Climate Change and Vermont's Future Ecosystems -- Stationary is Dead

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Vermont Vulnerability Assessment Workshop

The Vermont Statehouse, Montpelier, VT

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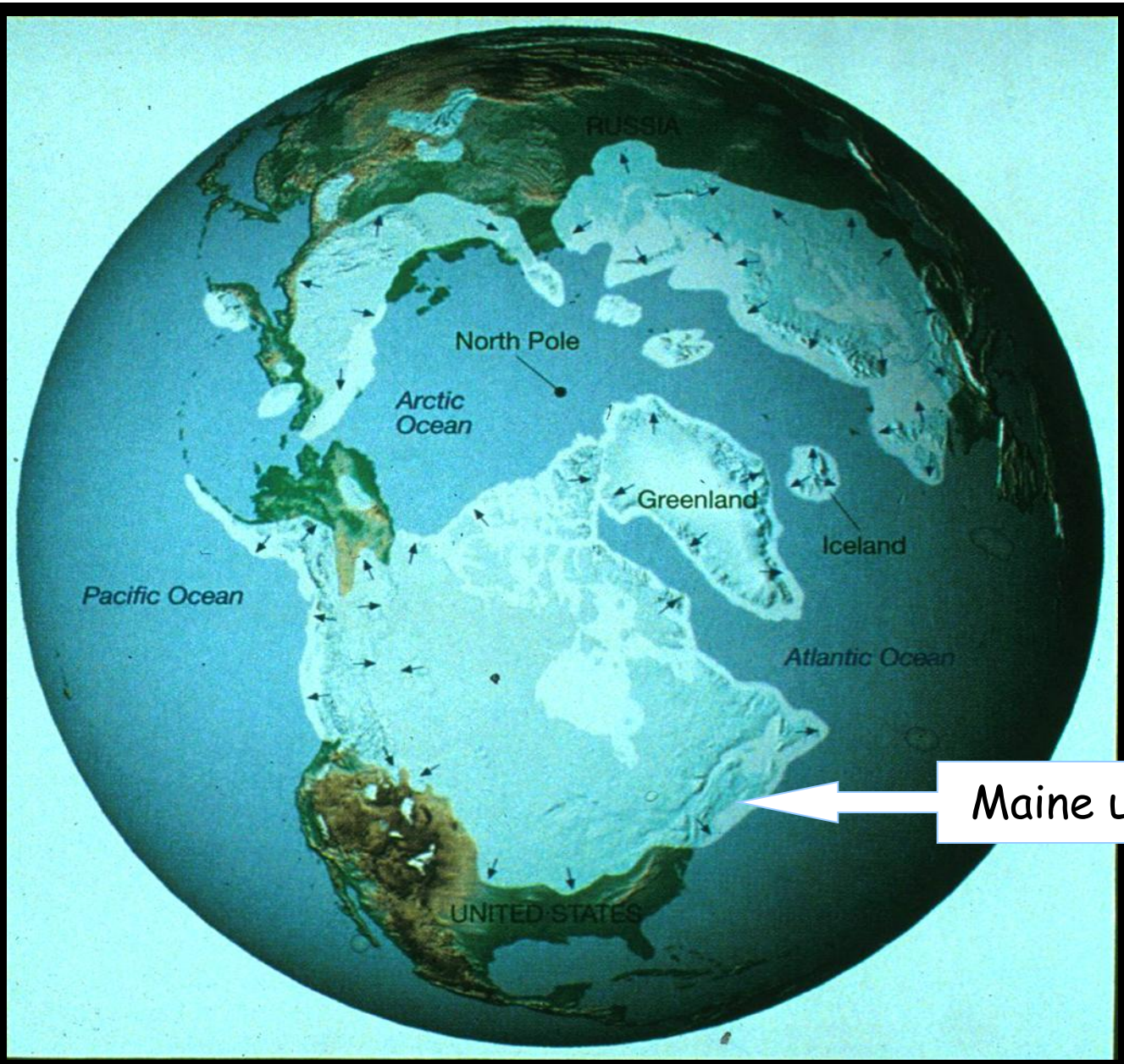
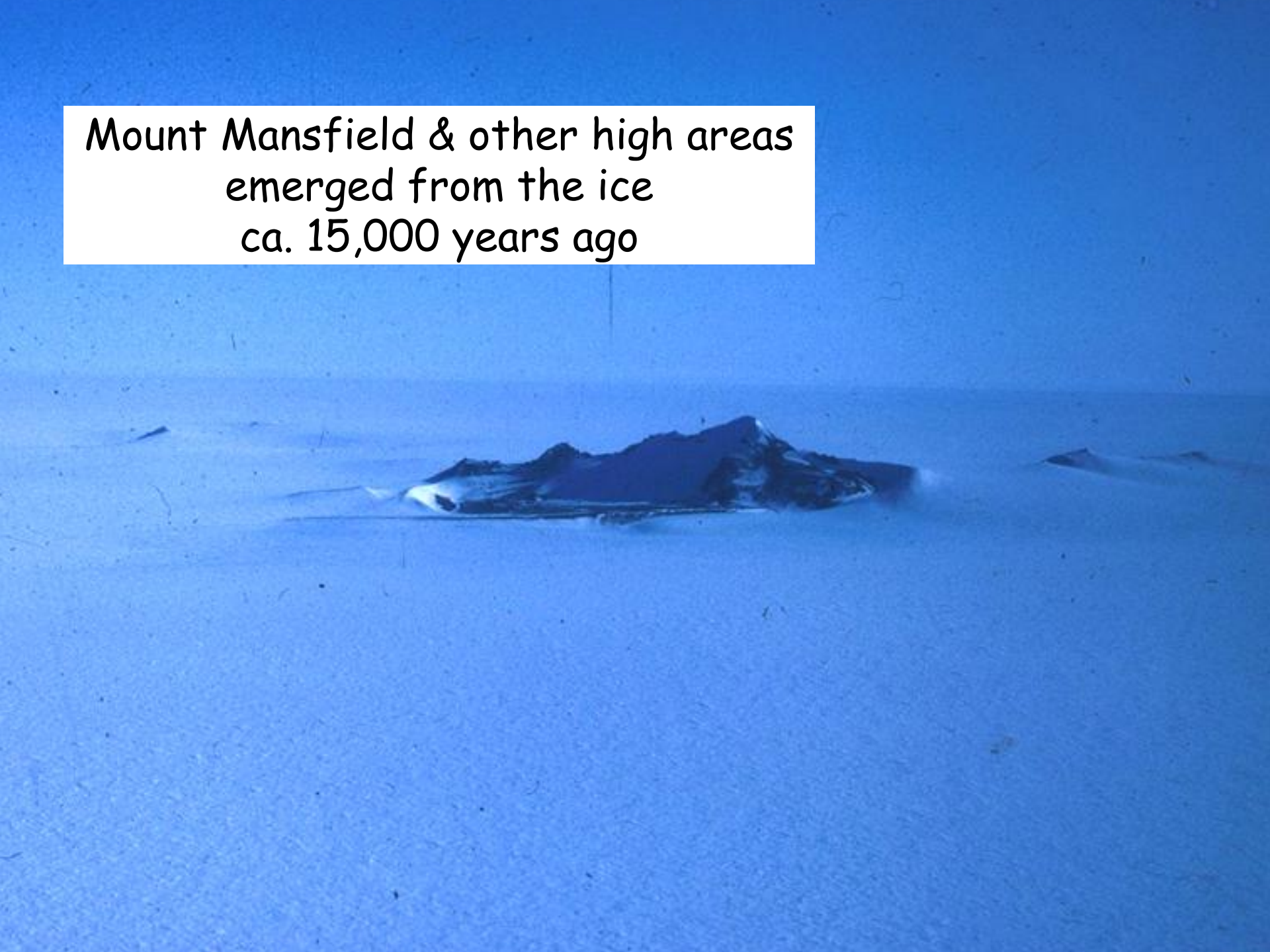
MANOMET Center for Conservation Sciences

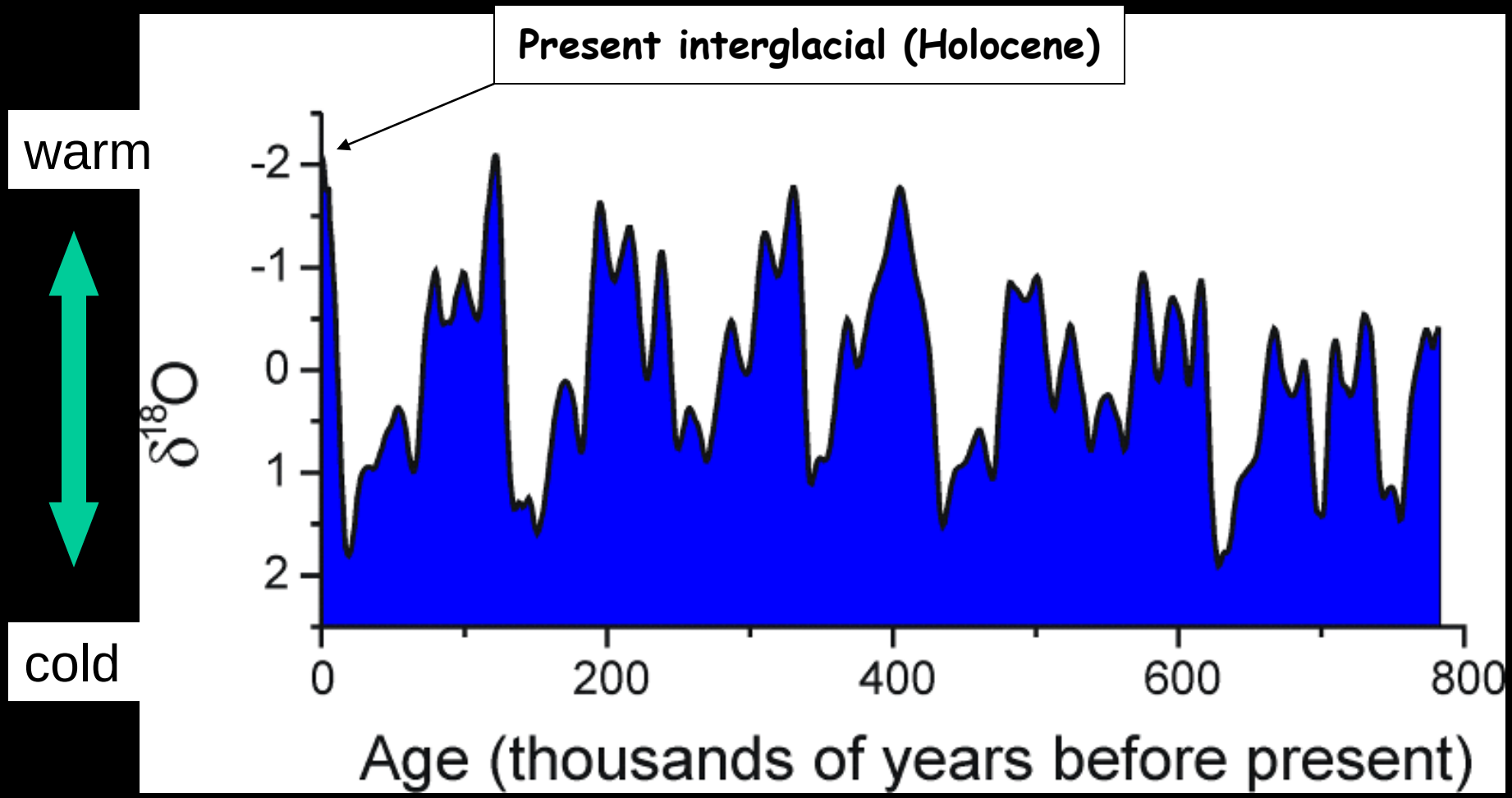
THE UNIVERSITY OF MAINE CLIMATE CHANGE INSTITUTE

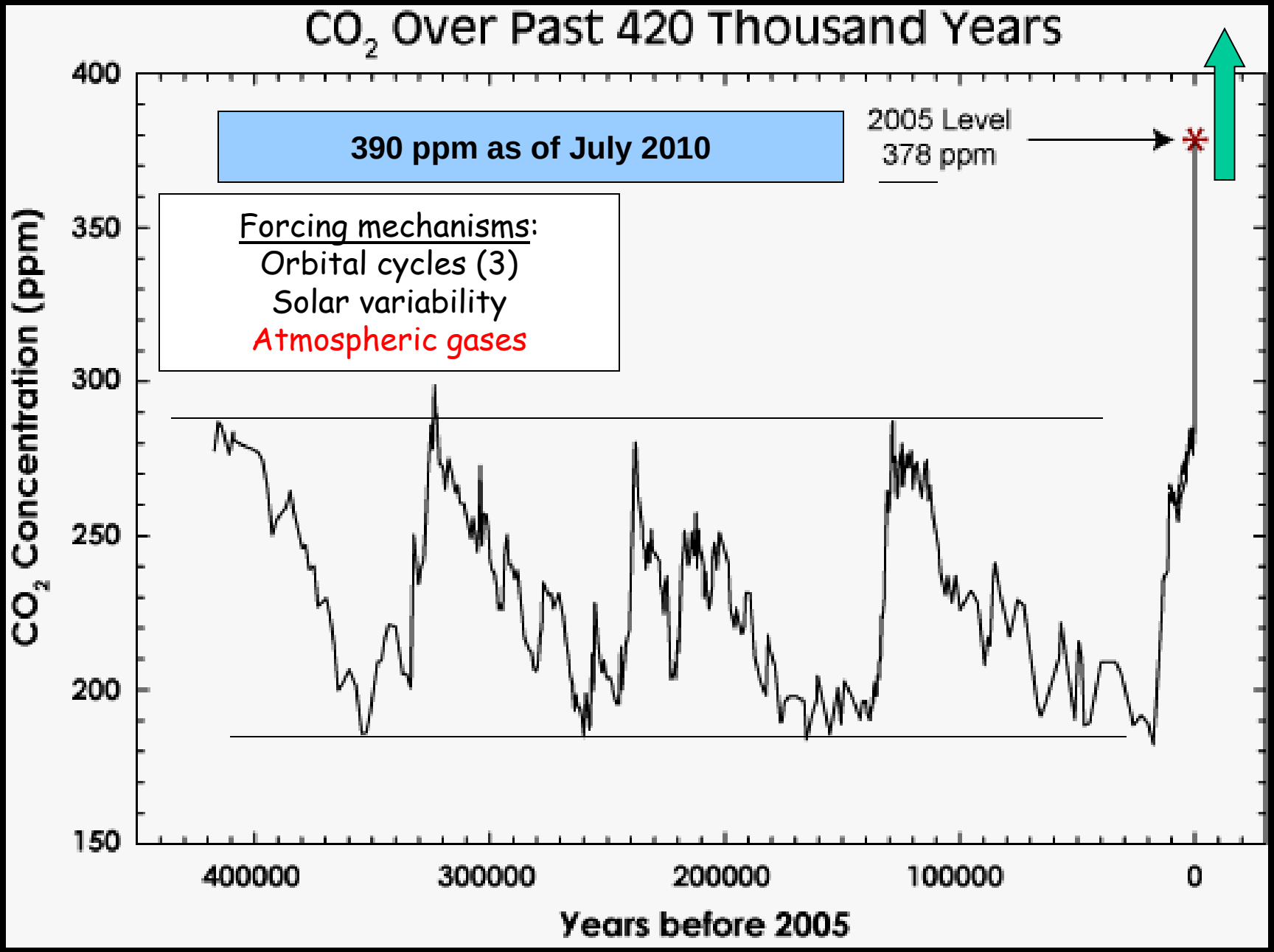
20,000 years ago was the most recent glacial maximum



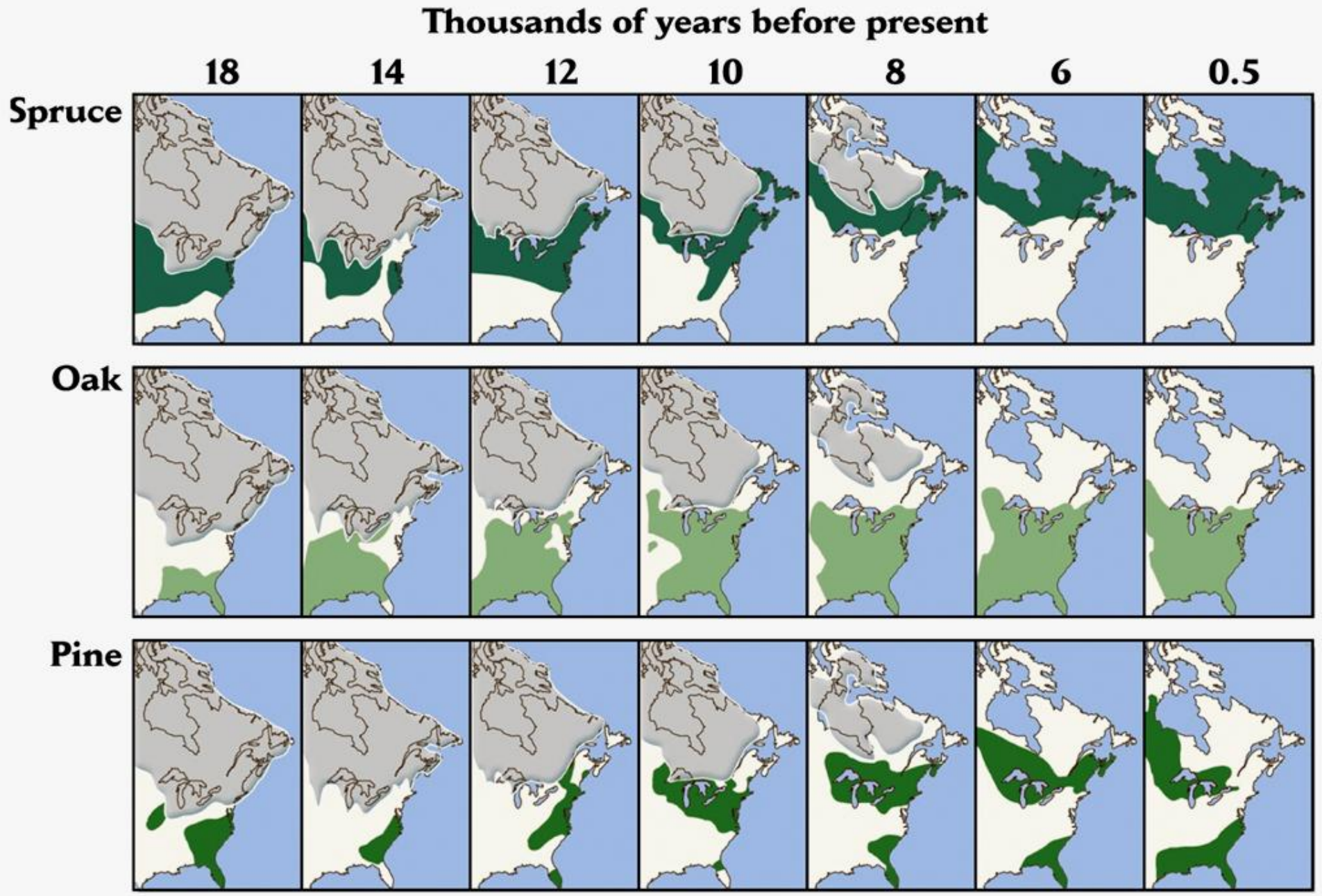

Mount Mansfield & other high areas
emerged from the ice
ca. 15,000 years ago

Regular ice ages characterize the past million years
(information derived from ocean sediments)




