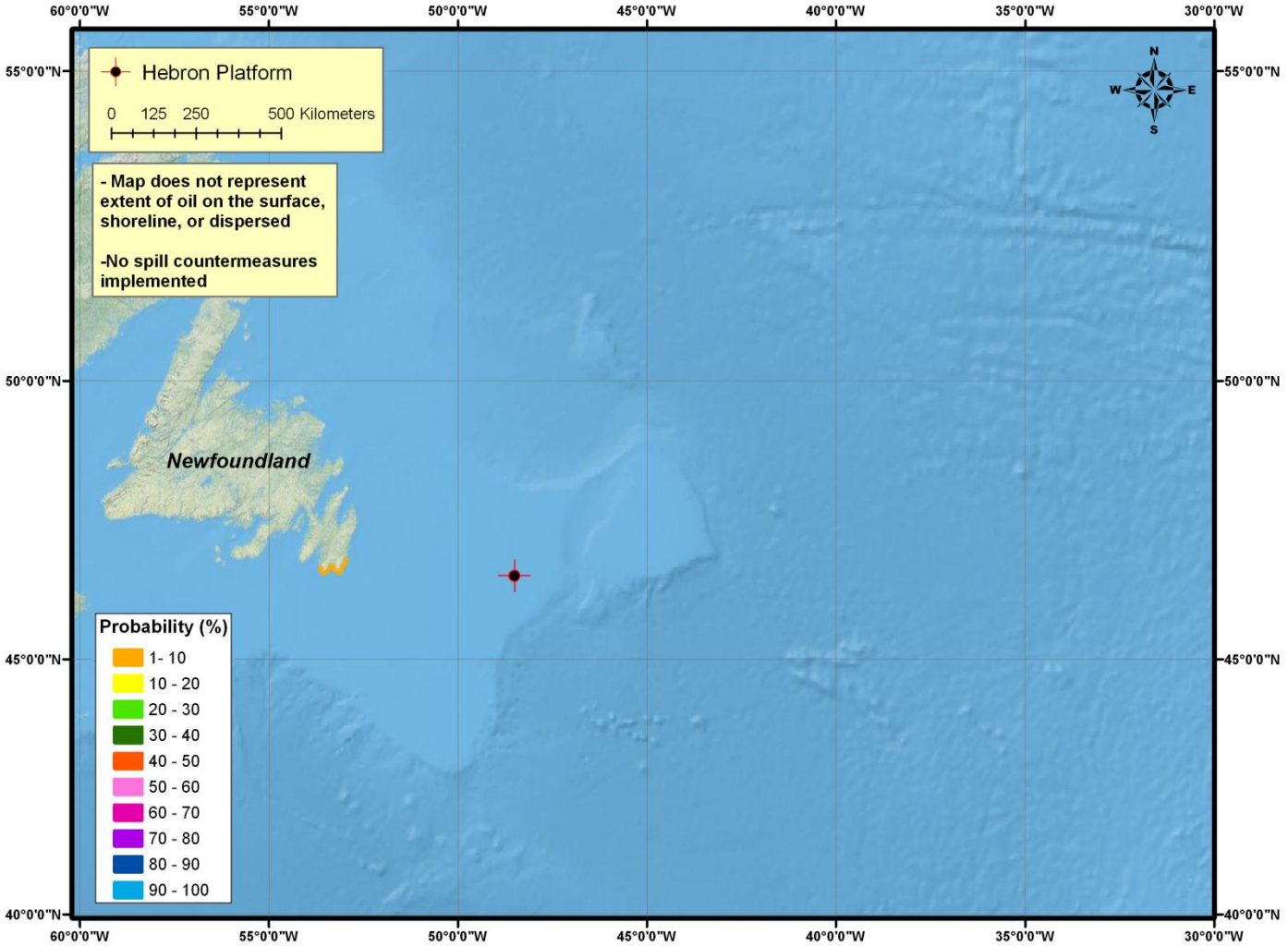


Figure 46. Shoreline oiling probabilities for a subsea blow-out of 3,200 m^3/day of Ben Nevis Well L55 oil over a 120-day period during the winter with ice present.

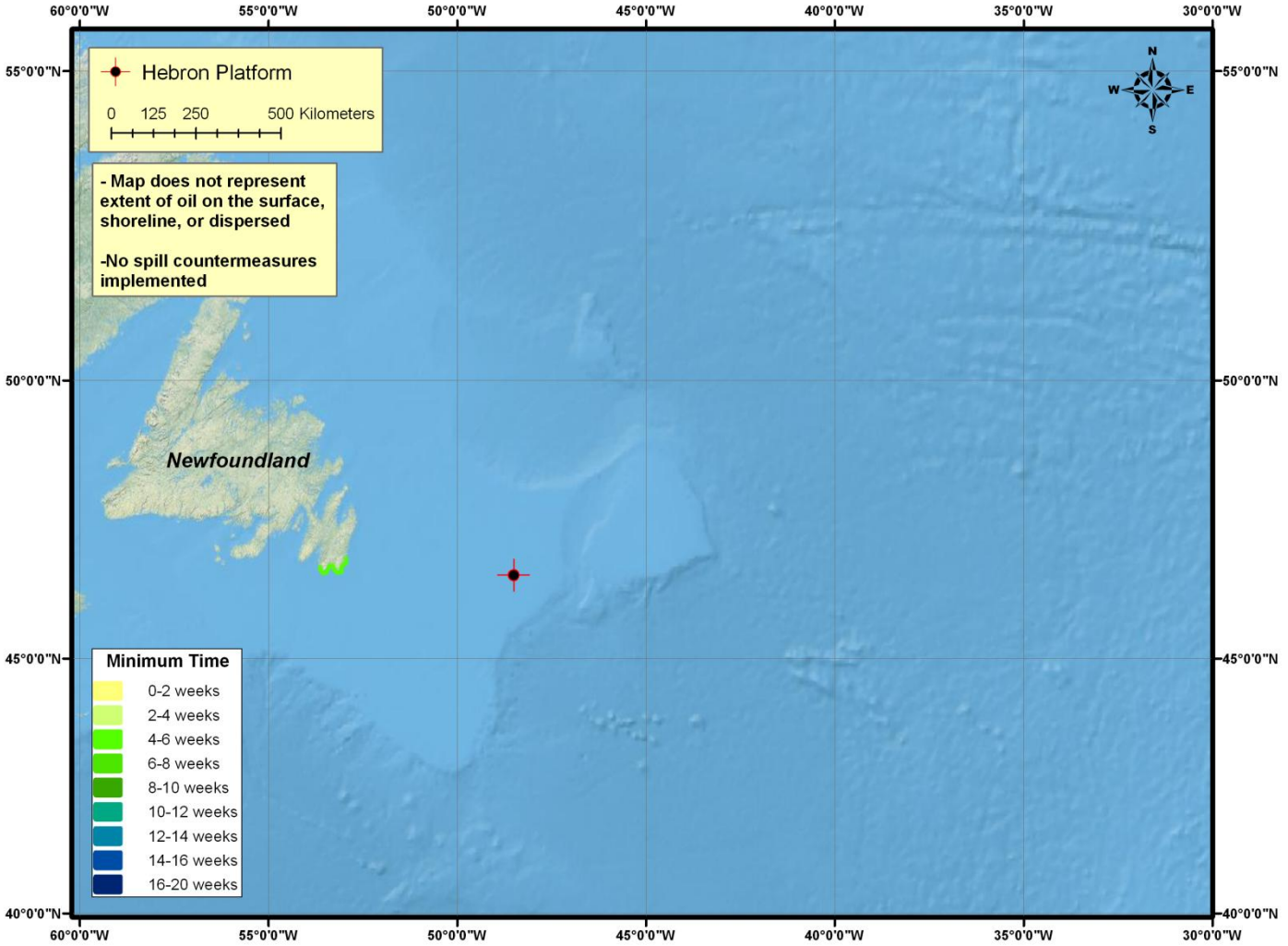


Figure 47. Minimum time to shoreline oiling from a subsea blow-out of 3,200 m^3/day of Ben Nevis Well L55 oil over a 120-day period during the winter with ice present.

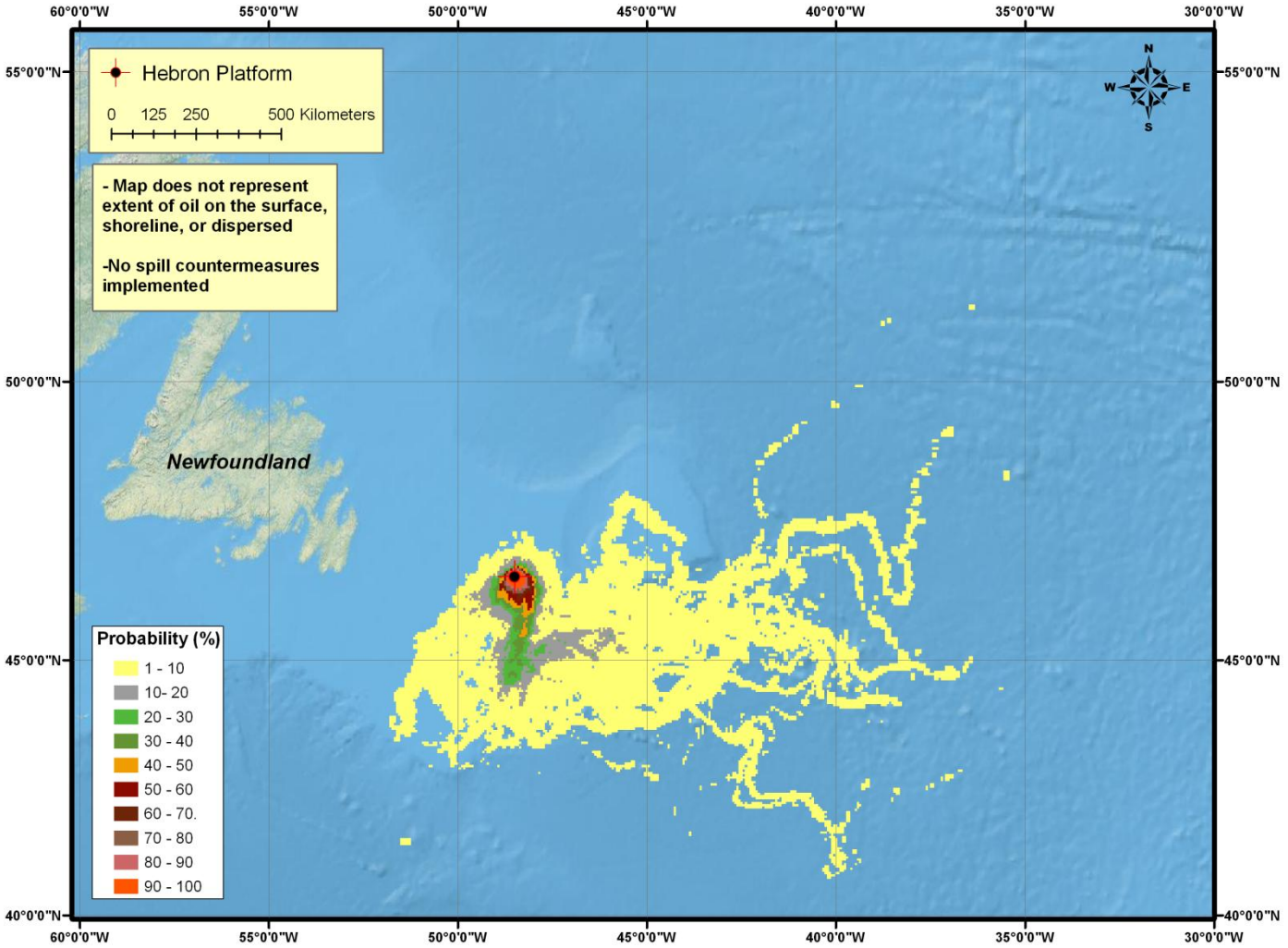


Figure 48. Entrained oil probabilities for a subsea blow-out of 3,200 m^3/day of Ben Nevis Well L55 oil over a 120-day period during the winter with ice present.

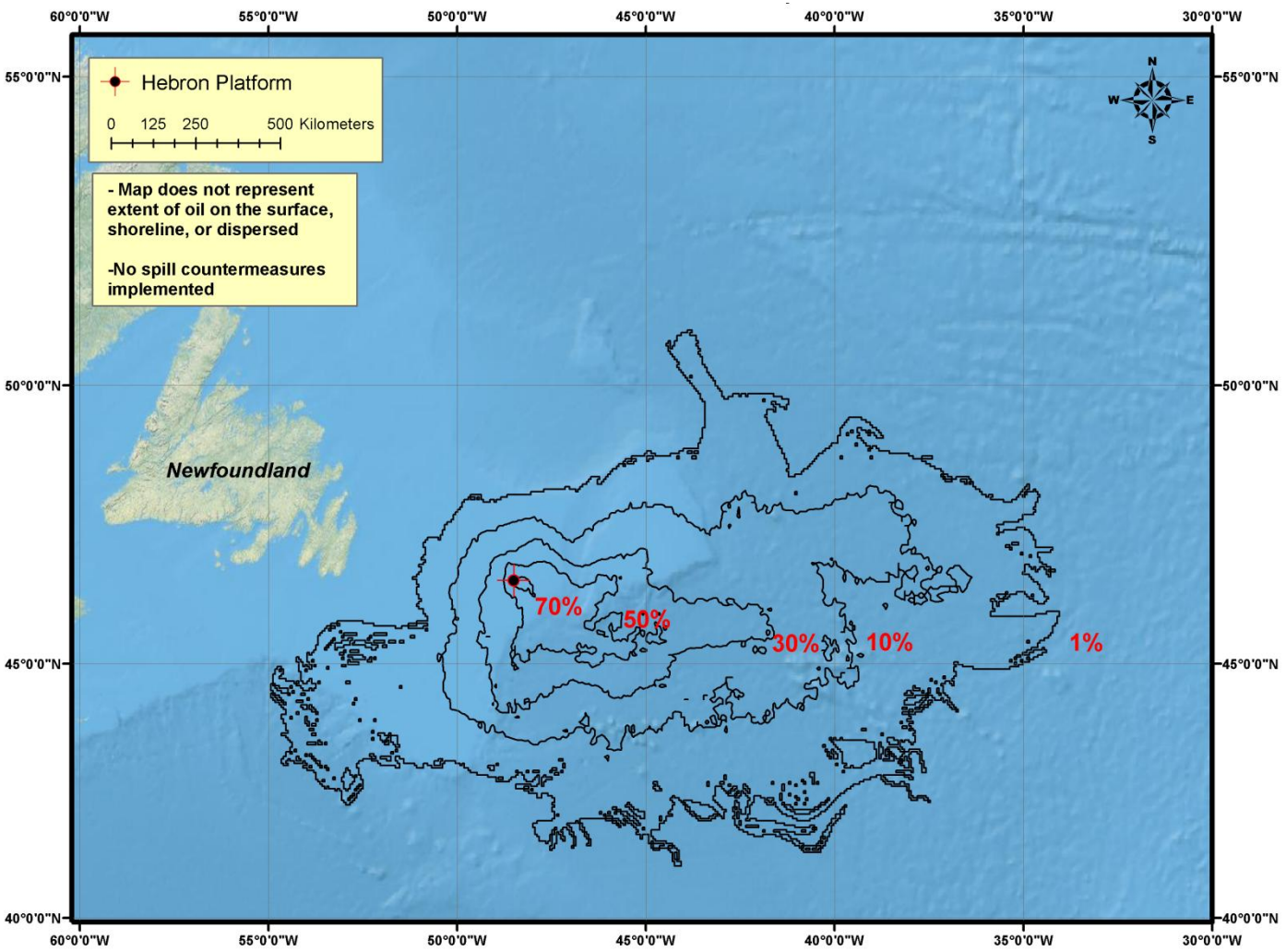


Figure 49. Surface oiling probabilities for a batch transfer release of 800 m^3 of diesel fuel oil during the summer.