CO_2 Over Past 420 Thousand Years
390 ppm as of July 2010
2005 Level
378 ppm
Forcing mechanisms:
Orbital cycles (3)
Solar variability
Atmospheric gases
CO_2 Concentration (ppm)
400
350
300
250
200
150
400000
300000
200000
100000
0
Years before 2005

Maps of change in plant distribution (after Jacobson et al. 1987)



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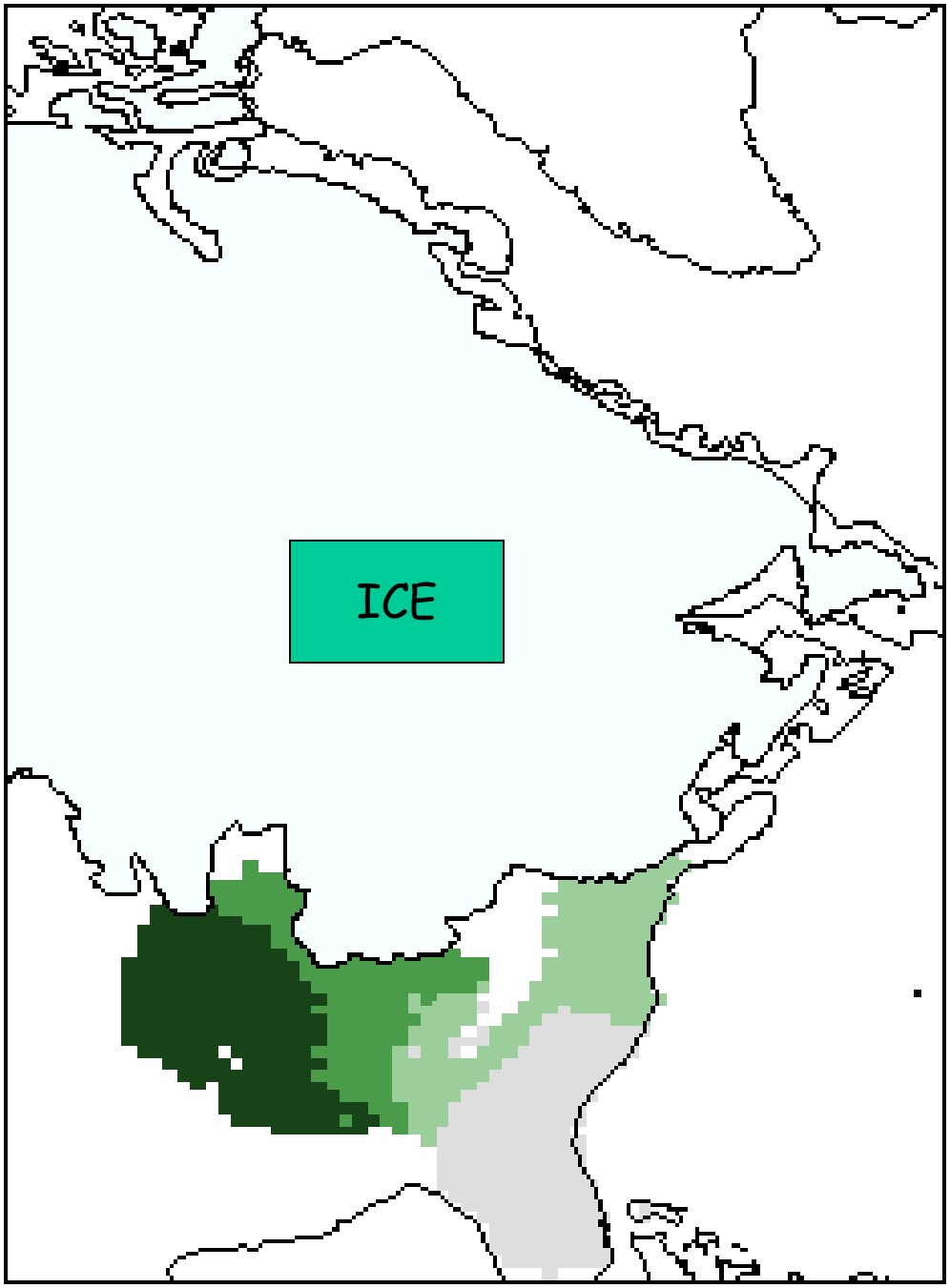

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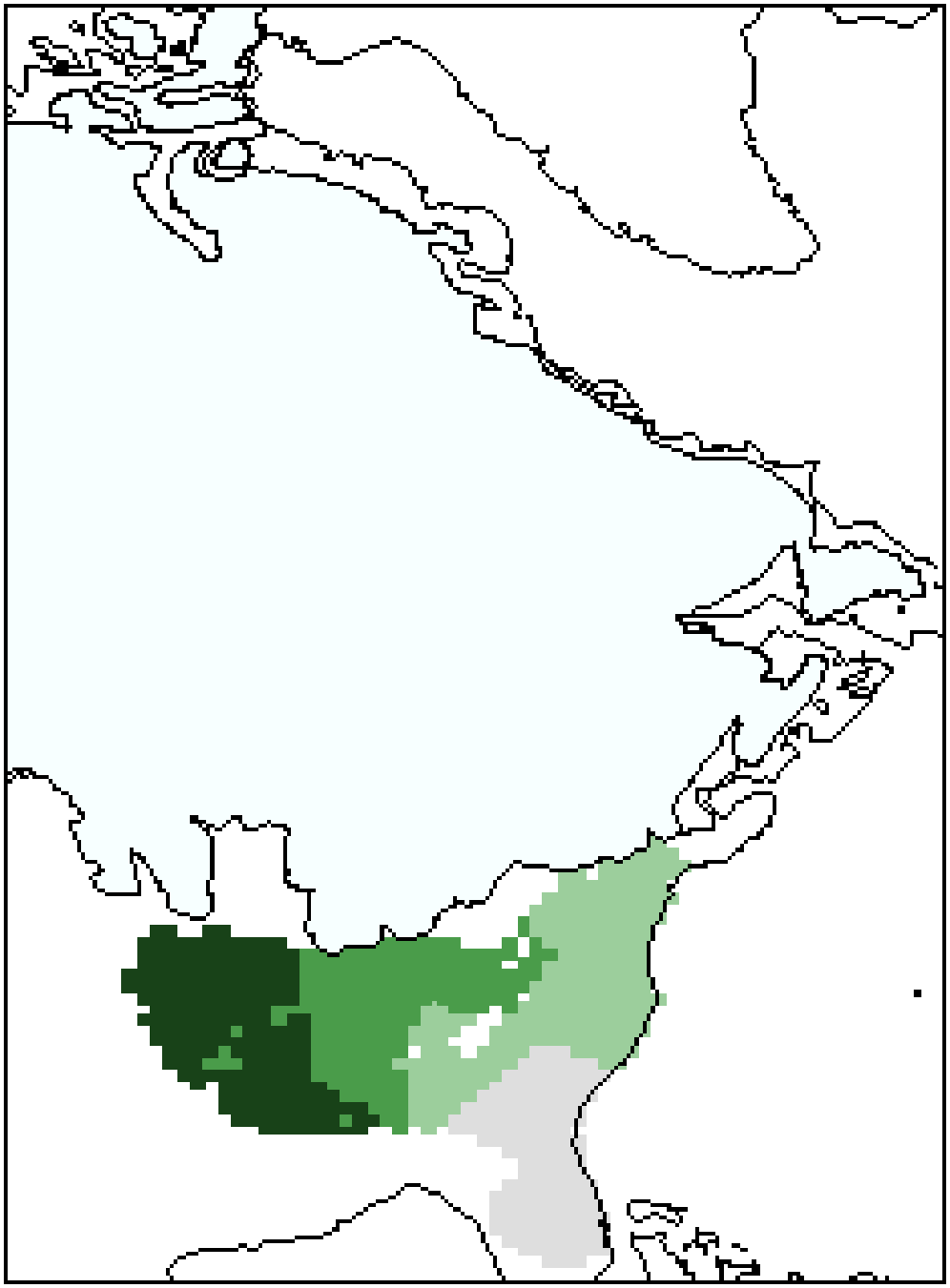

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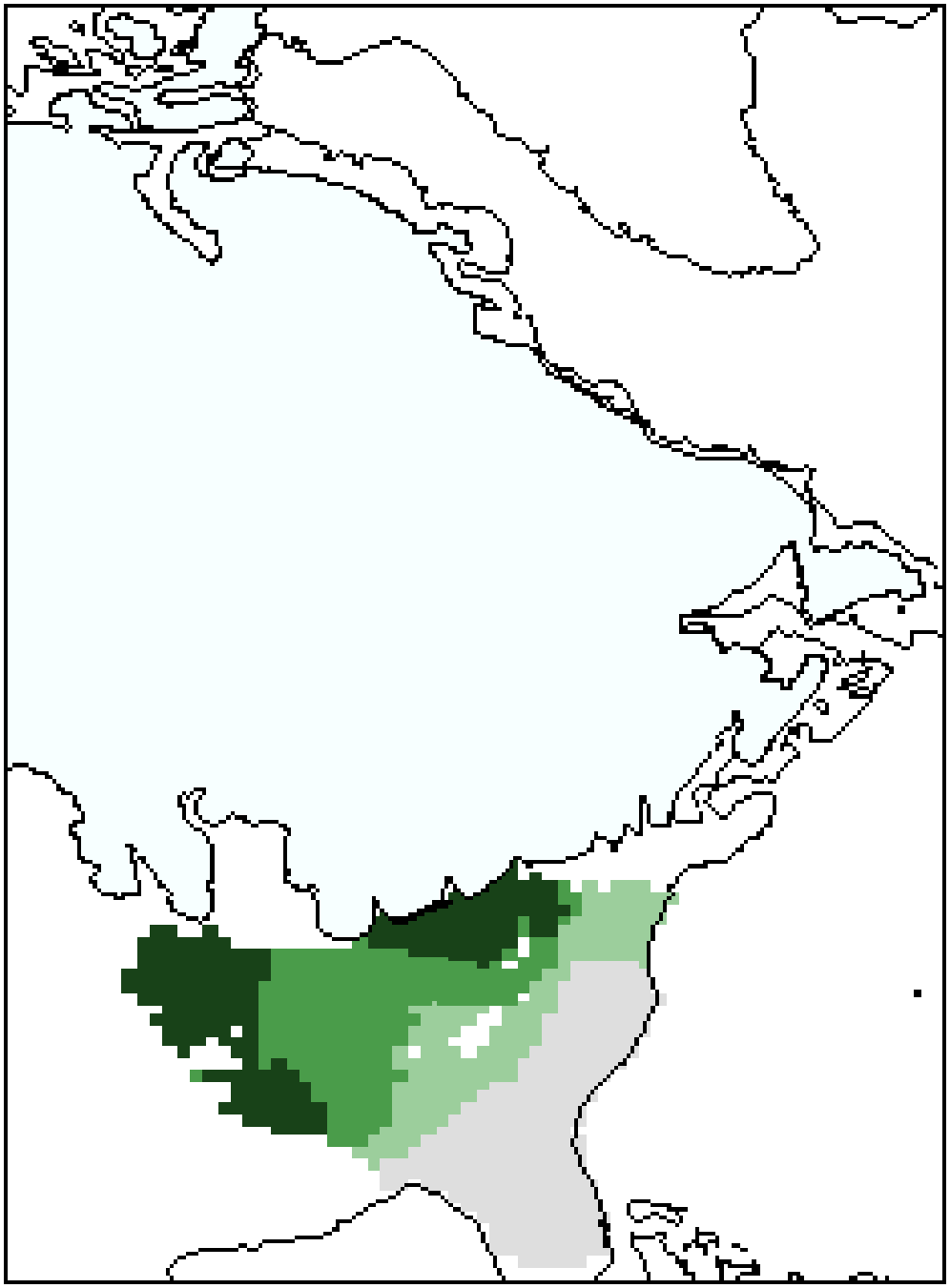

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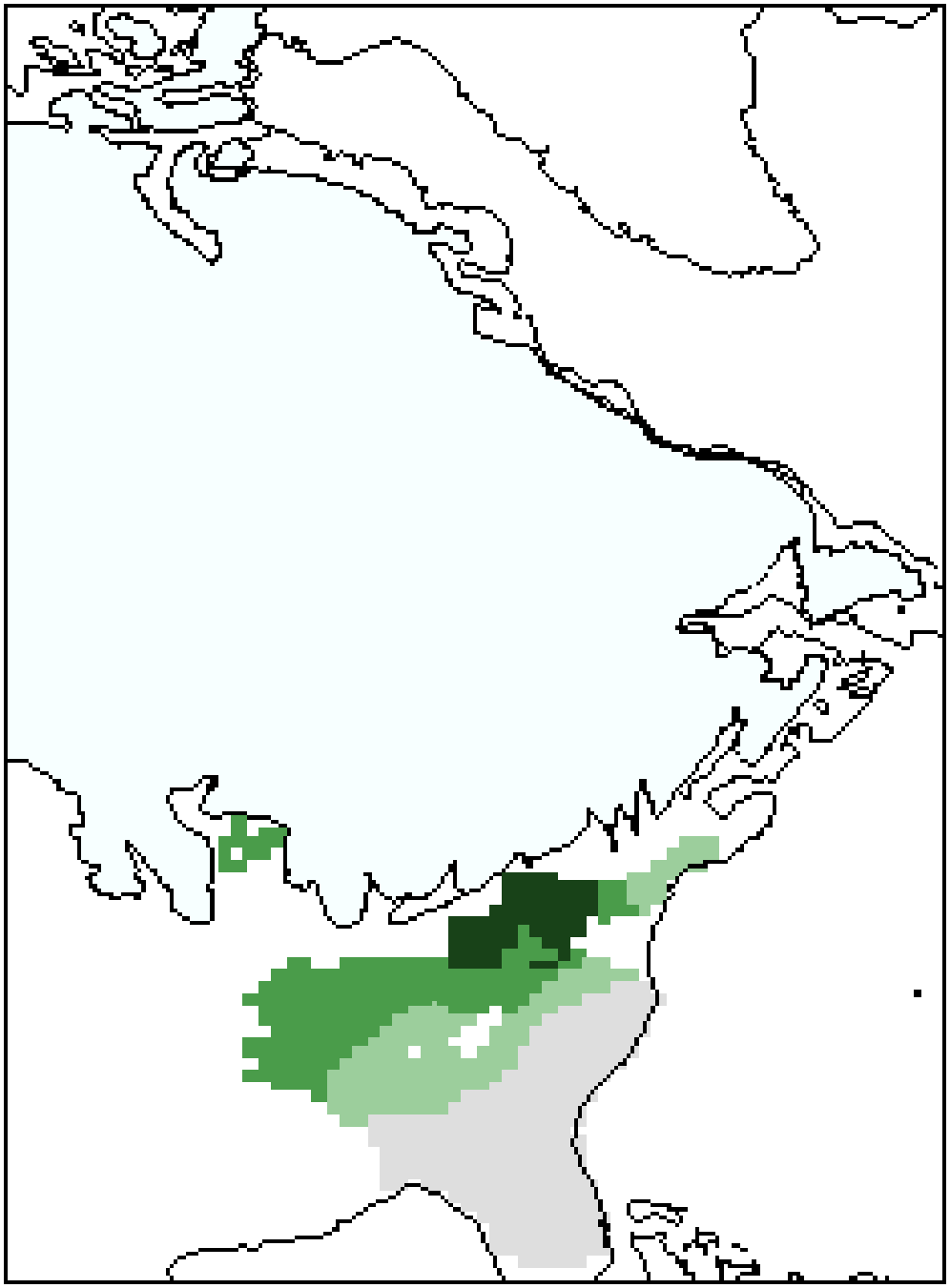

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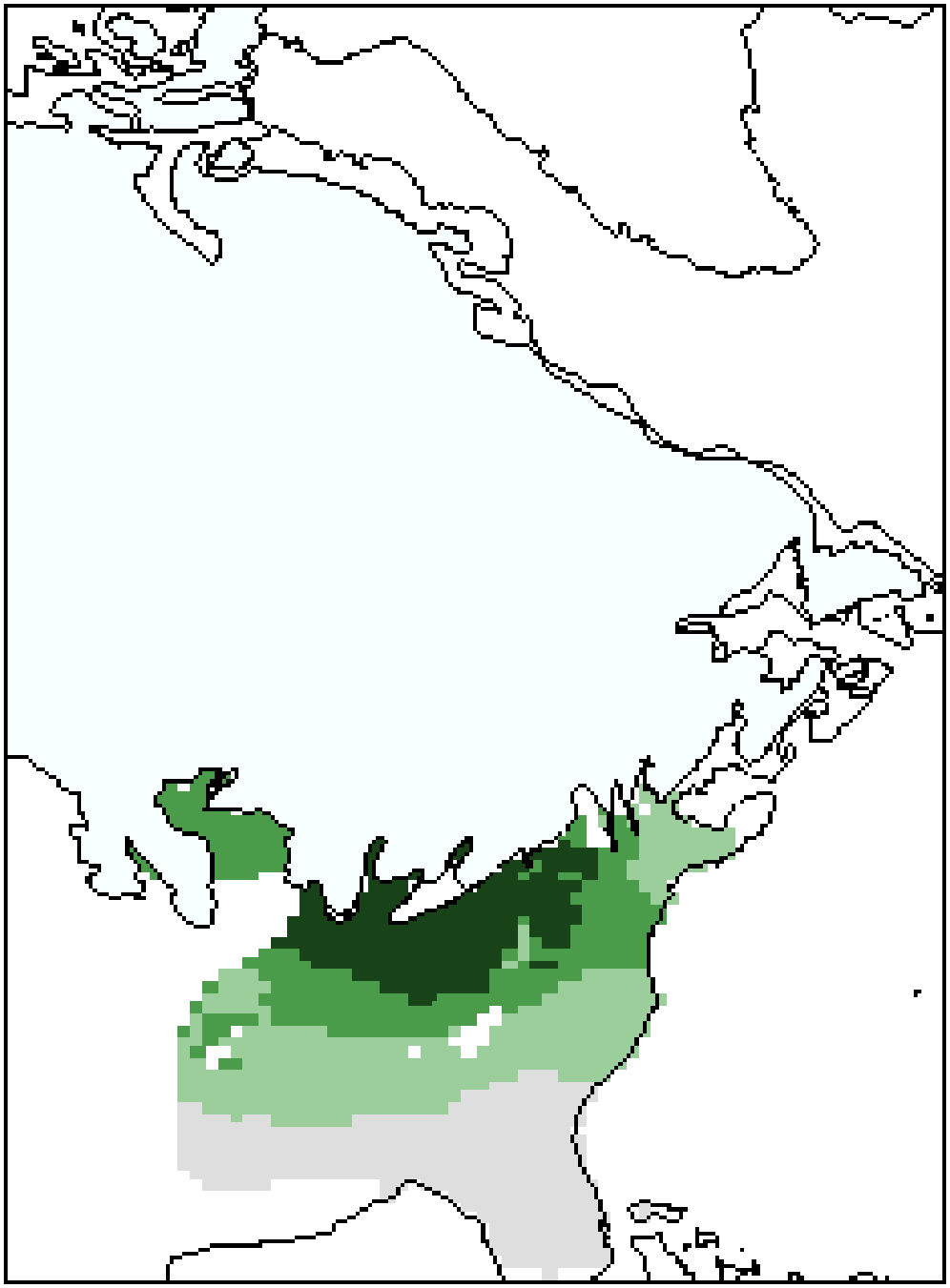