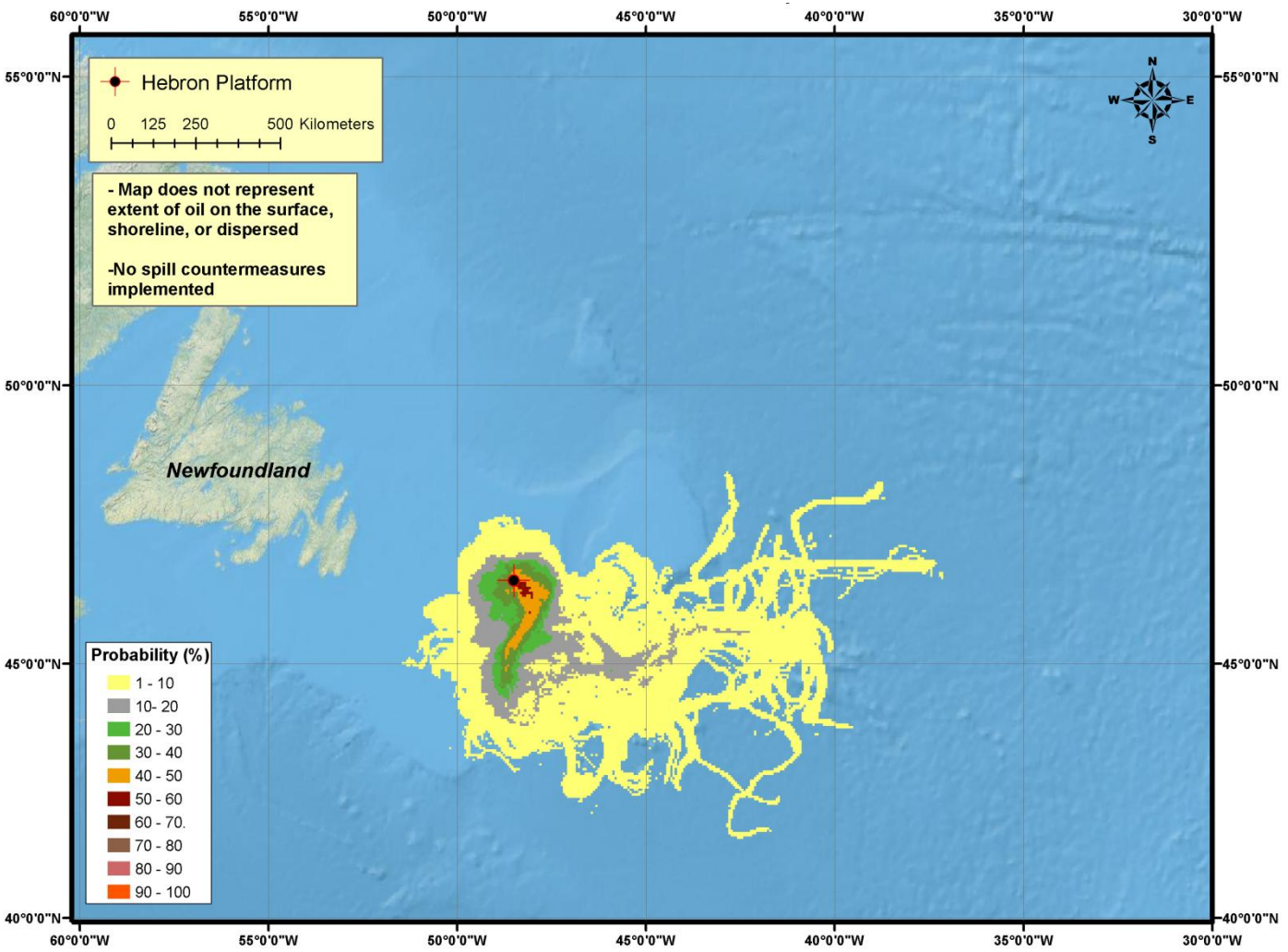


Figure 50. Entrained oil probabilities for a batch transfer release of 800 m^3 of diesel fuel oil during the summer.

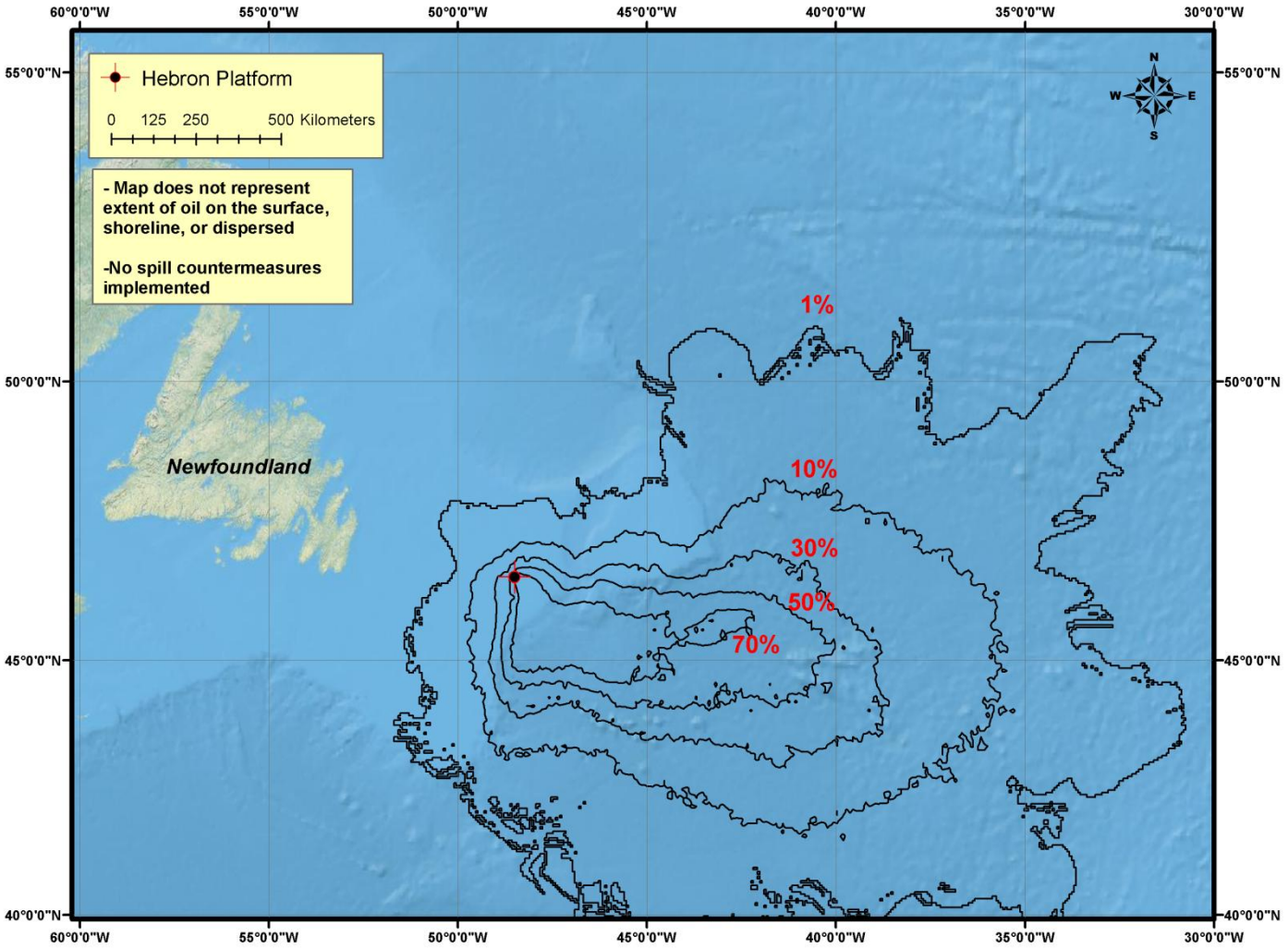


Figure 51. Surface oiling probabilities for a batch transfer release of 800 m^3 of diesel fuel oil during the winter.

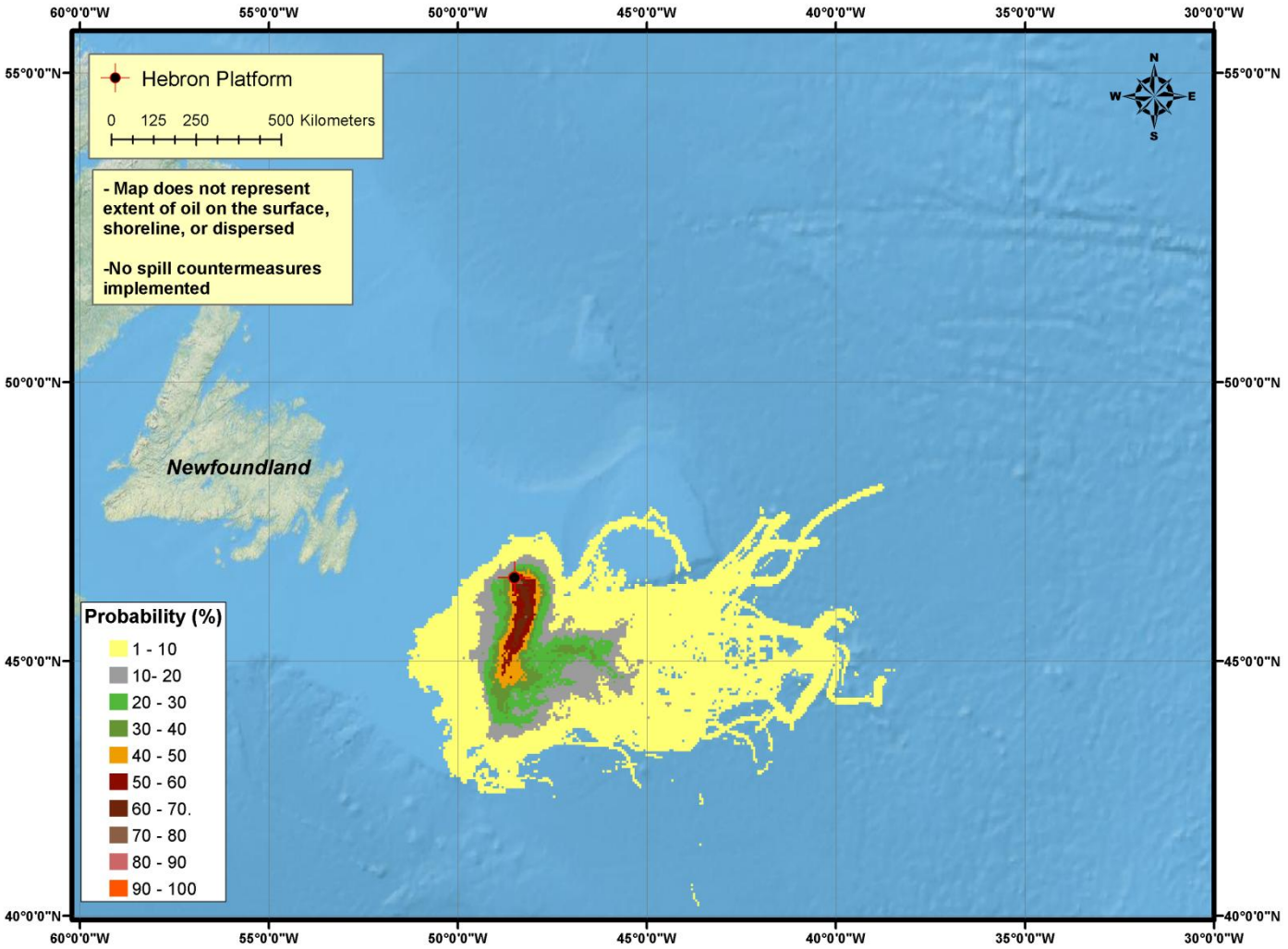


Figure 52. Entrained oil probabilities for a batch transfer release of 800 m^3 of diesel fuel oil during the winter.