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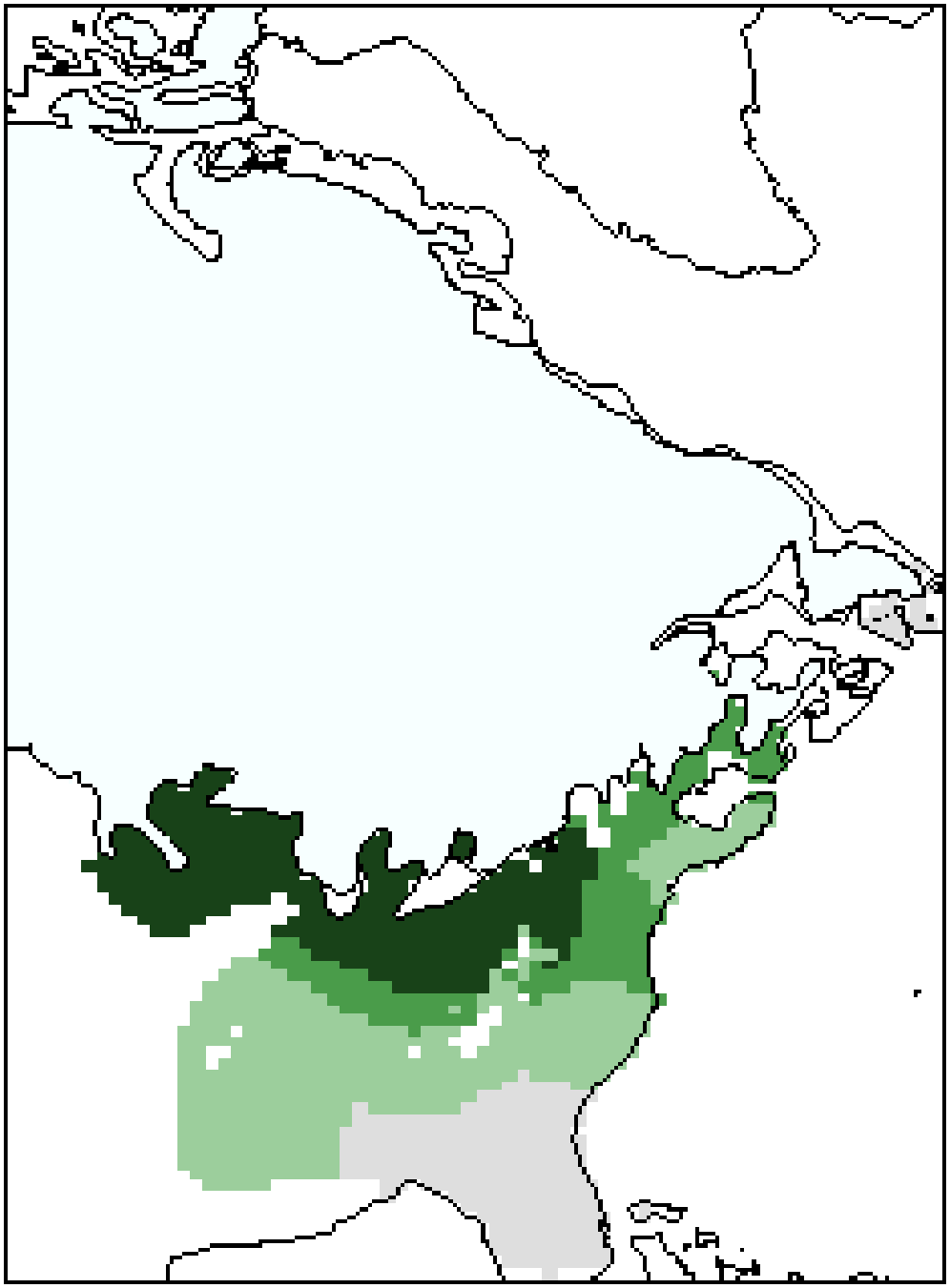

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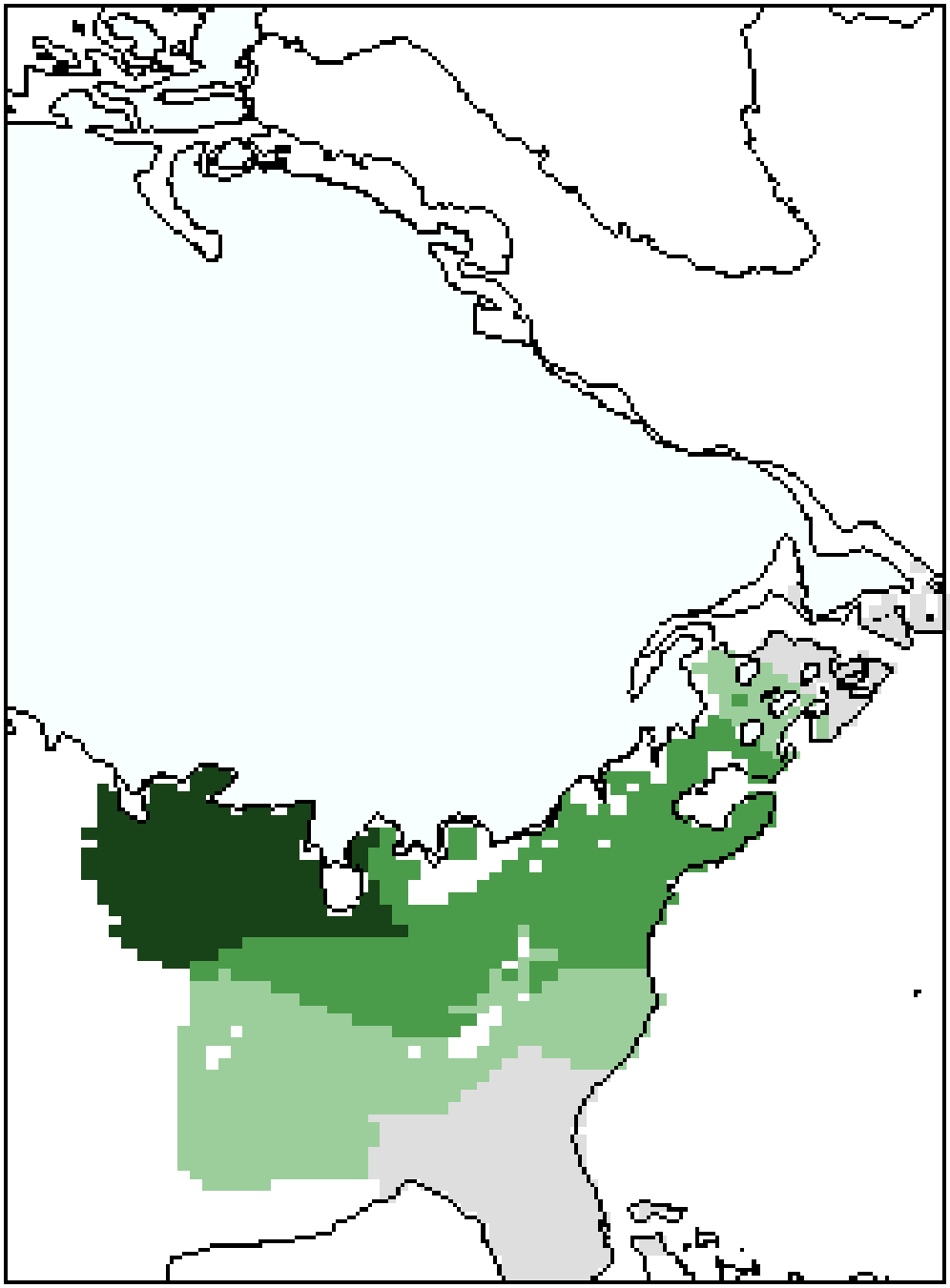

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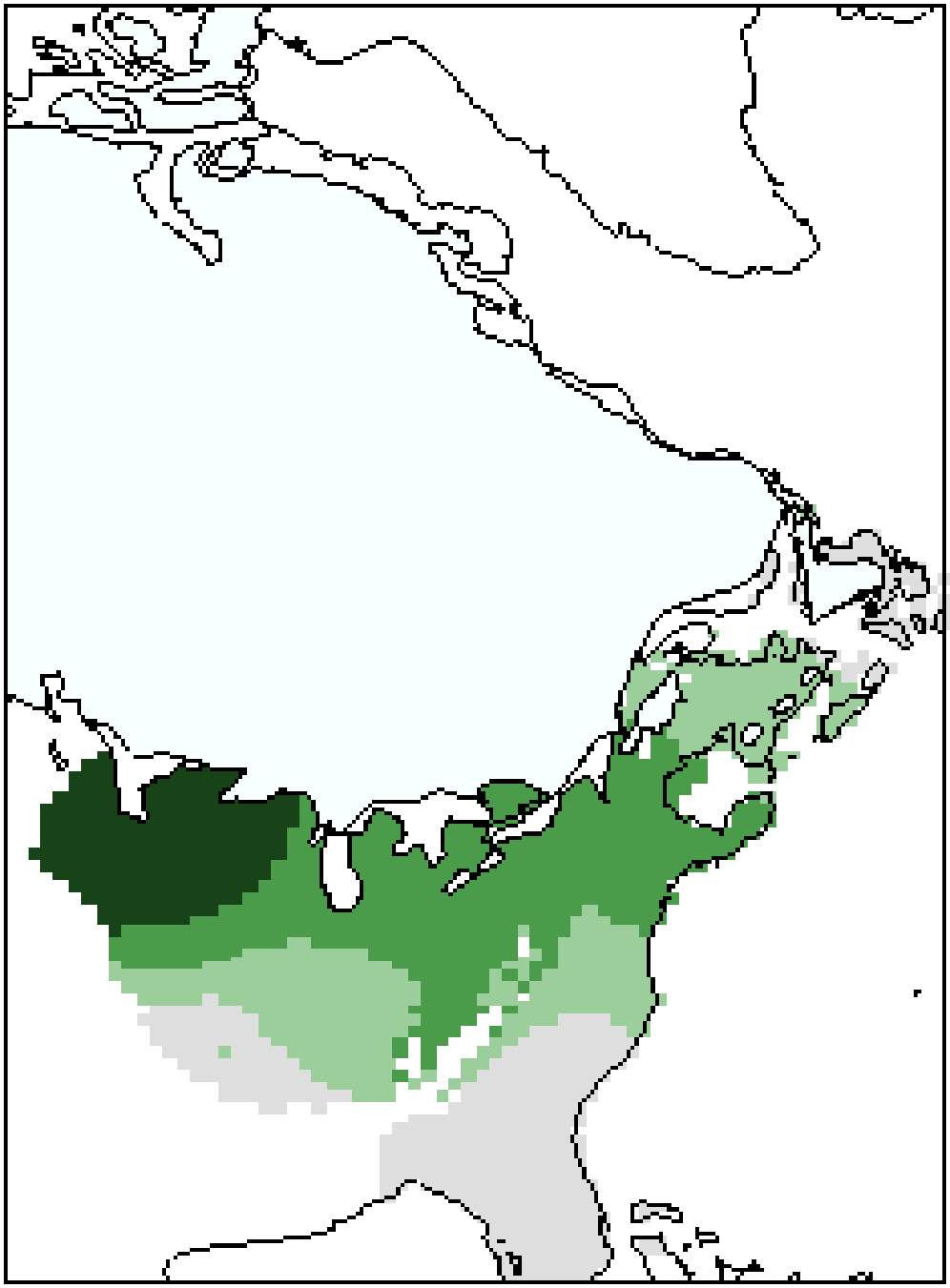

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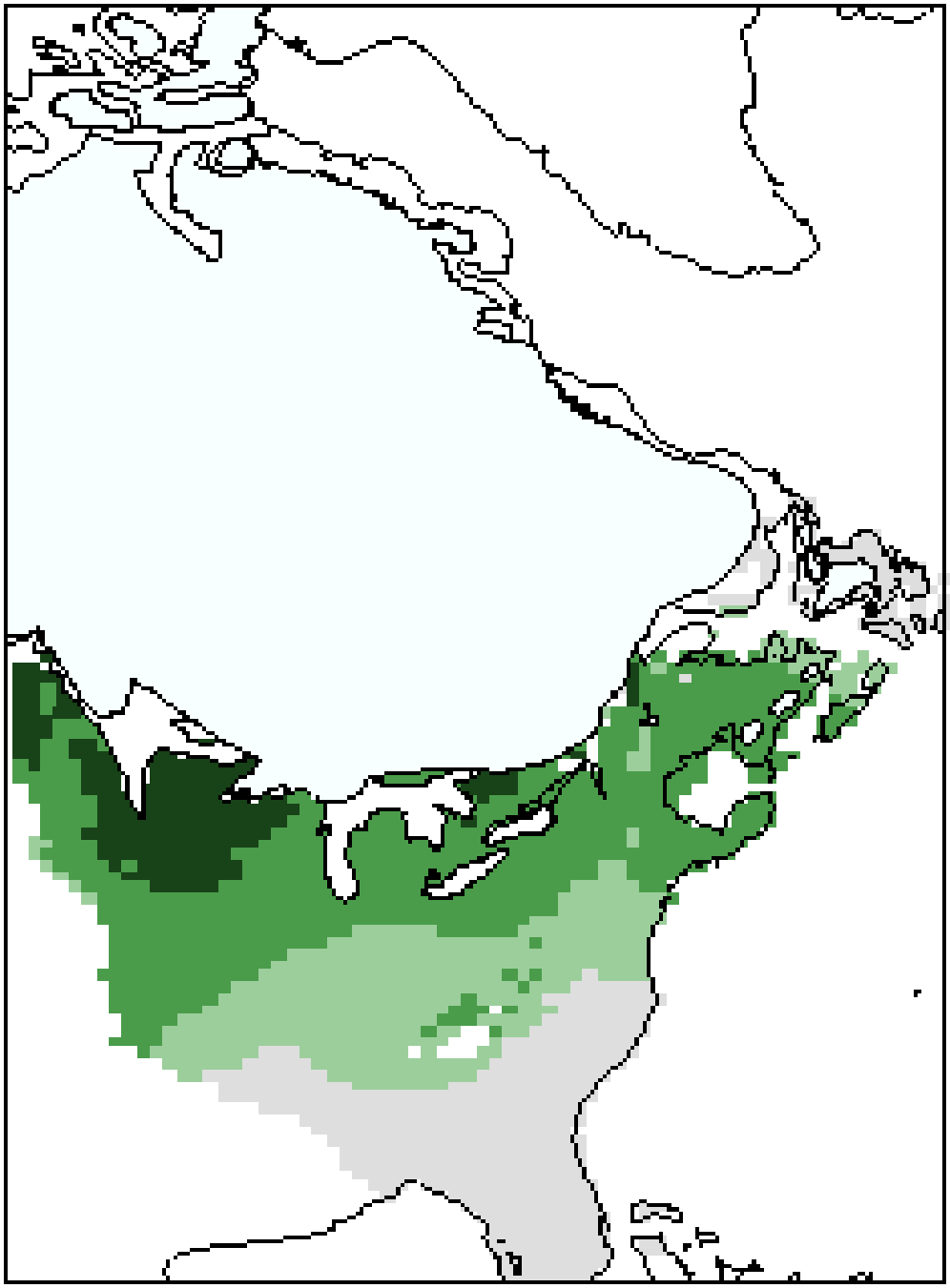

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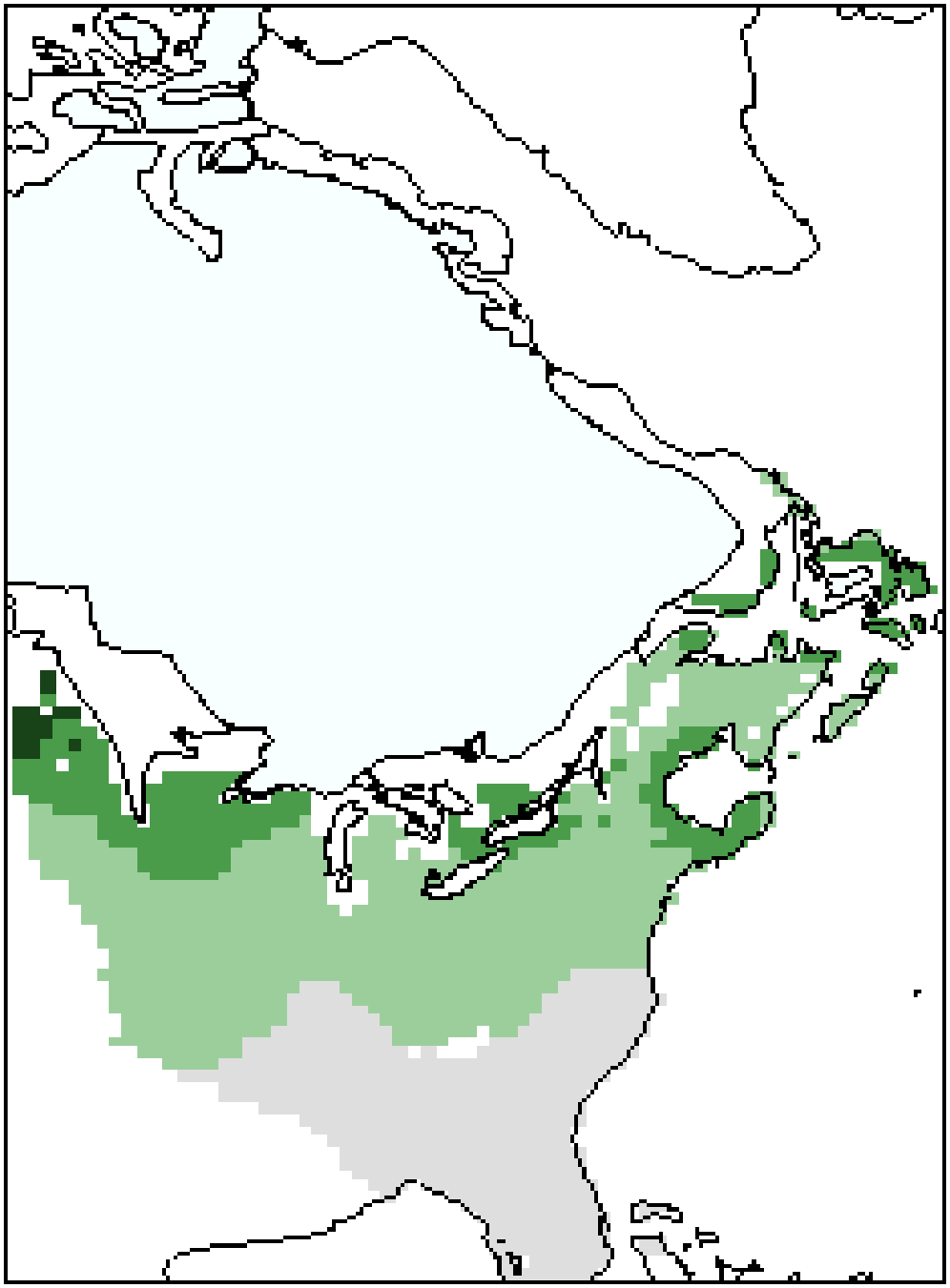

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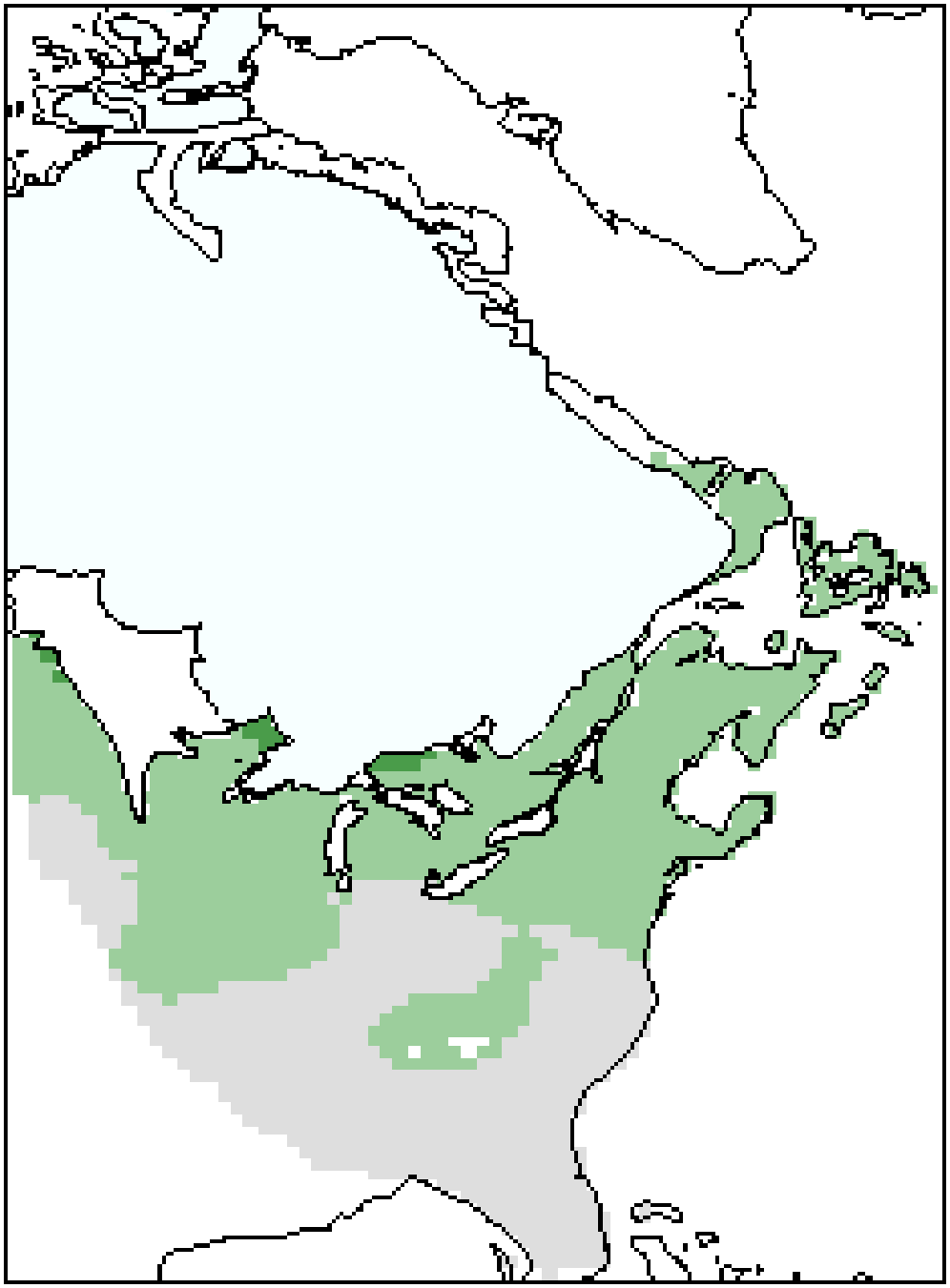

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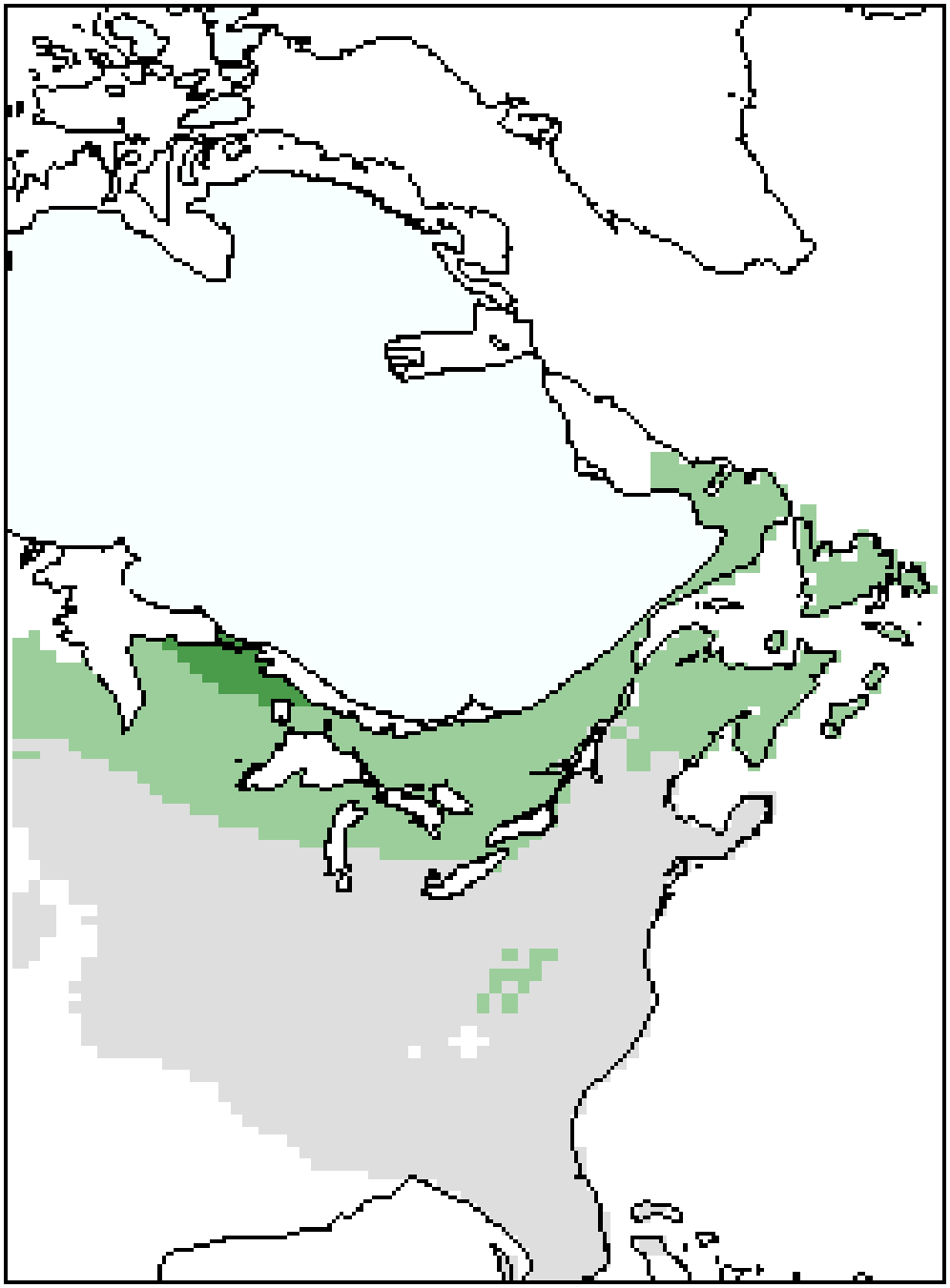

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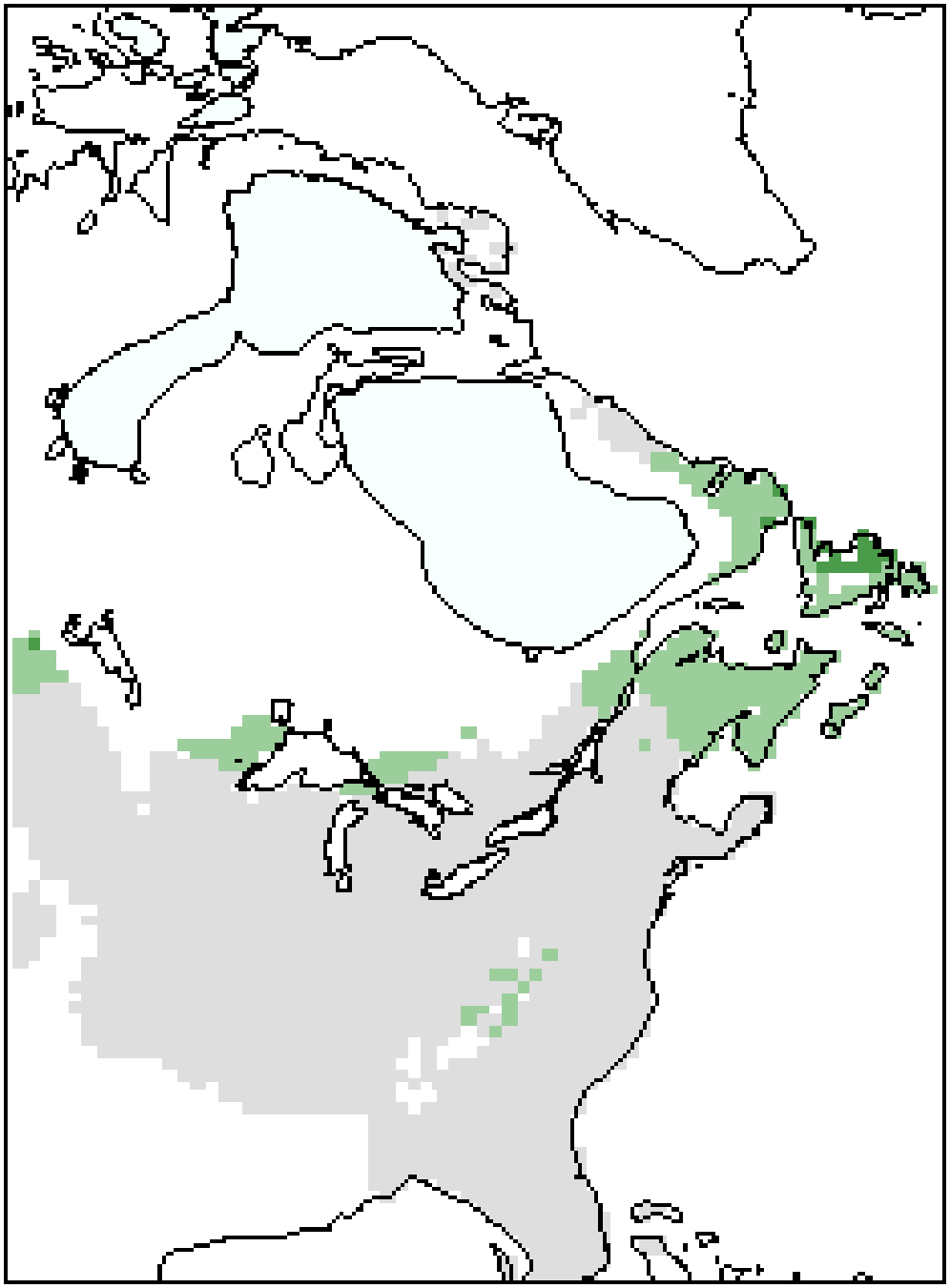

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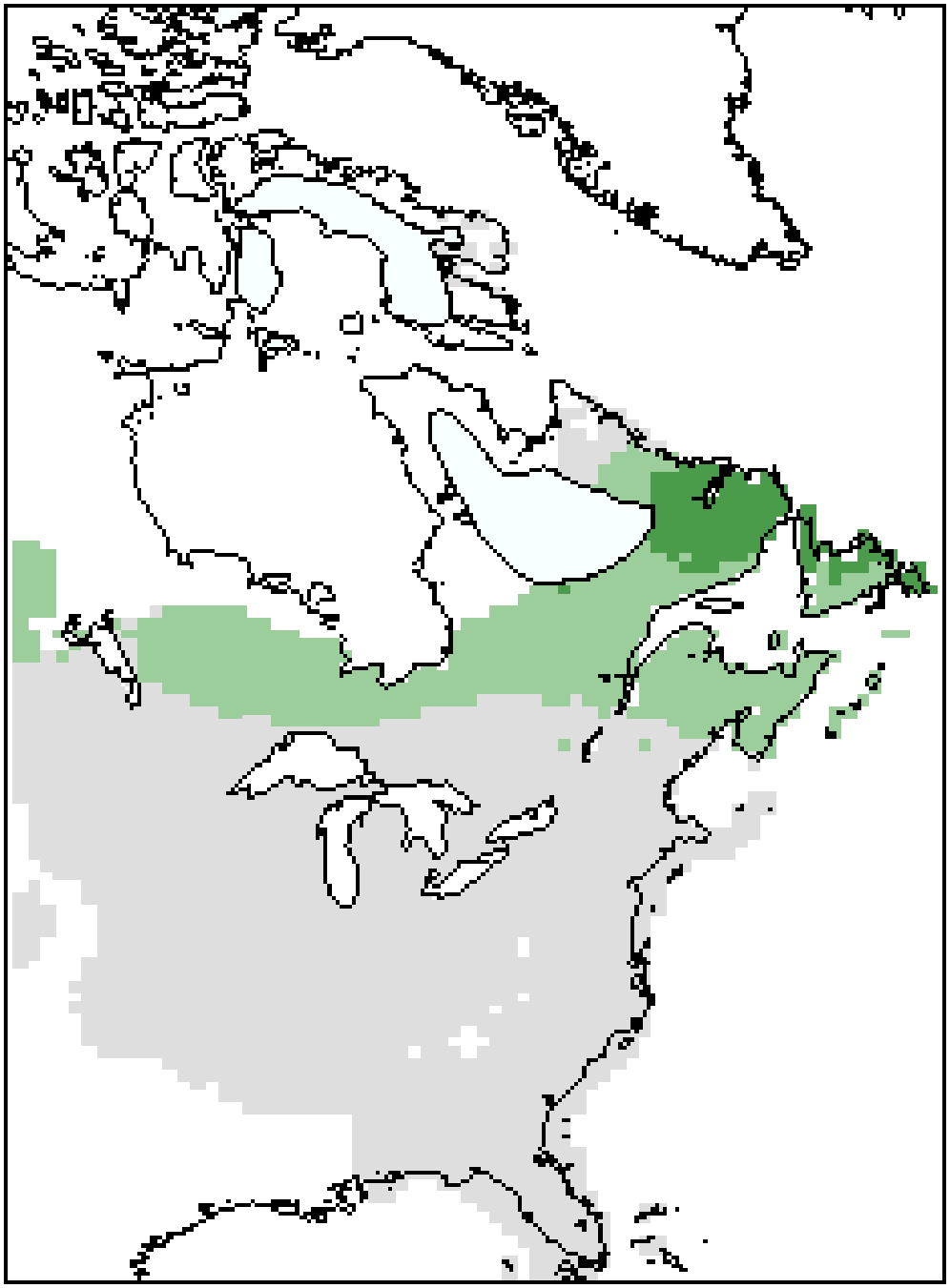

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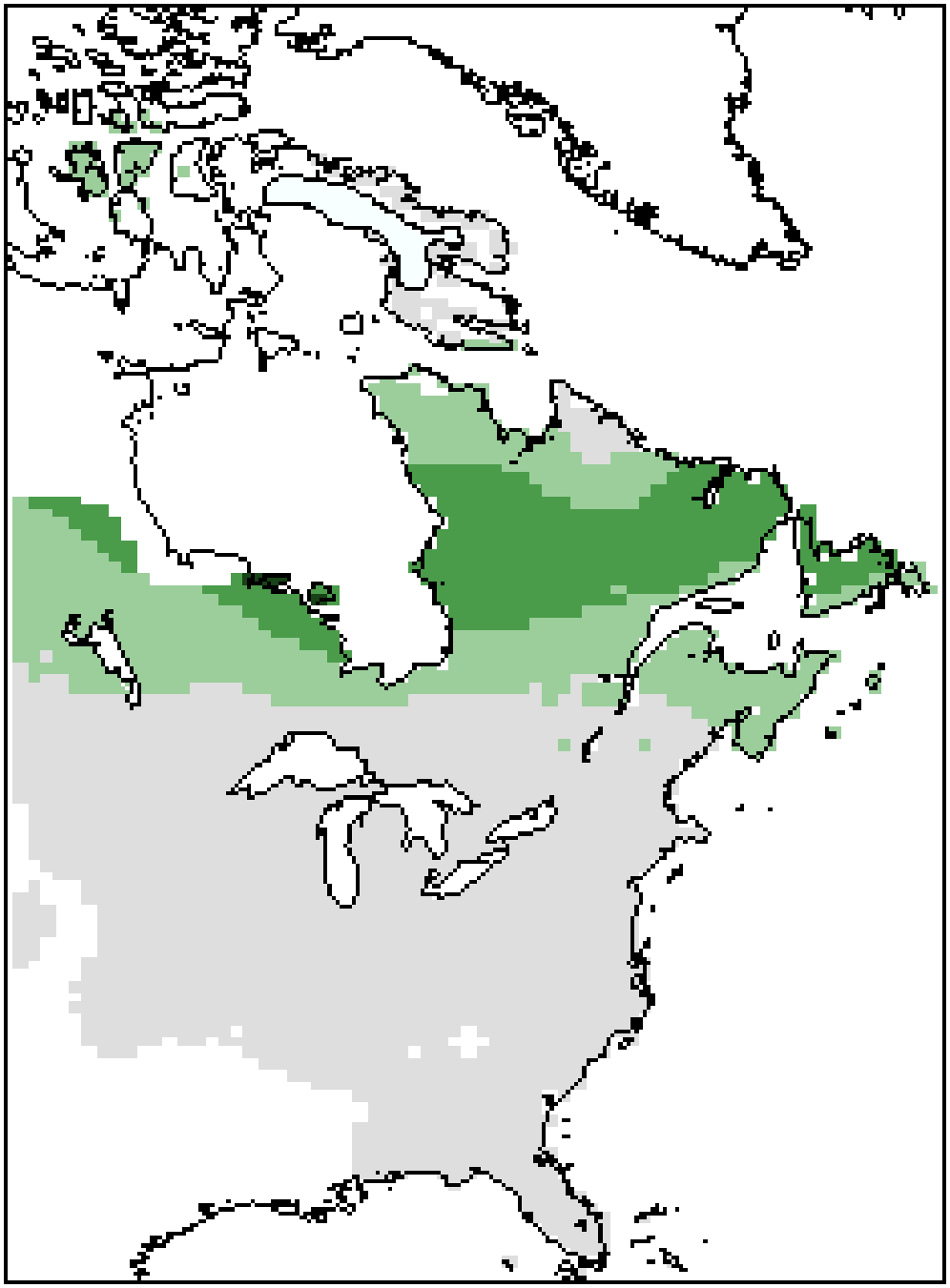