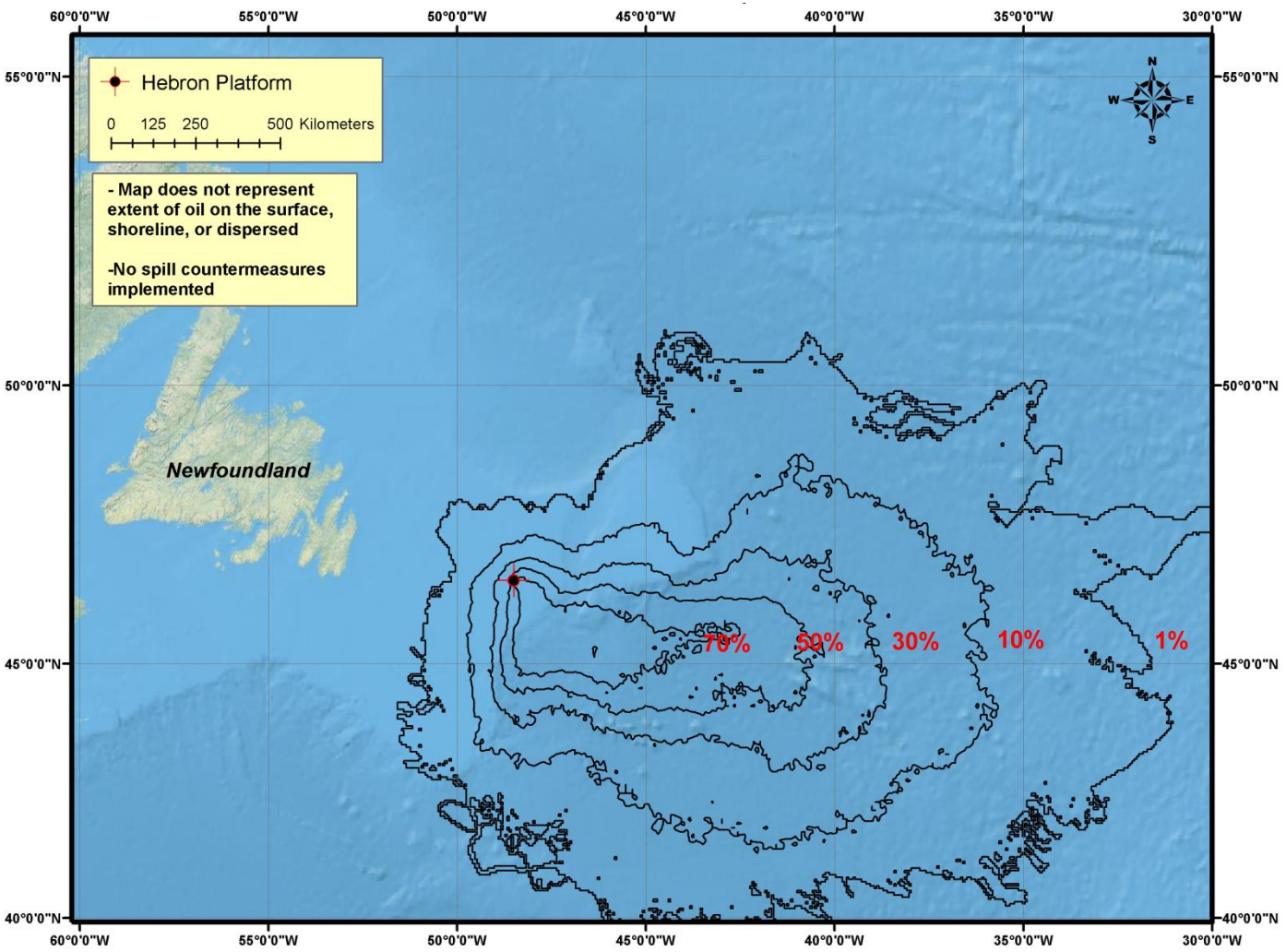


Figure 53. Surface oiling probabilities for a batch transfer release of 800 m^3 of diesel fuel oil during the winter with ice present.

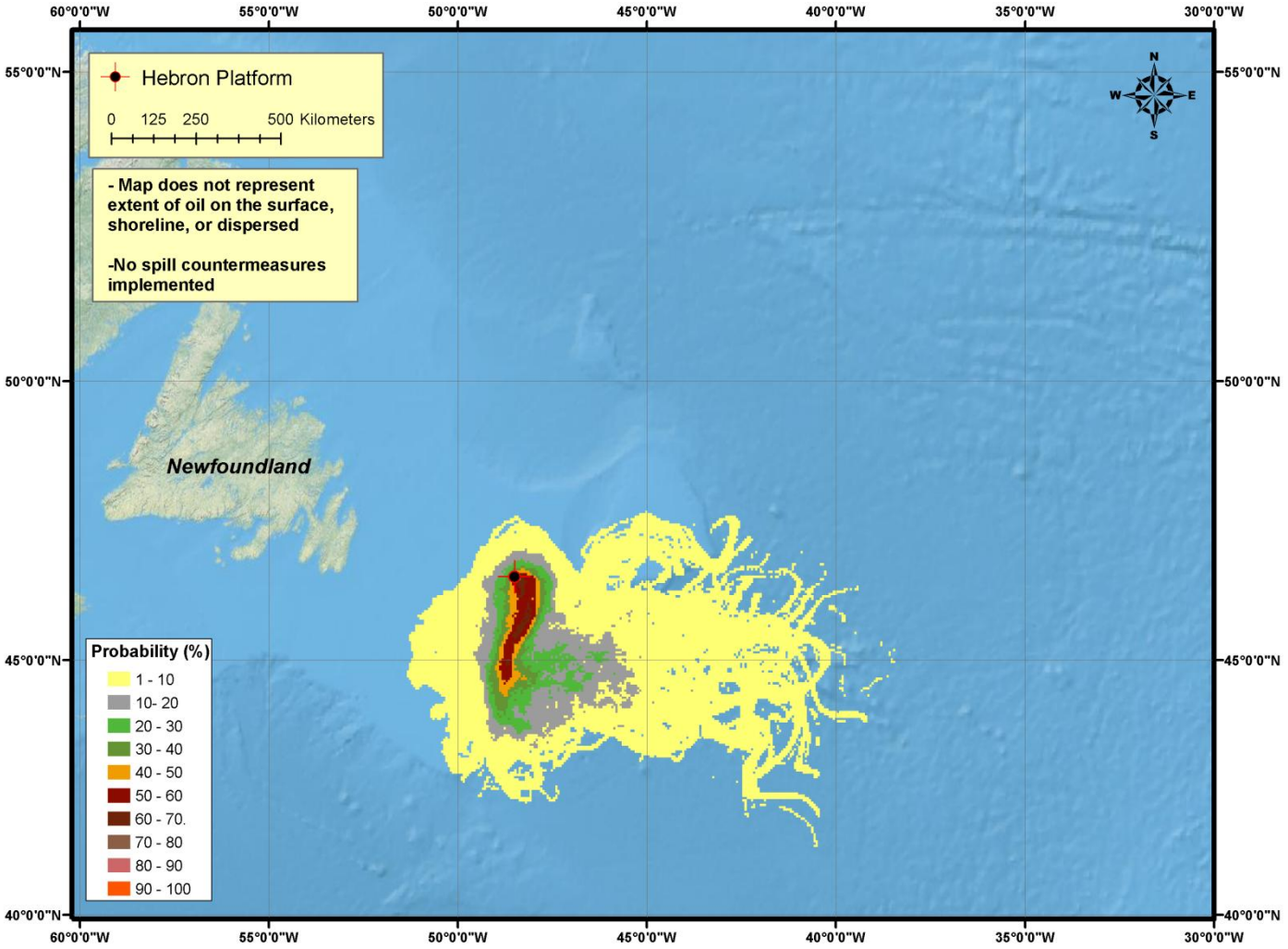


Figure 54. Entrained oil probabilities for a batch transfer release of 800 m^3 of diesel fuel oil during the winter with ice present.