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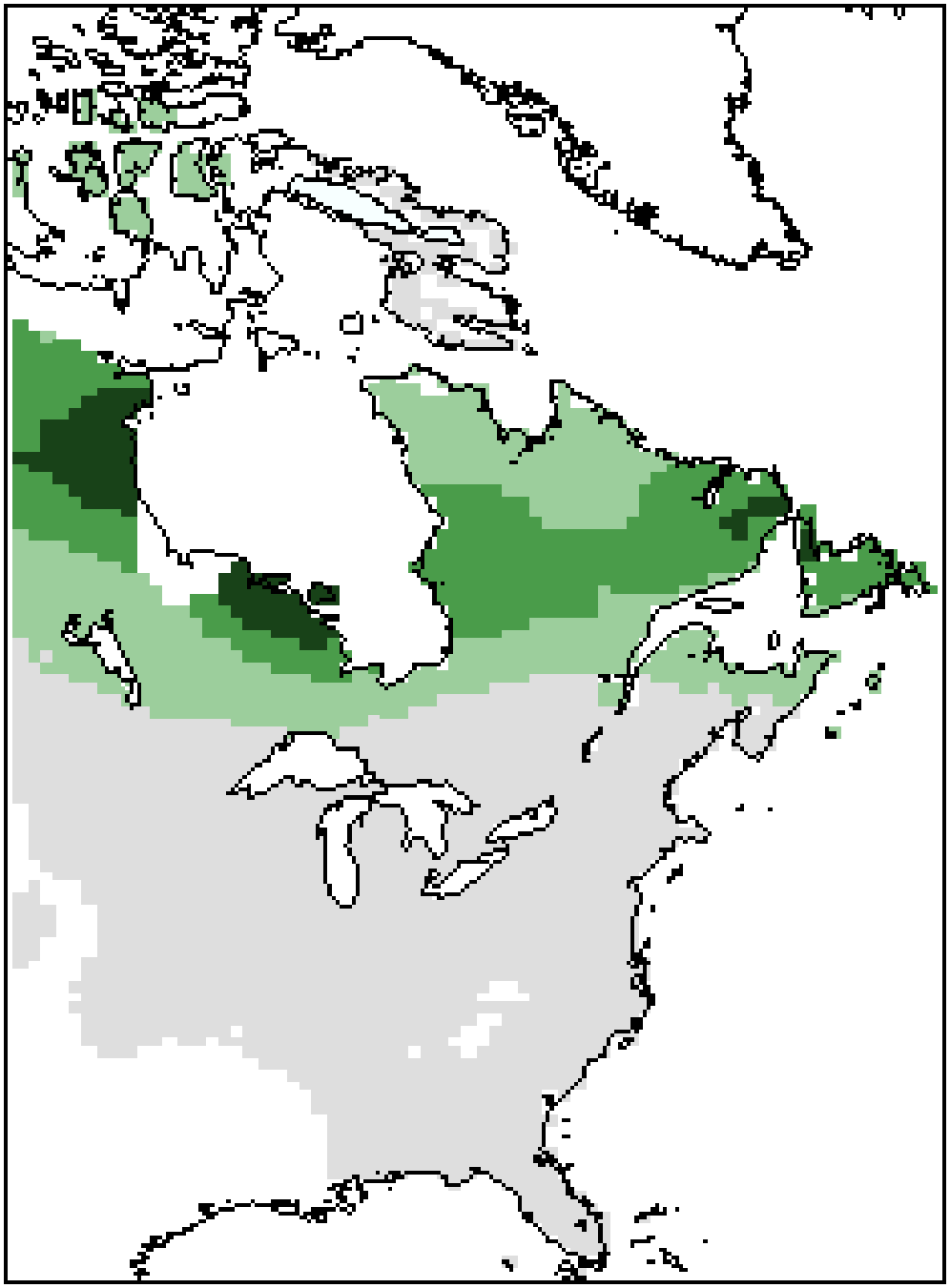

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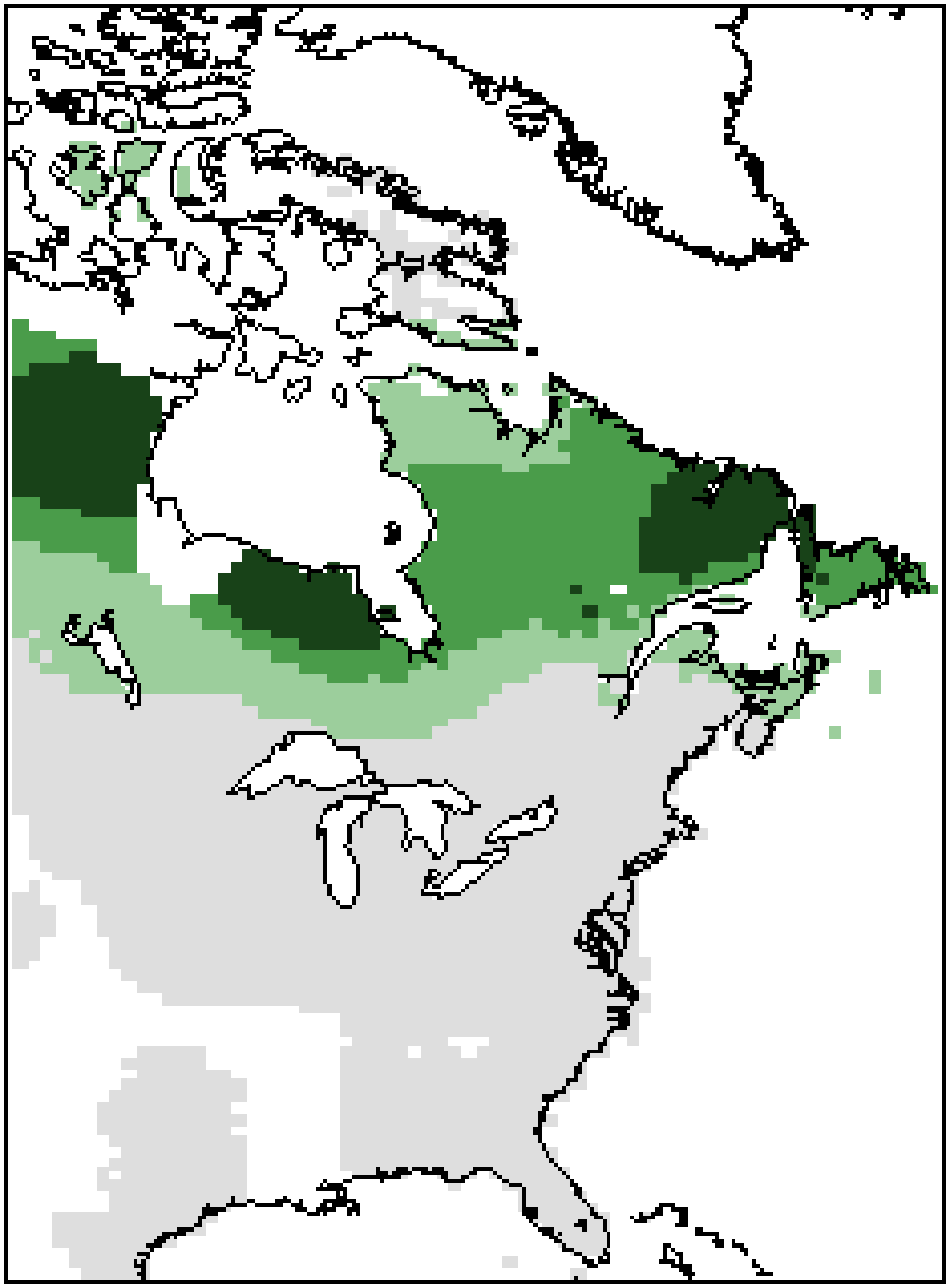

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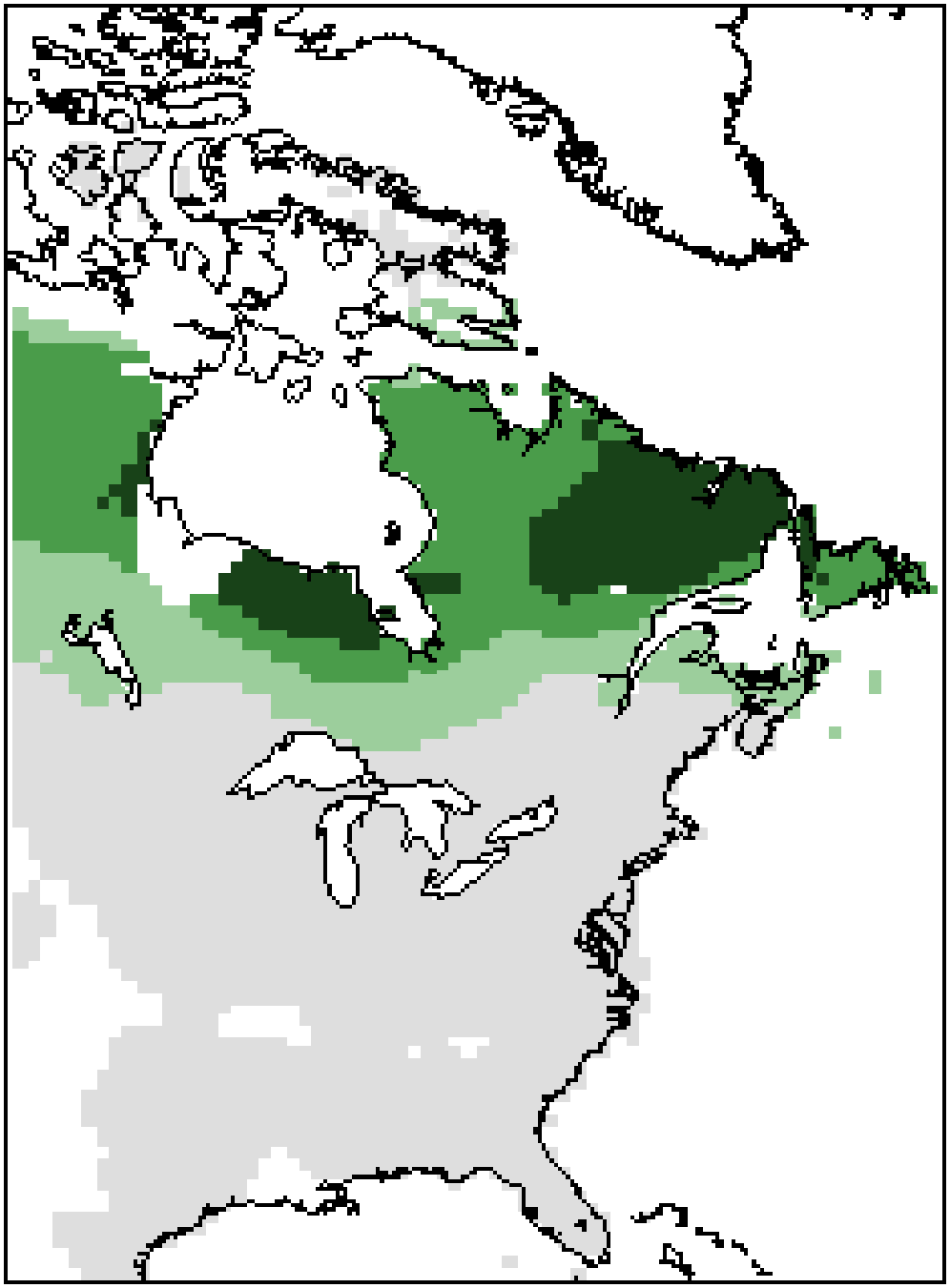

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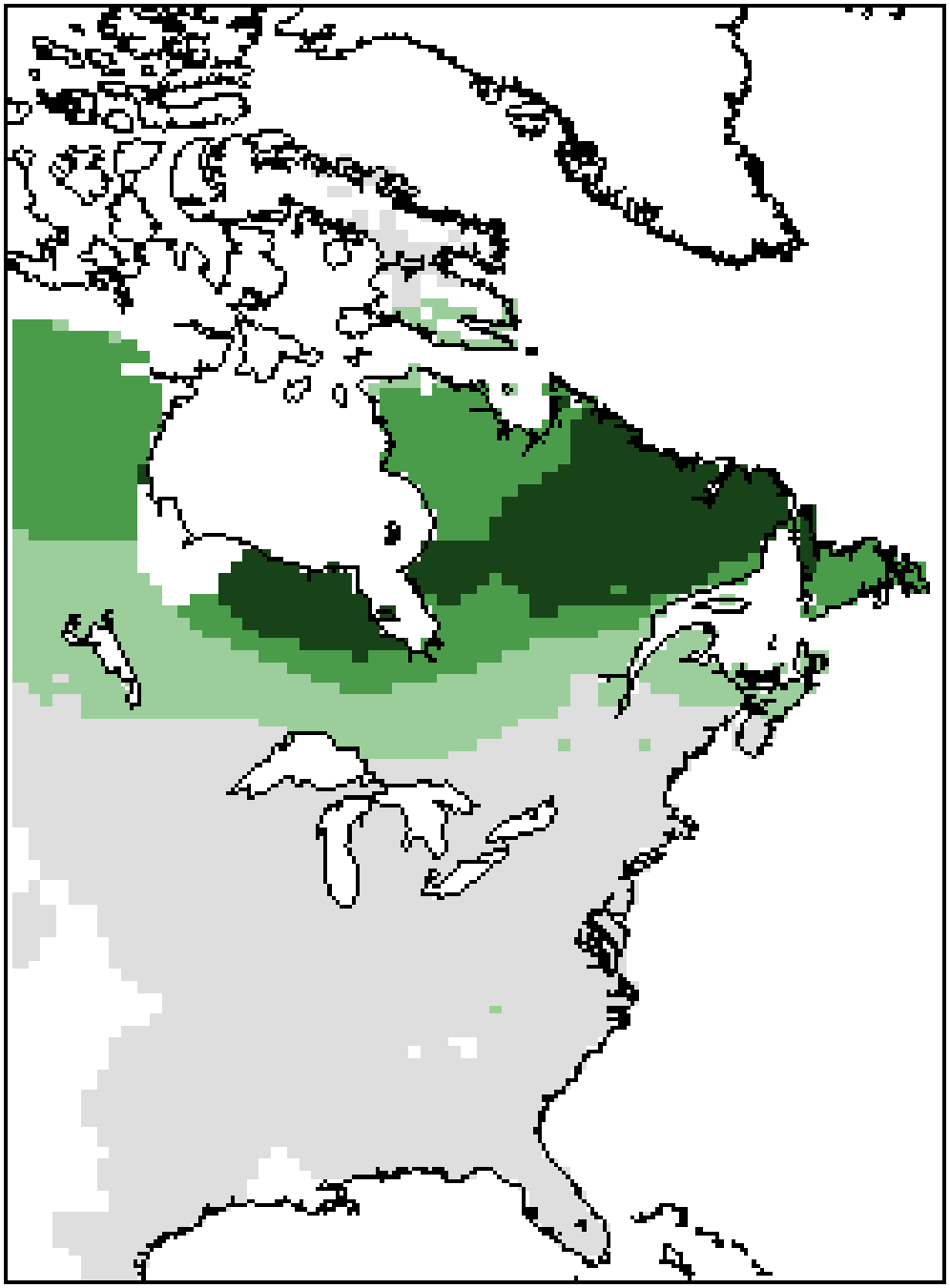

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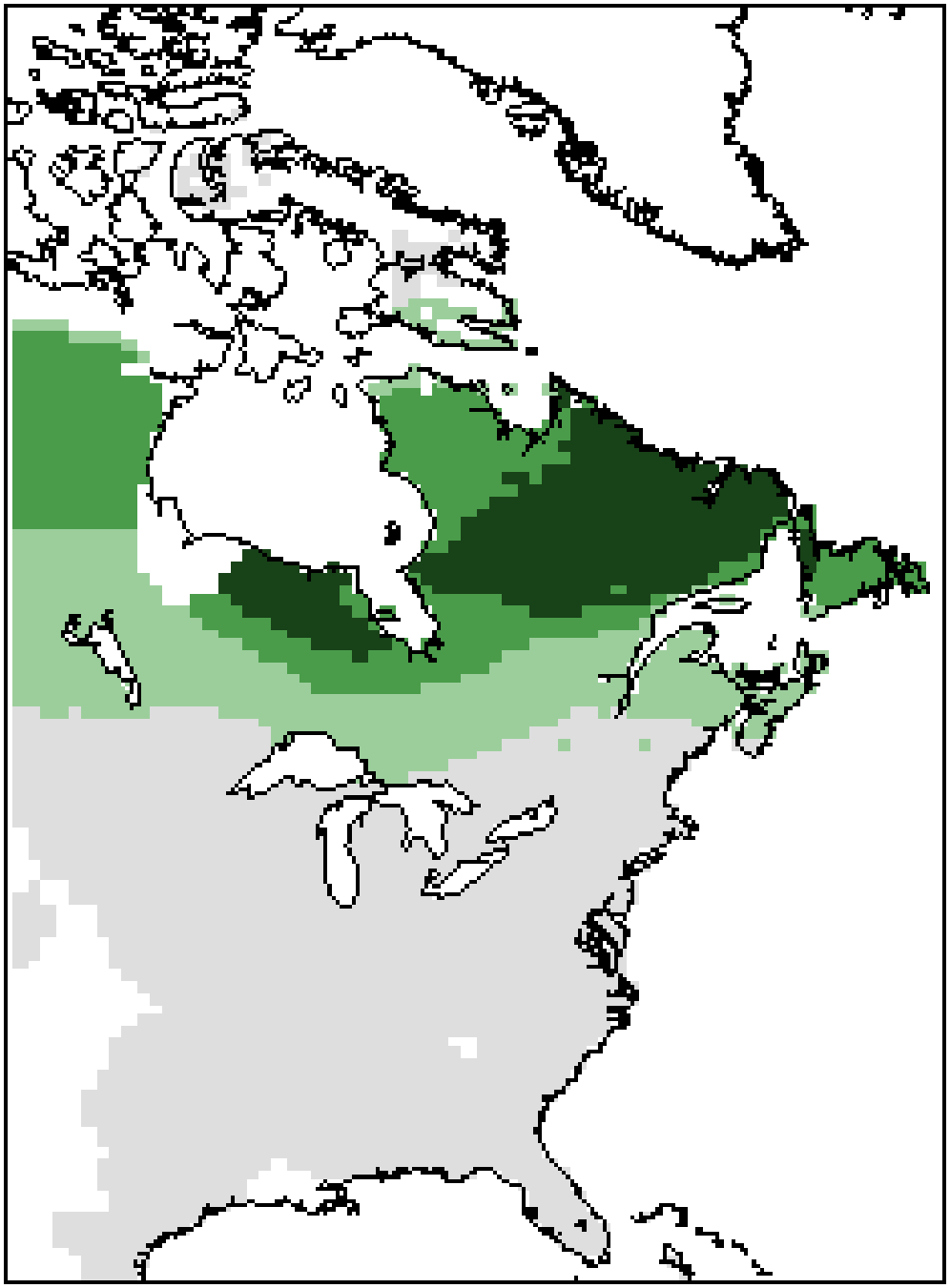

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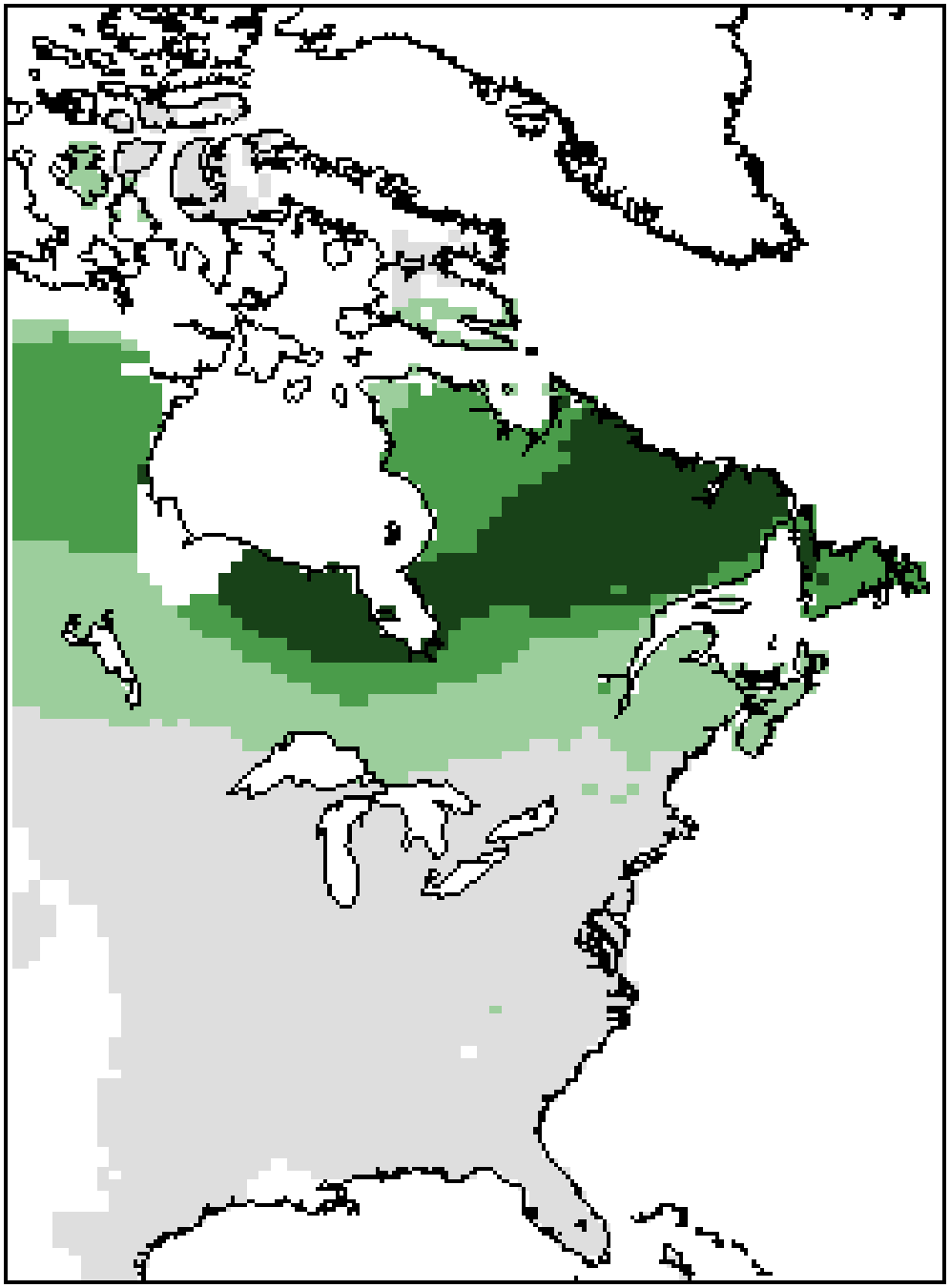

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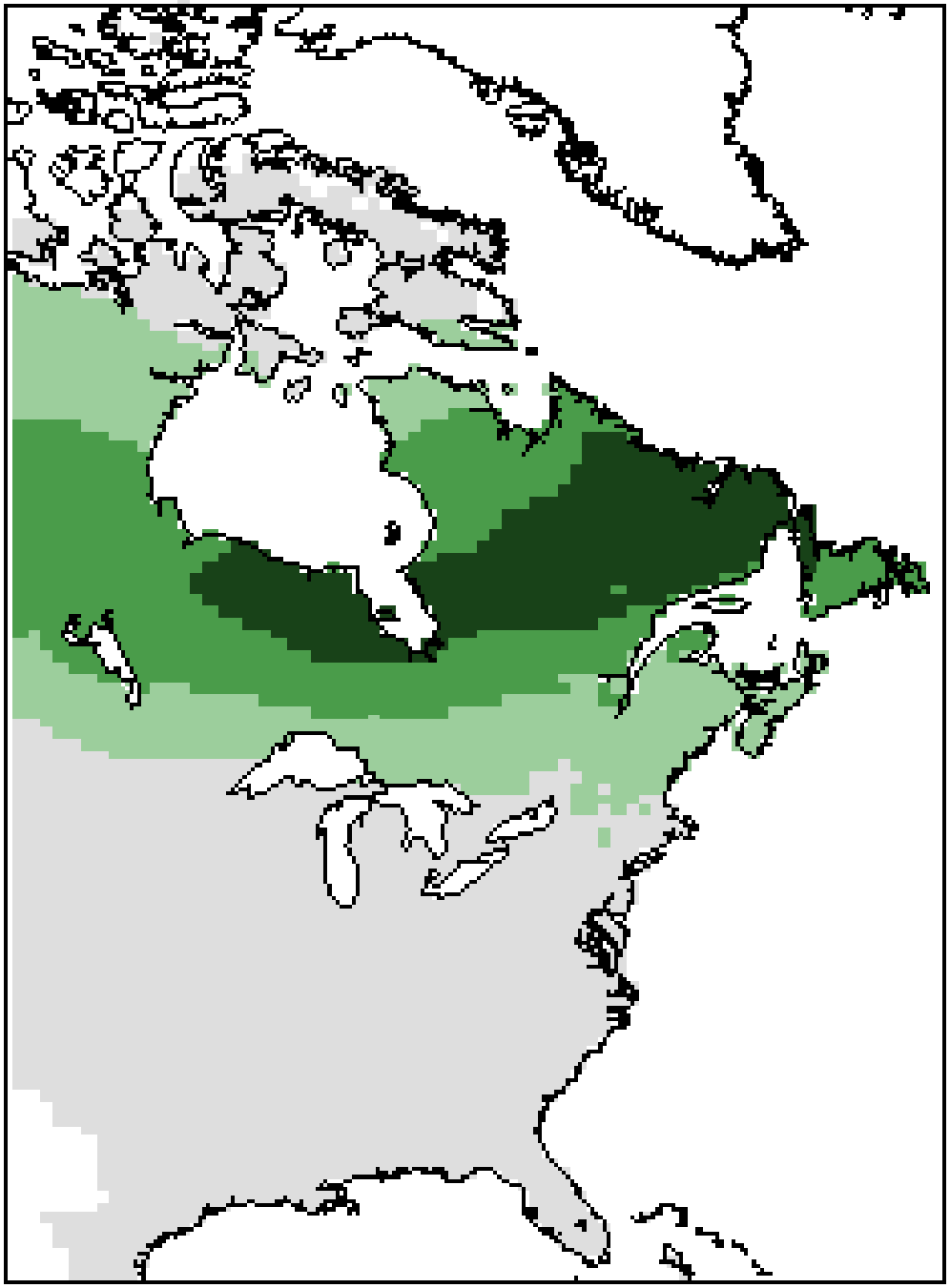
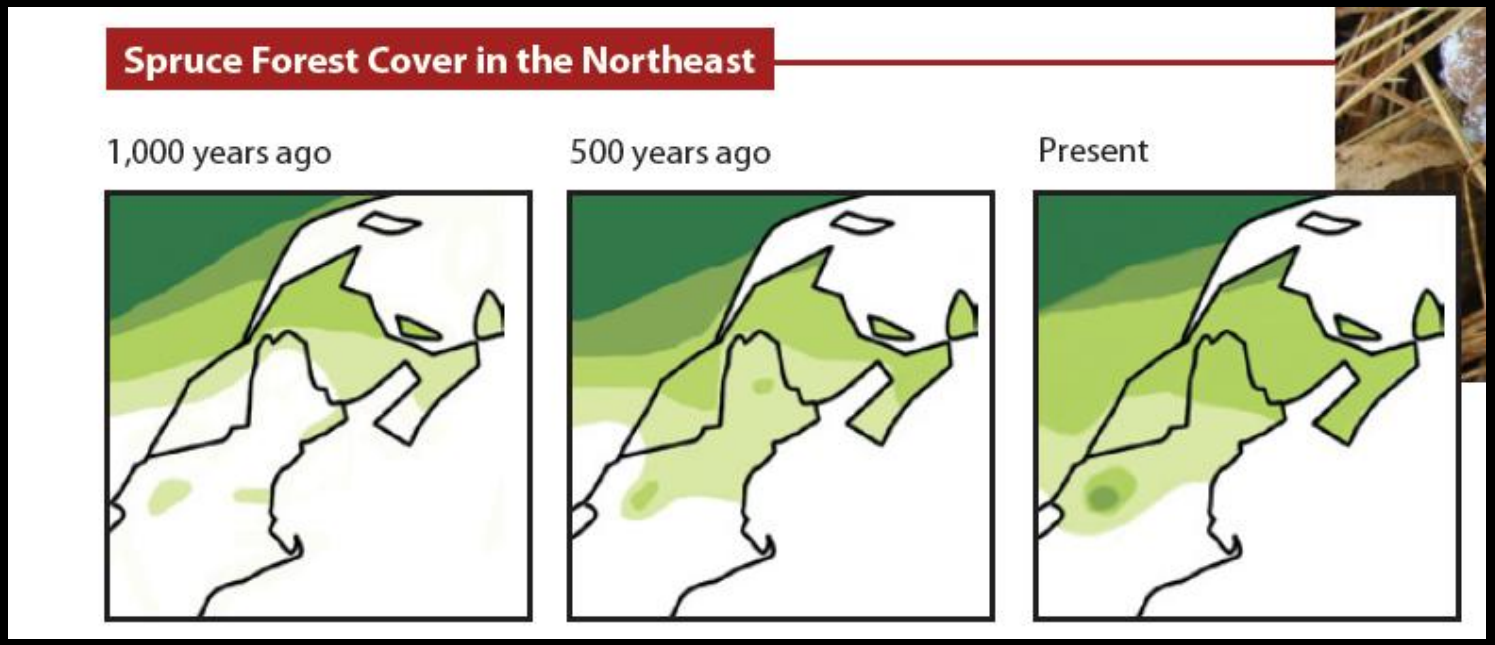
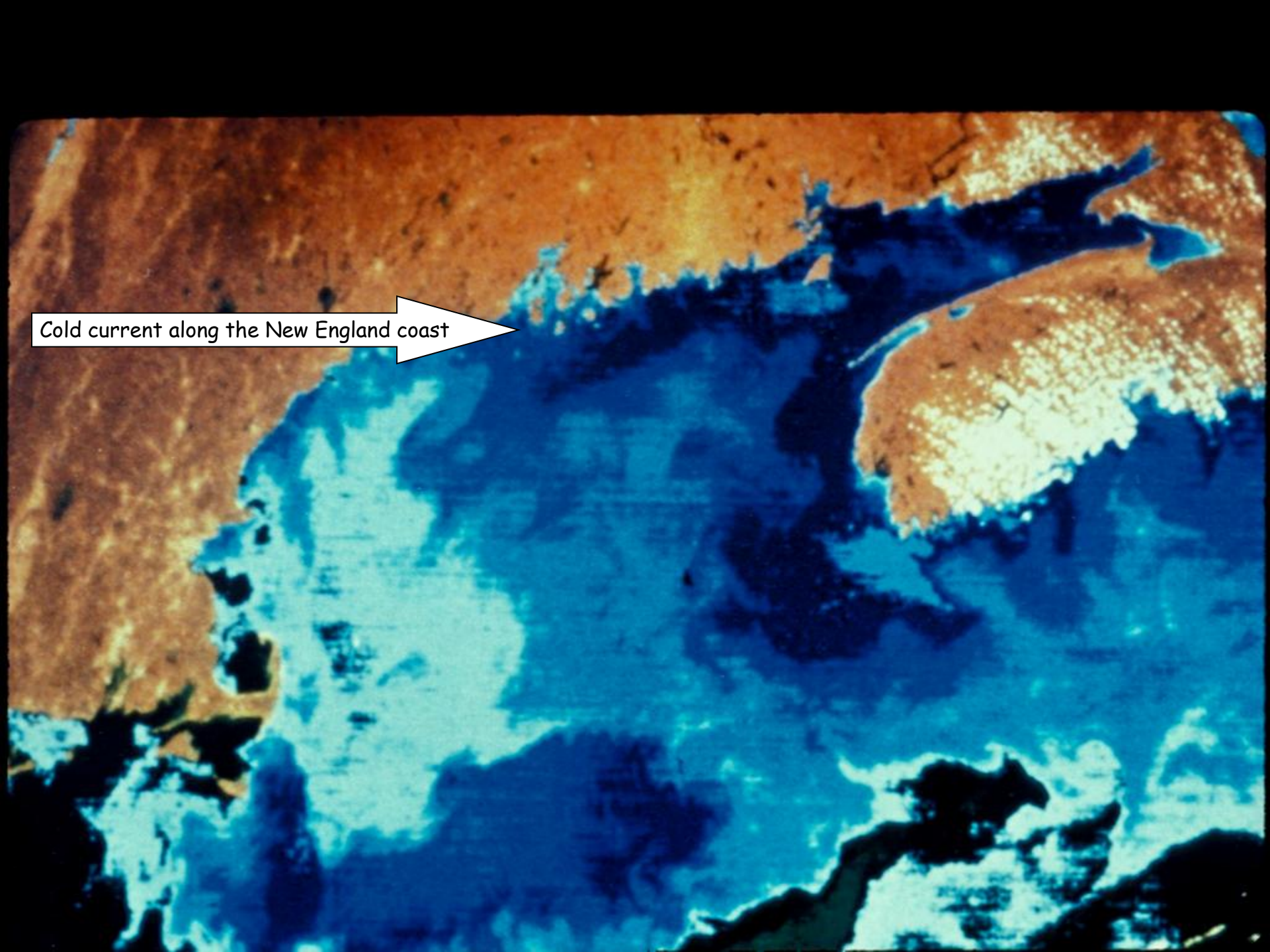
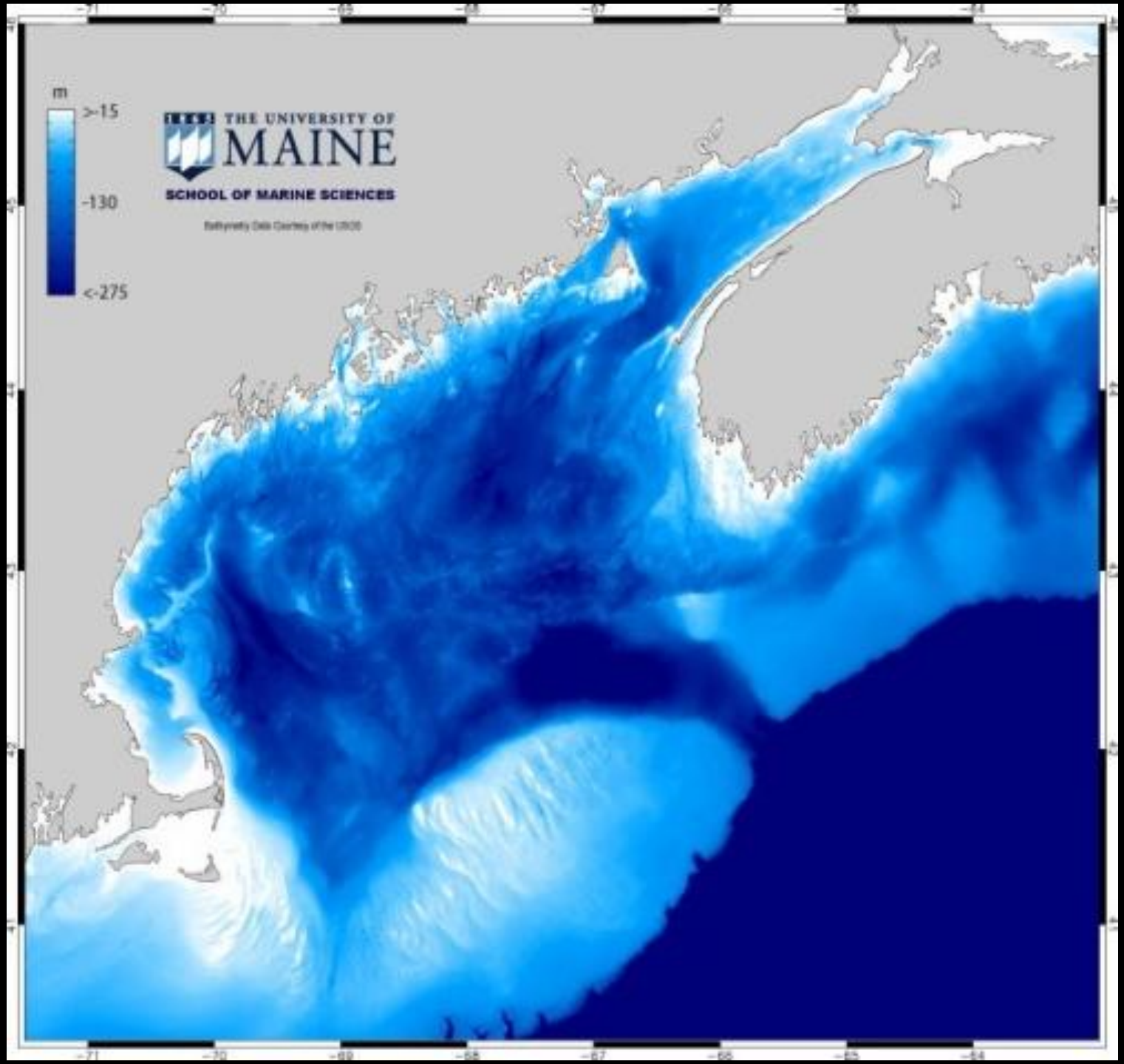


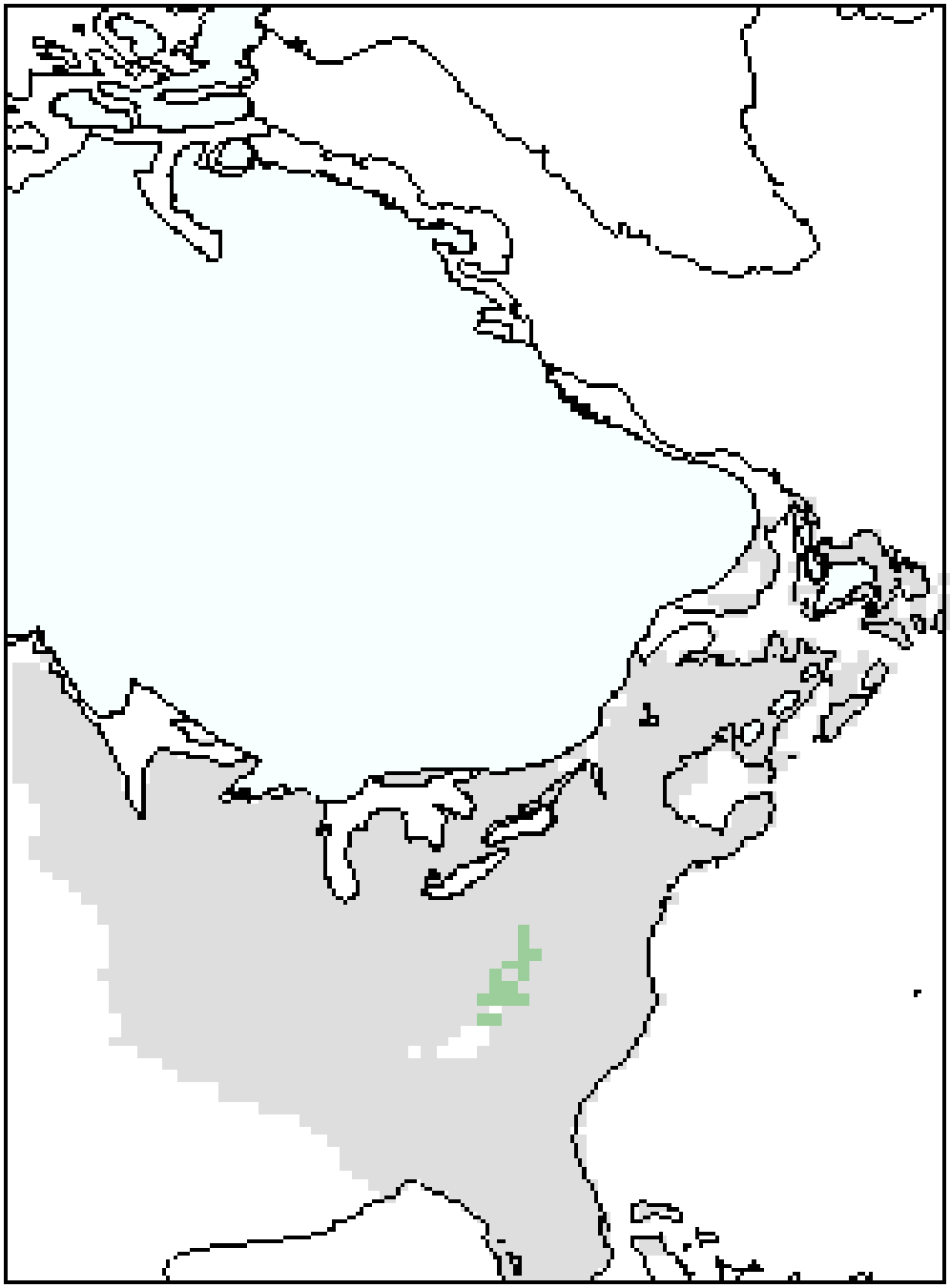
Cooler, moister conditions of the past few thousand years led to decreases in white pine and hemlock, and increases in **spruces** and Balsam fir.