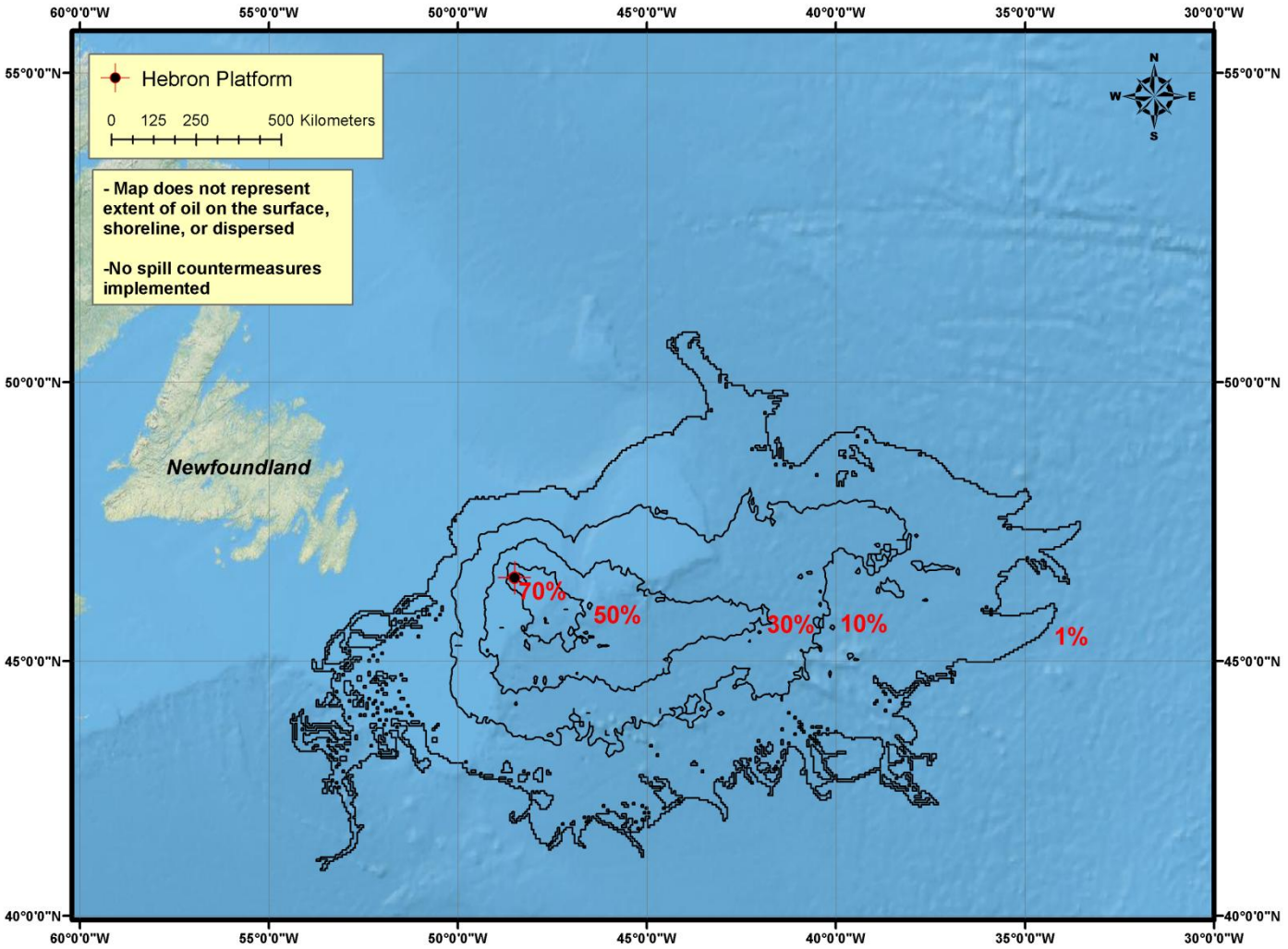


Figure 55. Surface oiling probabilities for a batch OLS transfer release of 5,000 m^3 of crude oil during the summer.

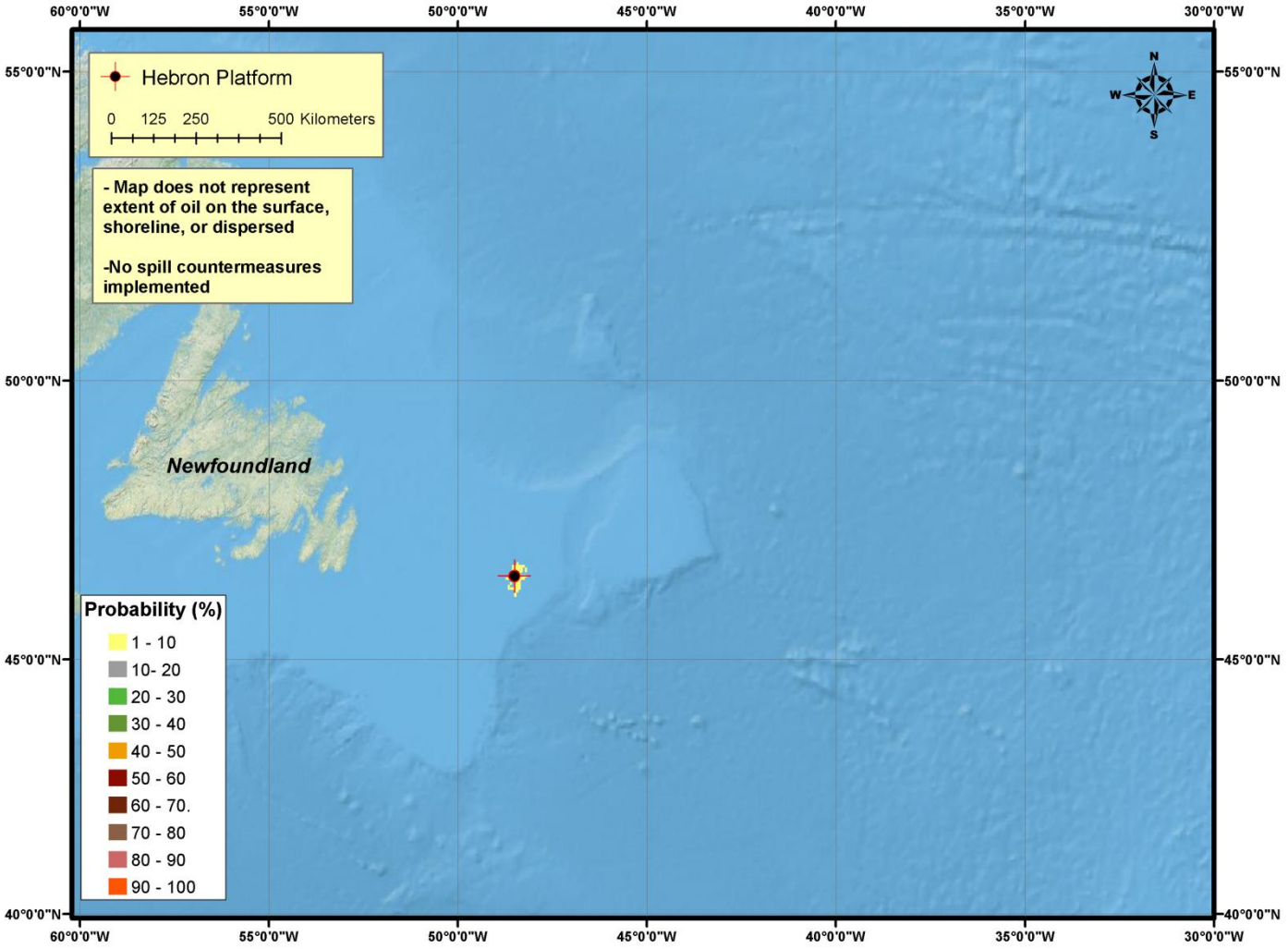


Figure 56. Entrained oil probabilities for a batch OLS transfer release of 5,000 m^3 of crude oil during the summer.

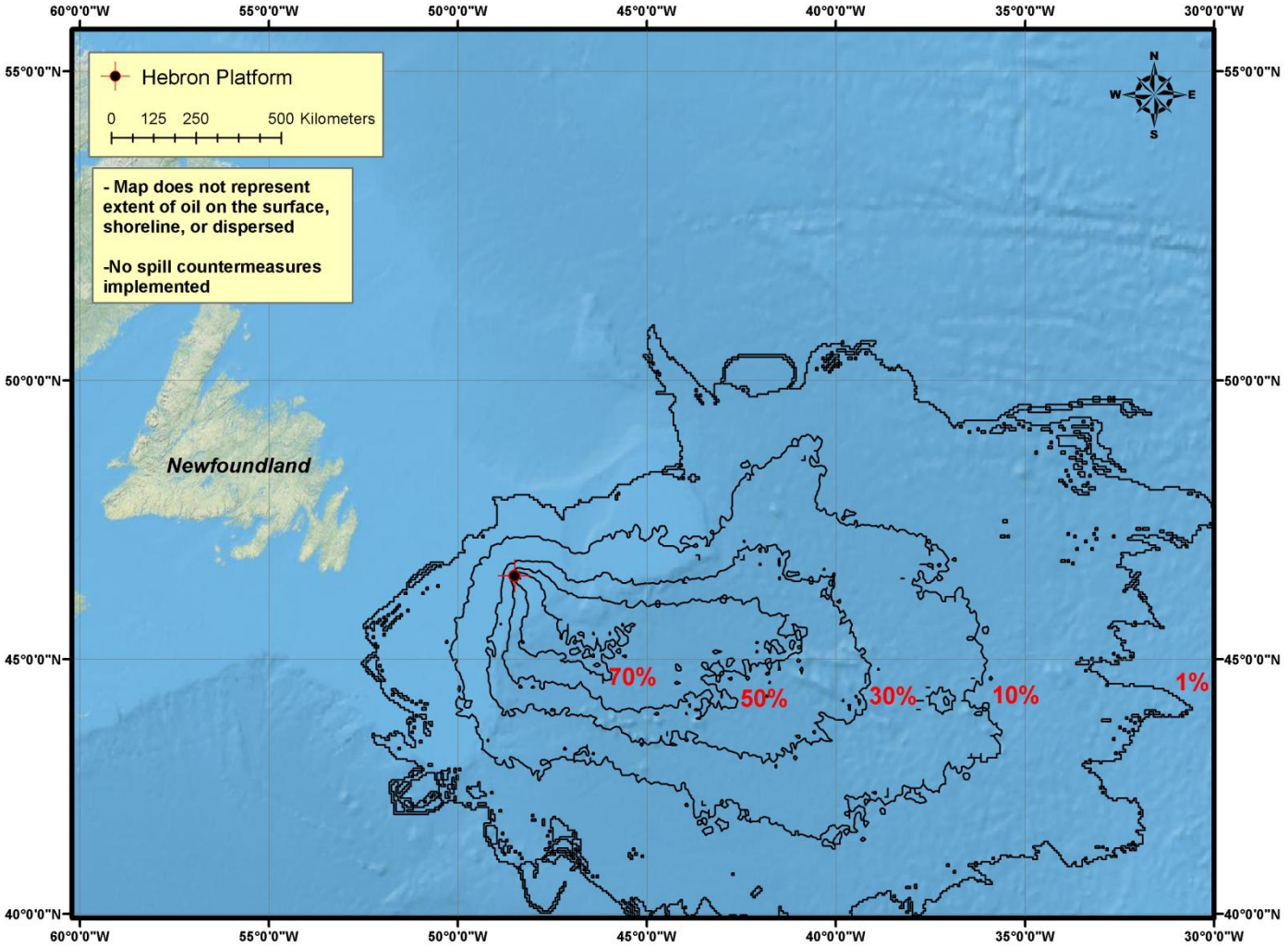


Figure 57. Surface oiling probabilities for a batch OLS transfer release of 5,000 m^3 of crude oil during the winter.

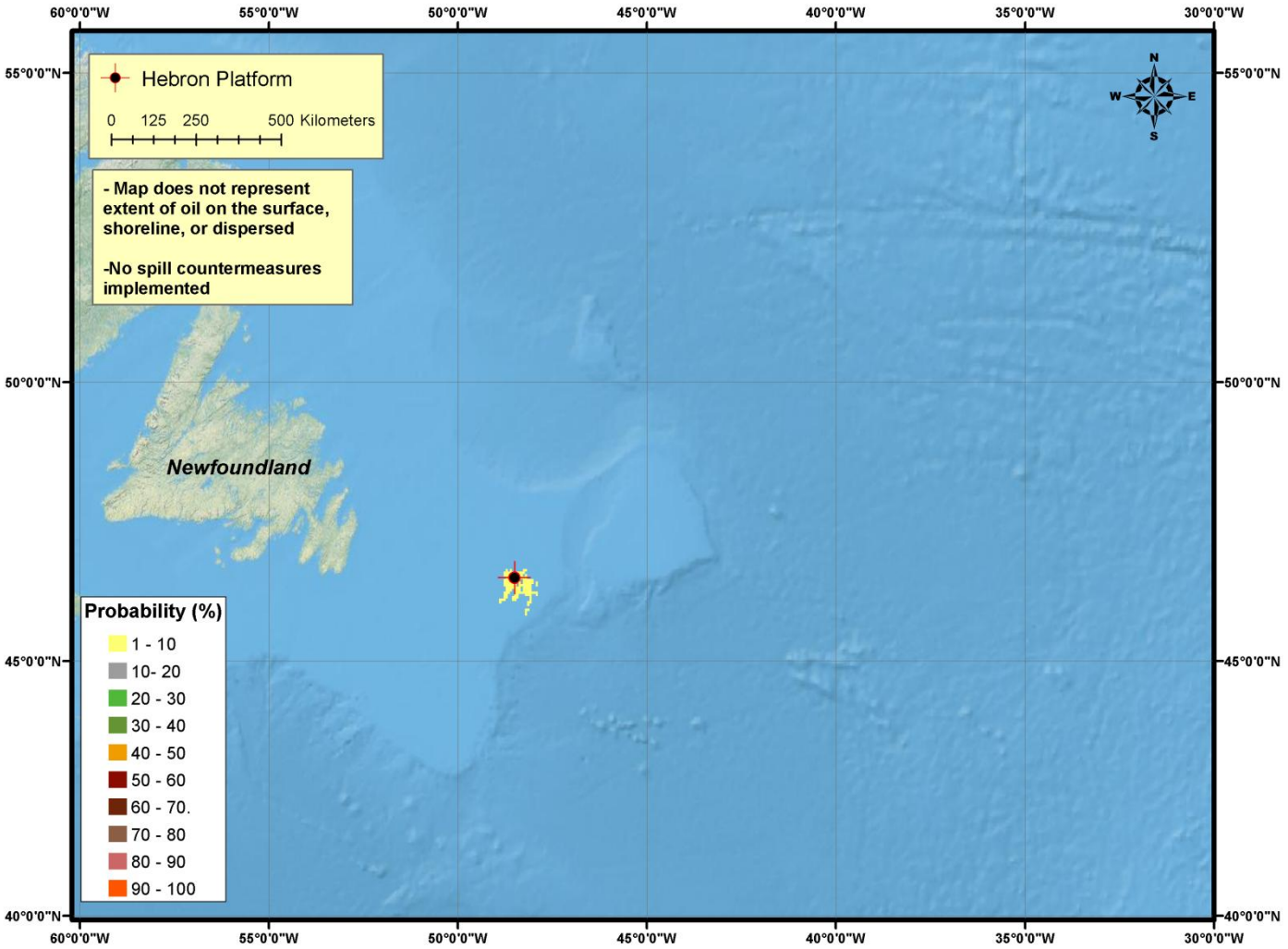


Figure 58. Entrained oil probabilities for a batch OLS transfer release of 5,000 m^3 of crude oil during the winter.