Cold current along the New England coast


m
>-15
-130
<-275
THE UNIVERSITY OF
MAINE
SCHOOL OF MARINE SCIENCES

Hemlock 13000



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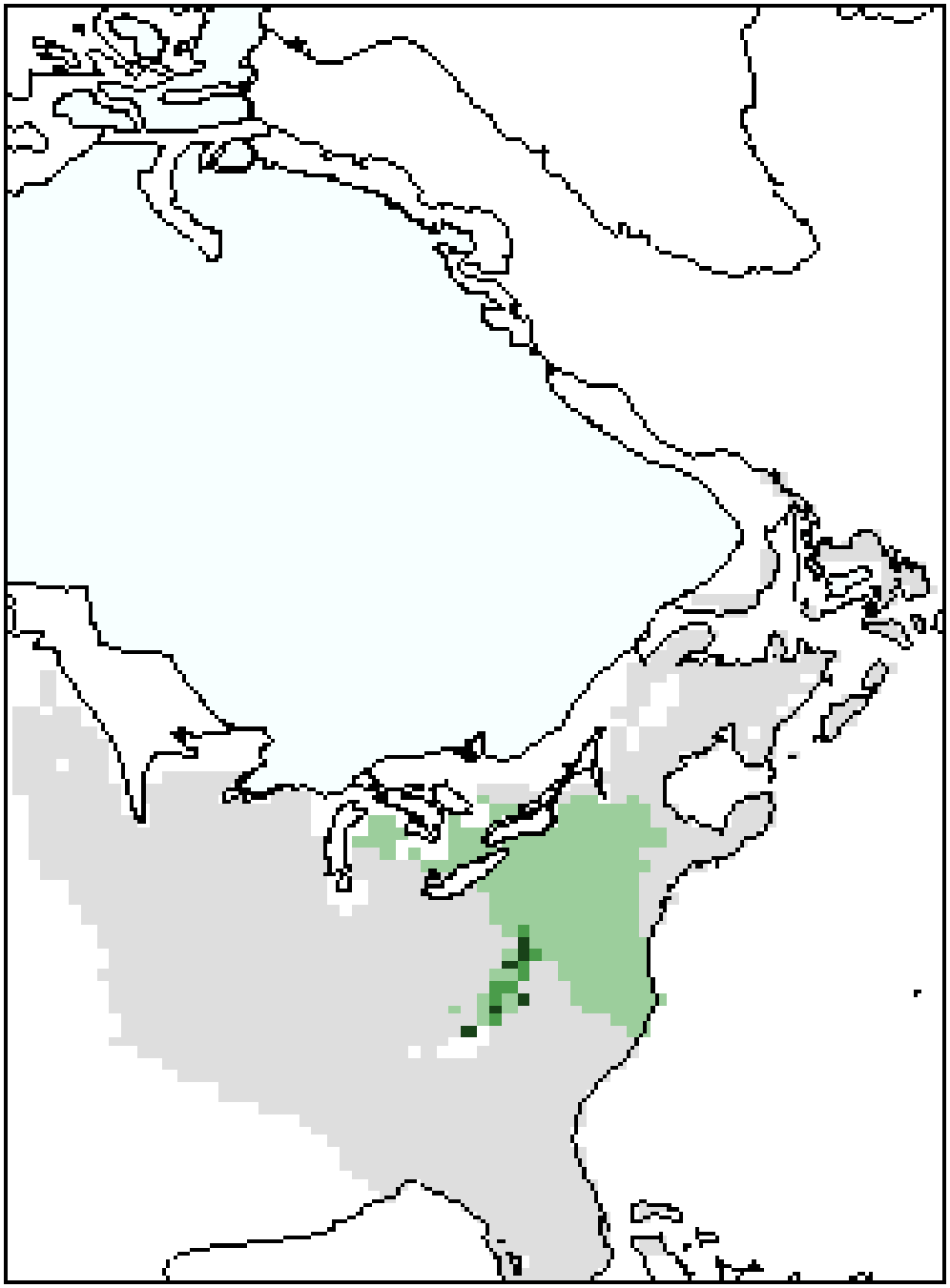

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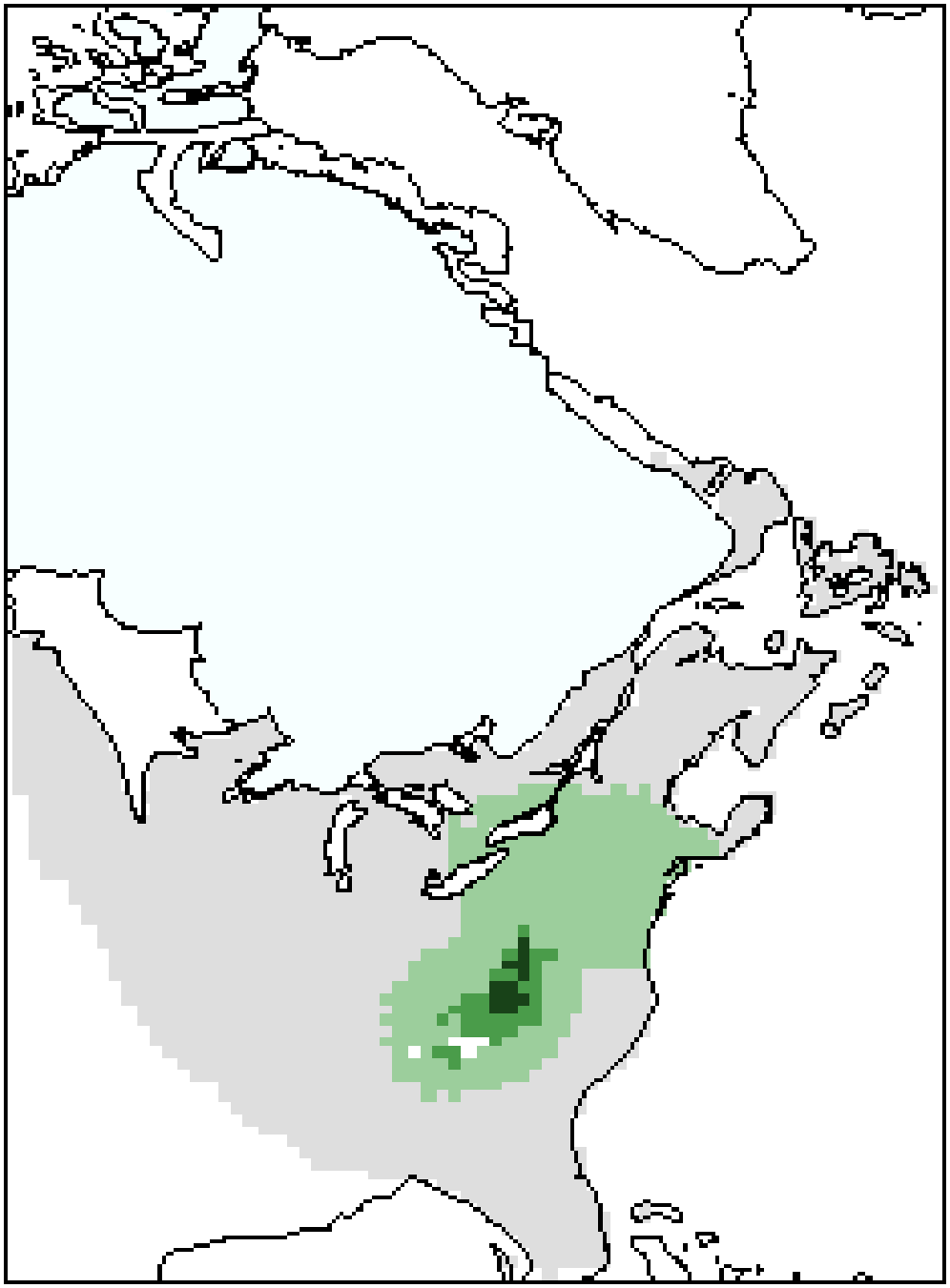

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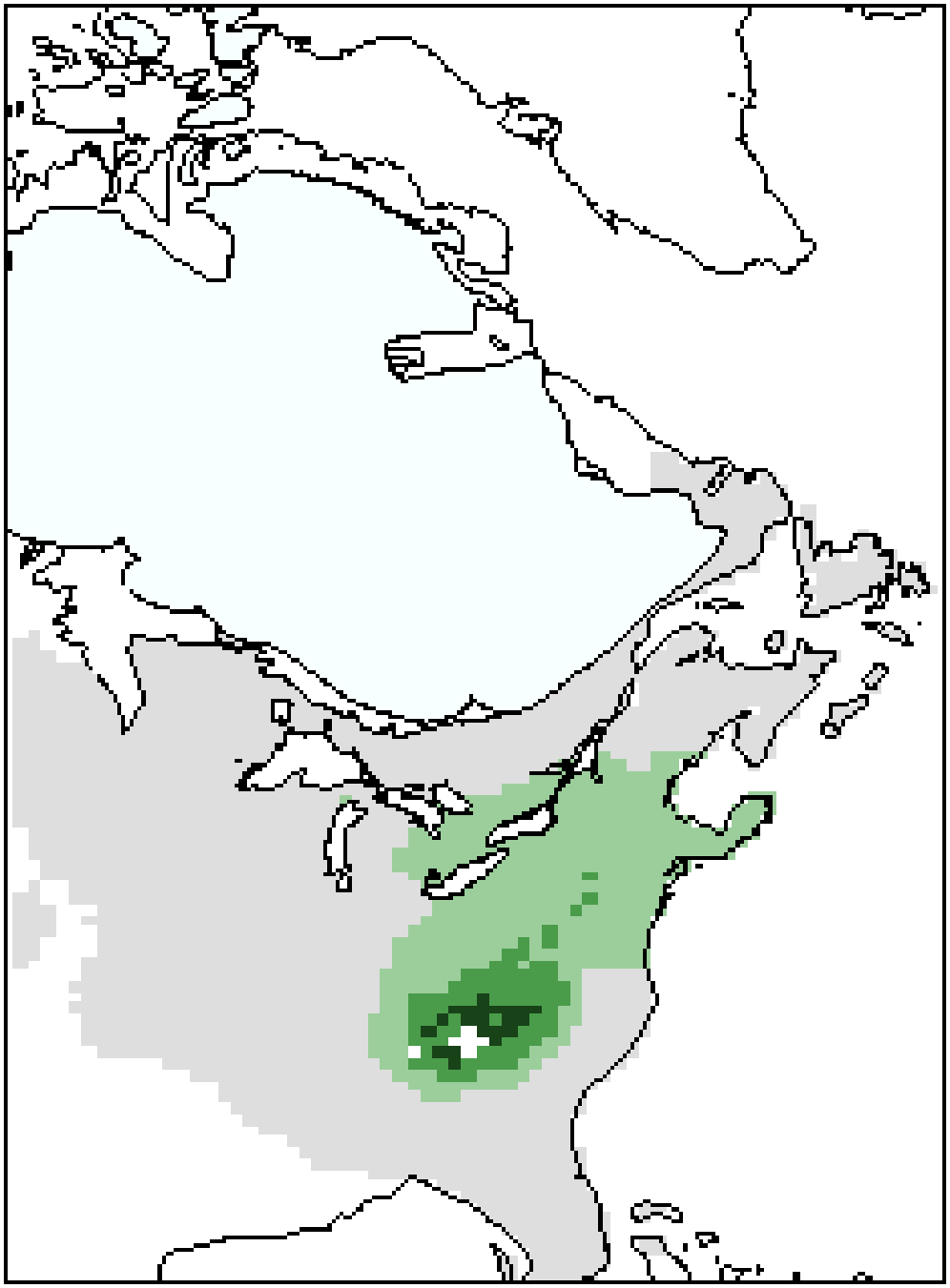

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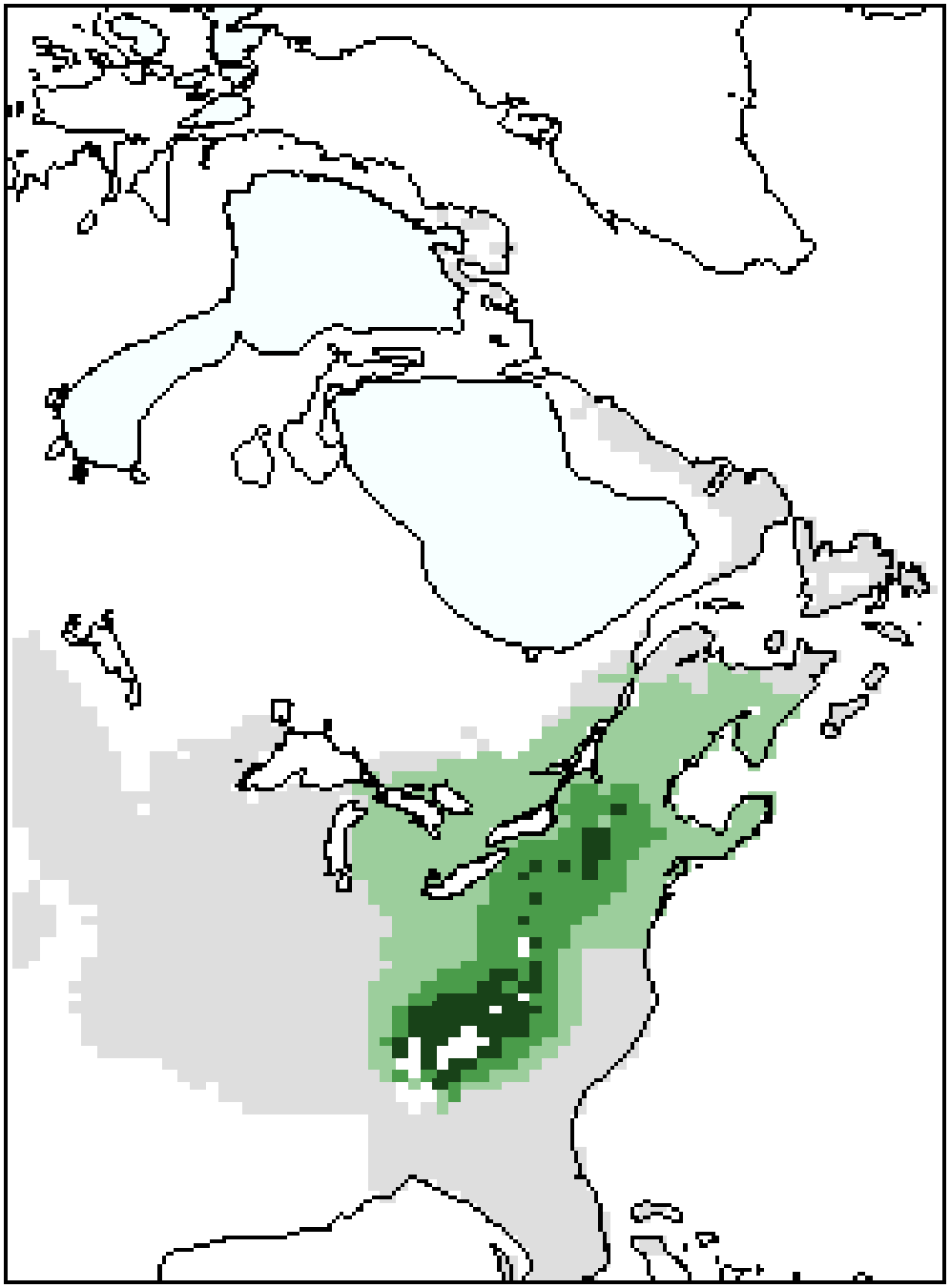

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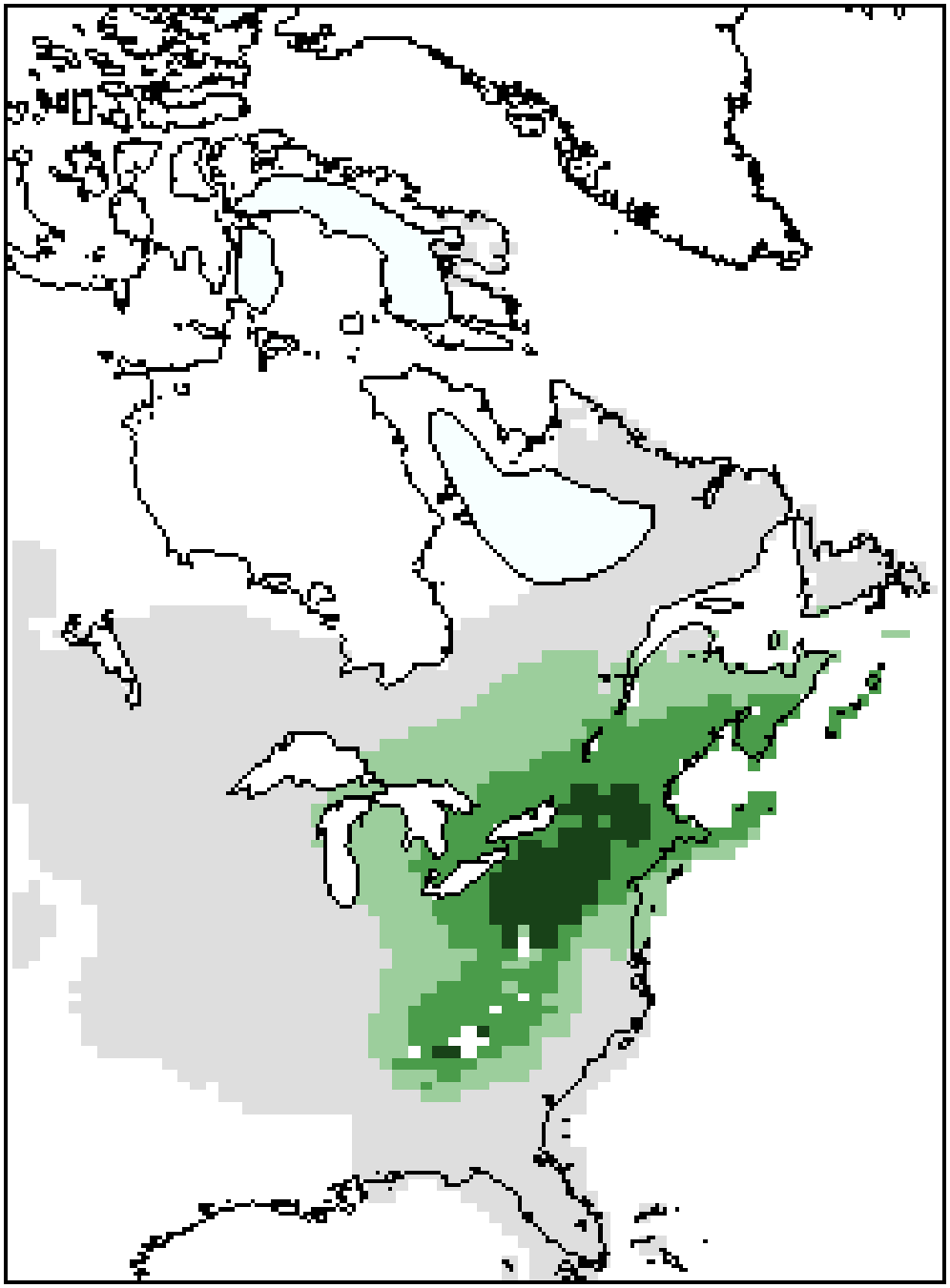