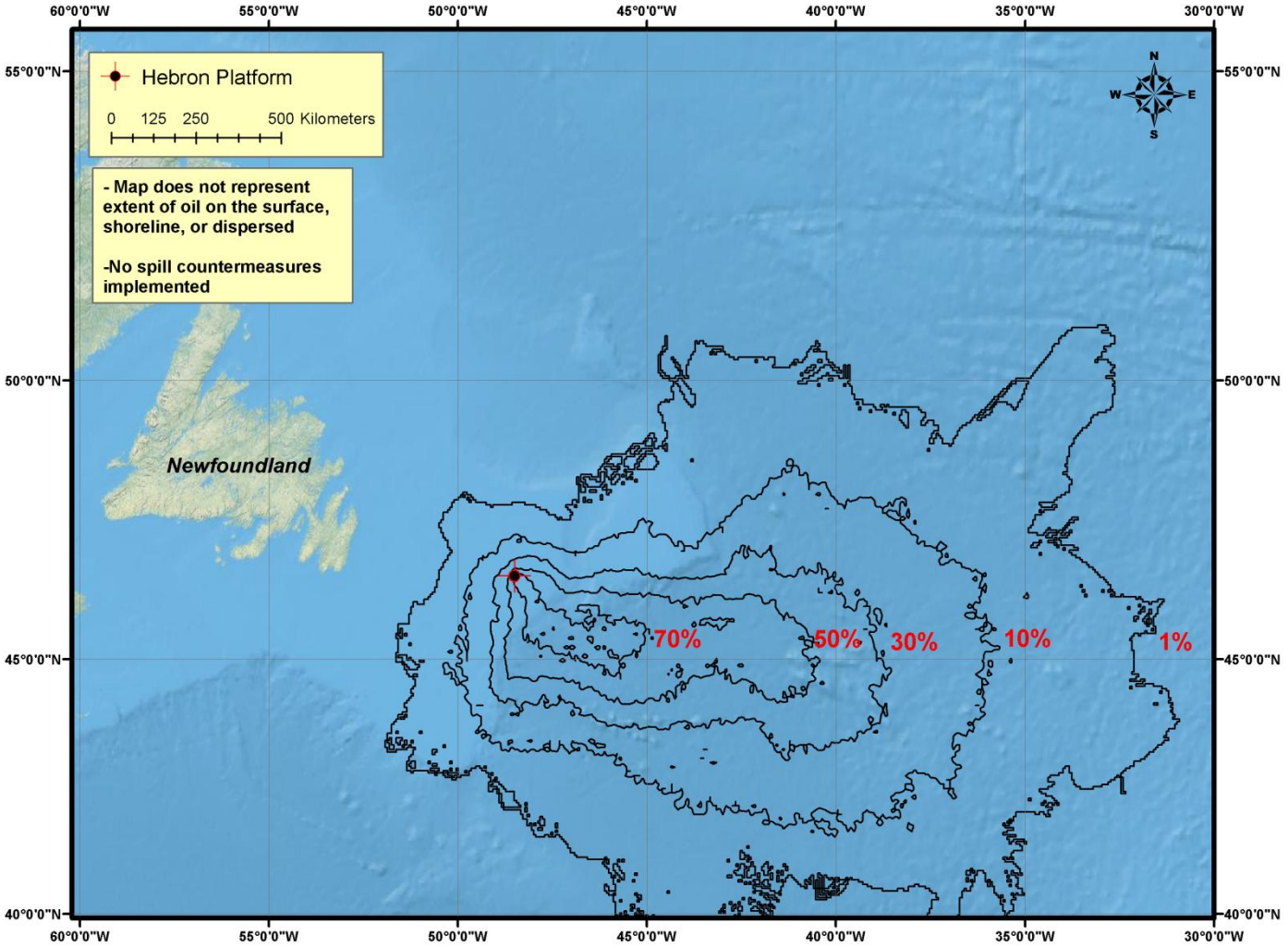


Figure 59. Surface oiling probabilities for a batch OLS transfer release of 5,000 m^3 of crude oil during the winter with ice present.

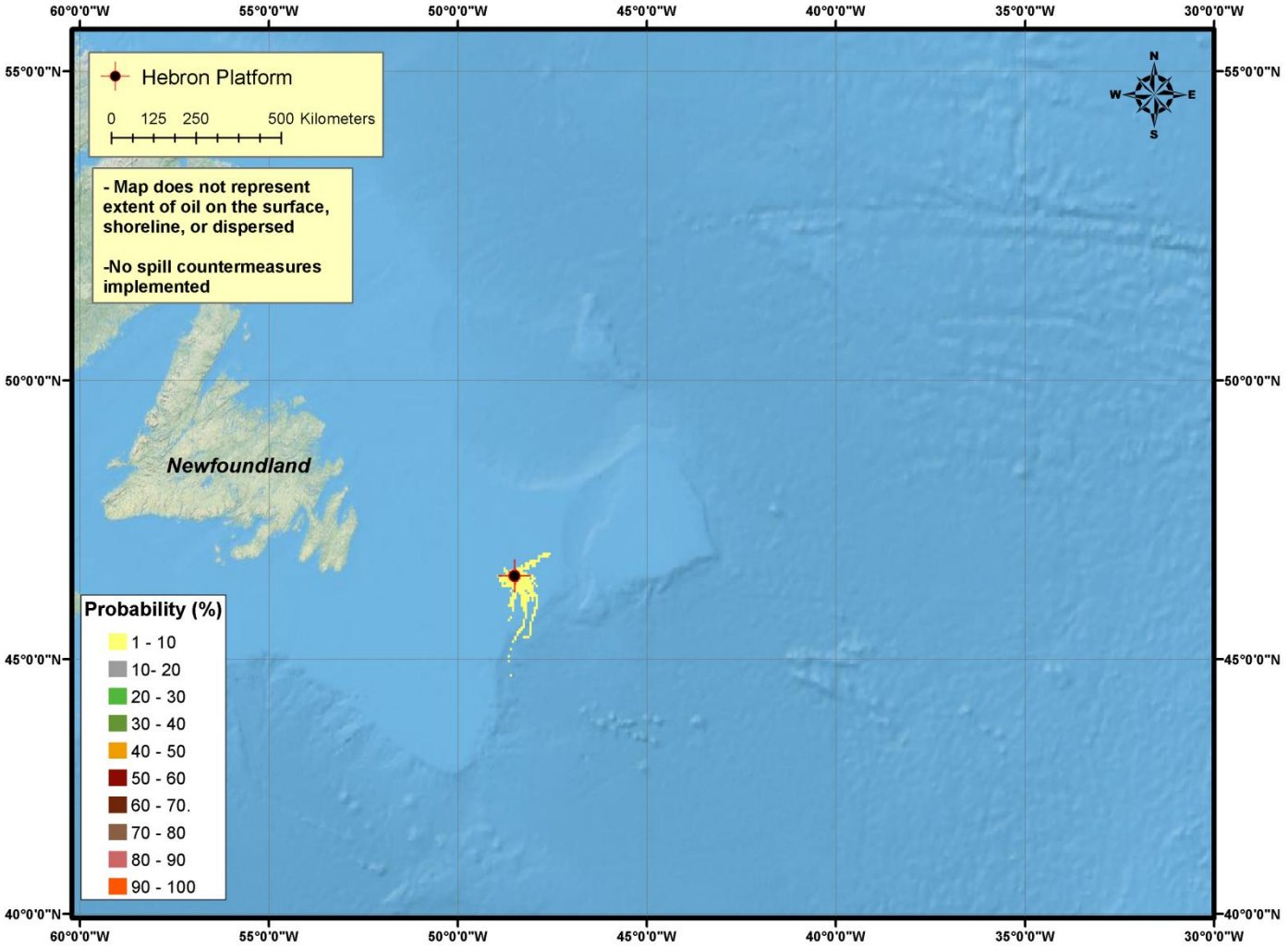


Figure 60. Entrained oil probabilities for a batch OLS transfer release of 5,000 m^3 of crude oil during the winter with ice present.