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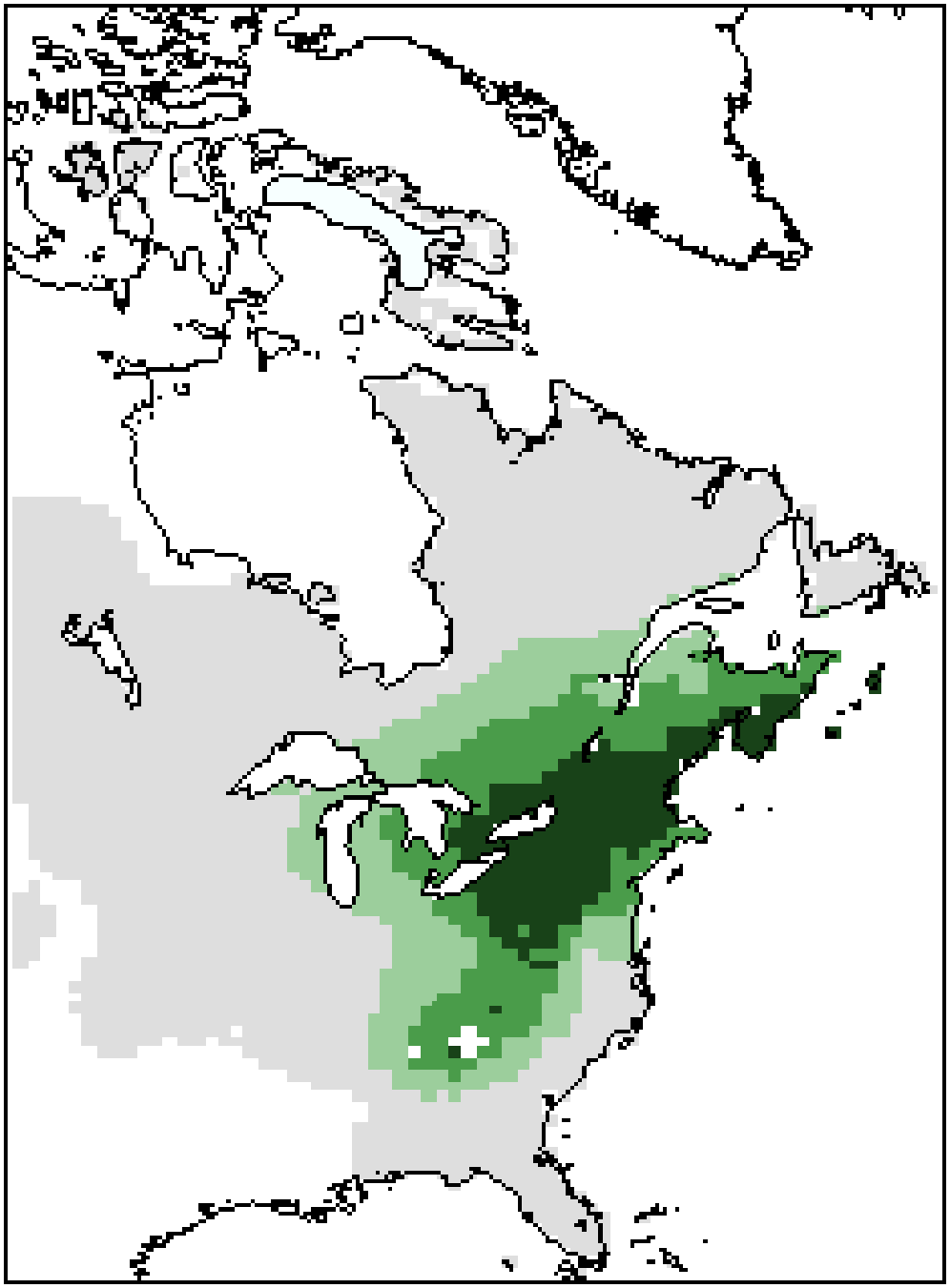

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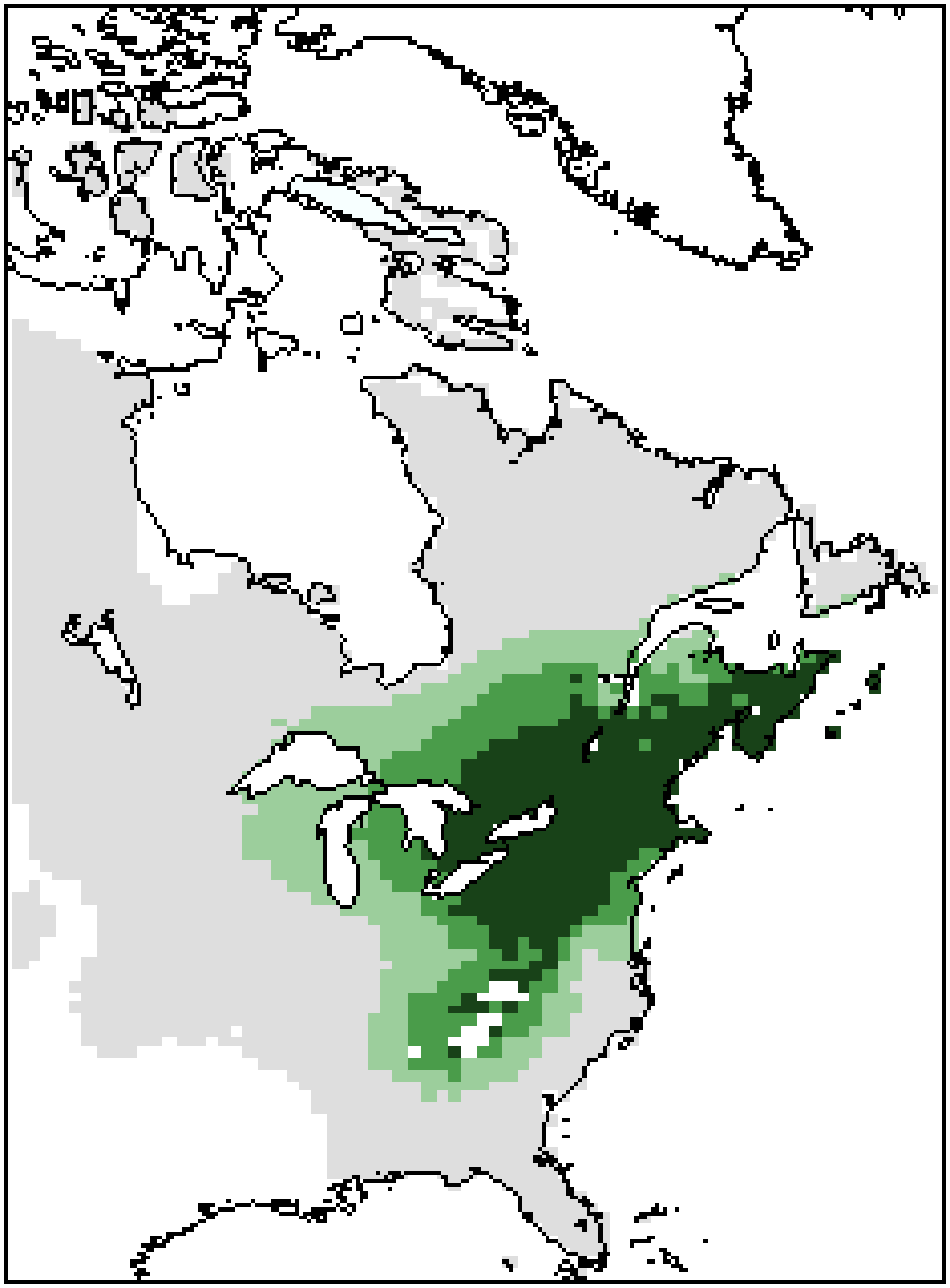

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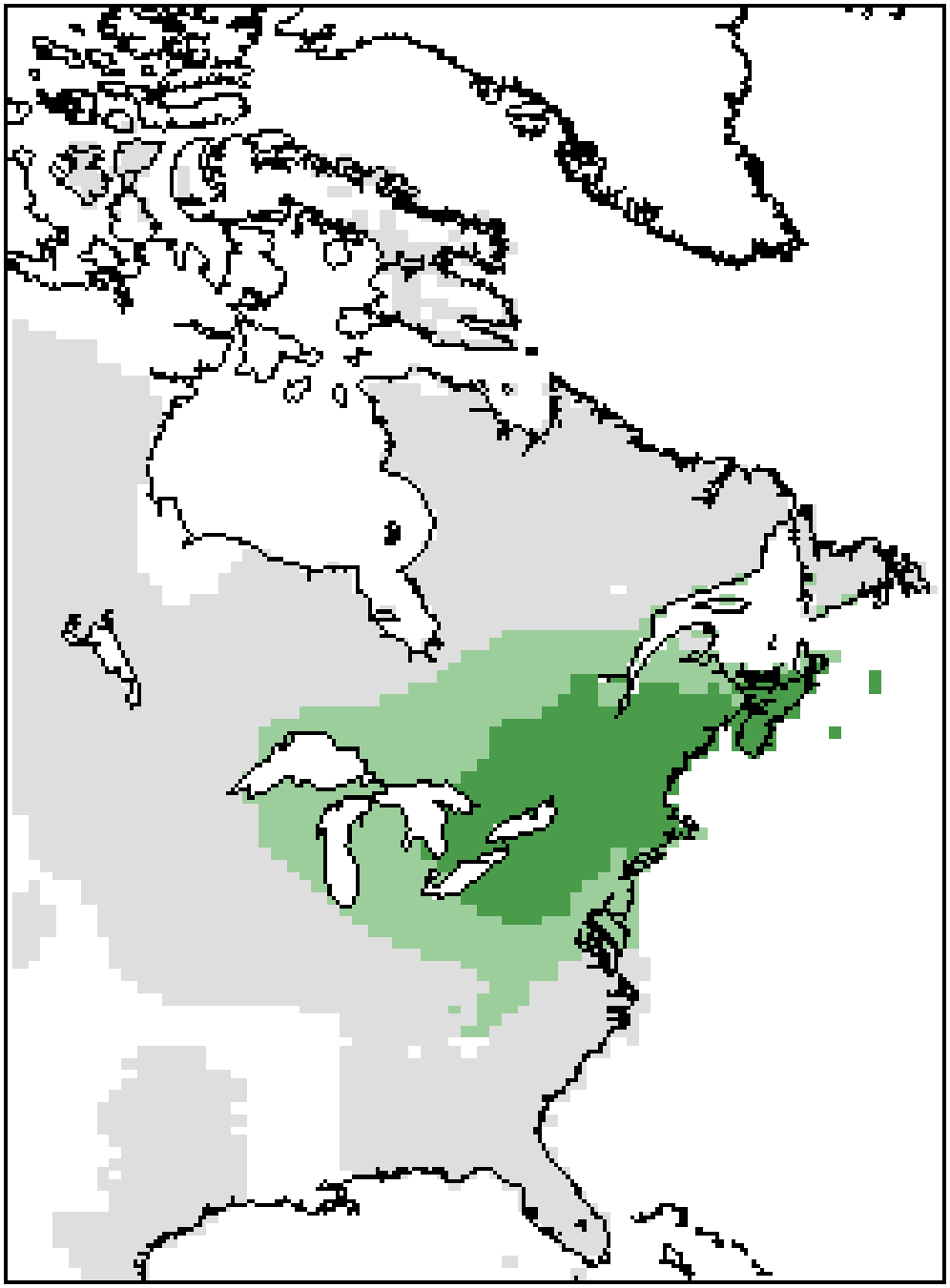

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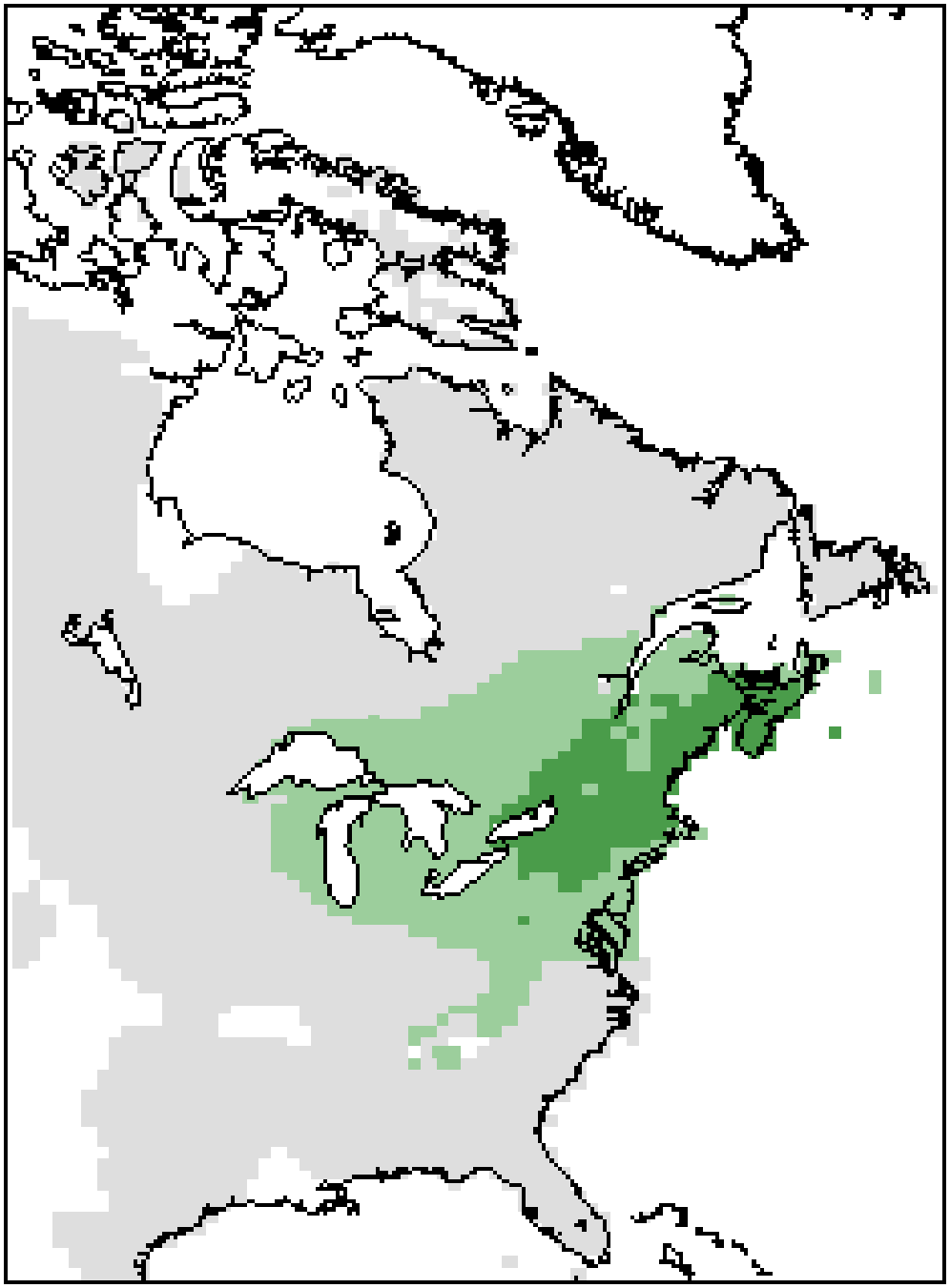

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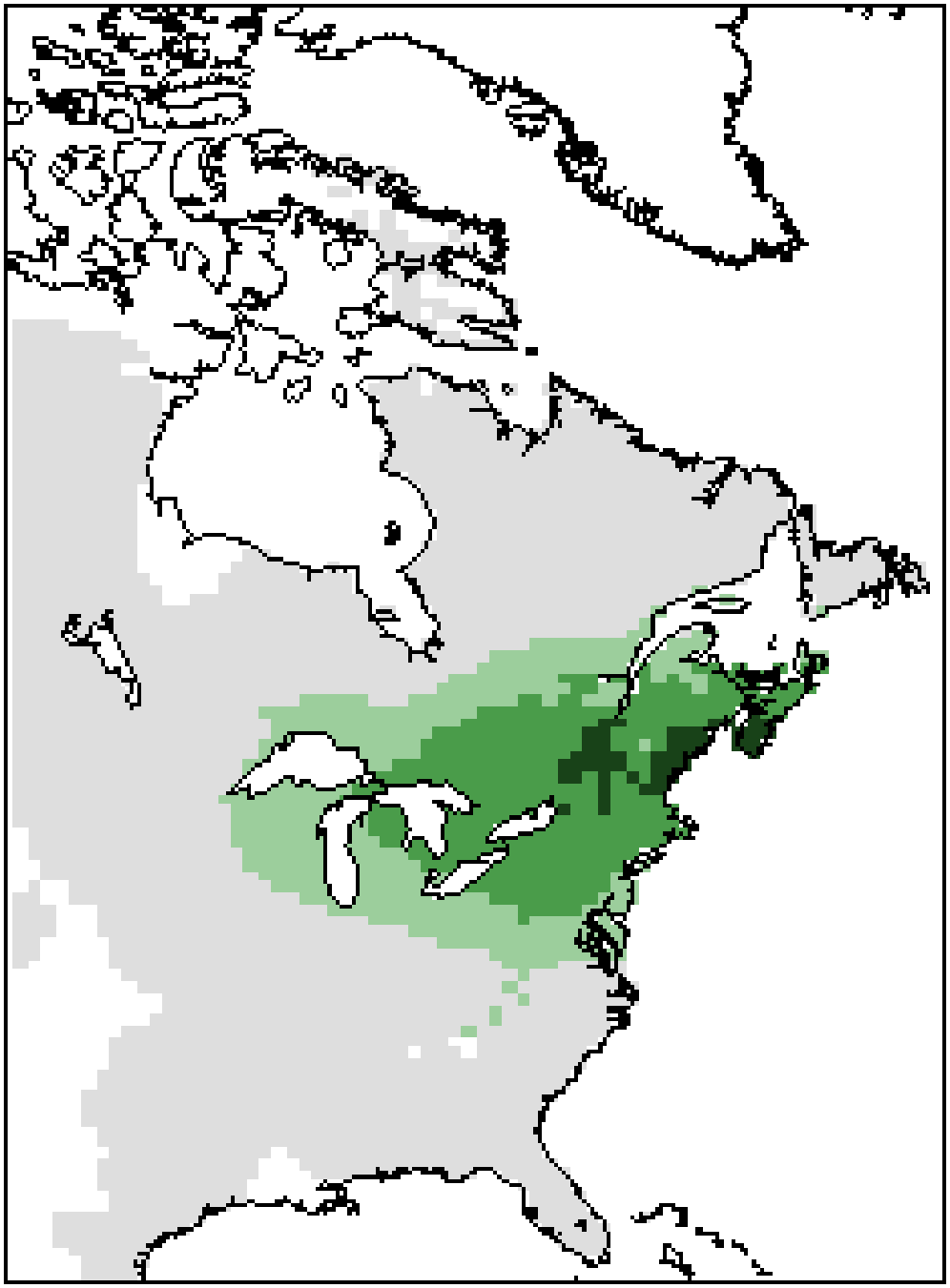

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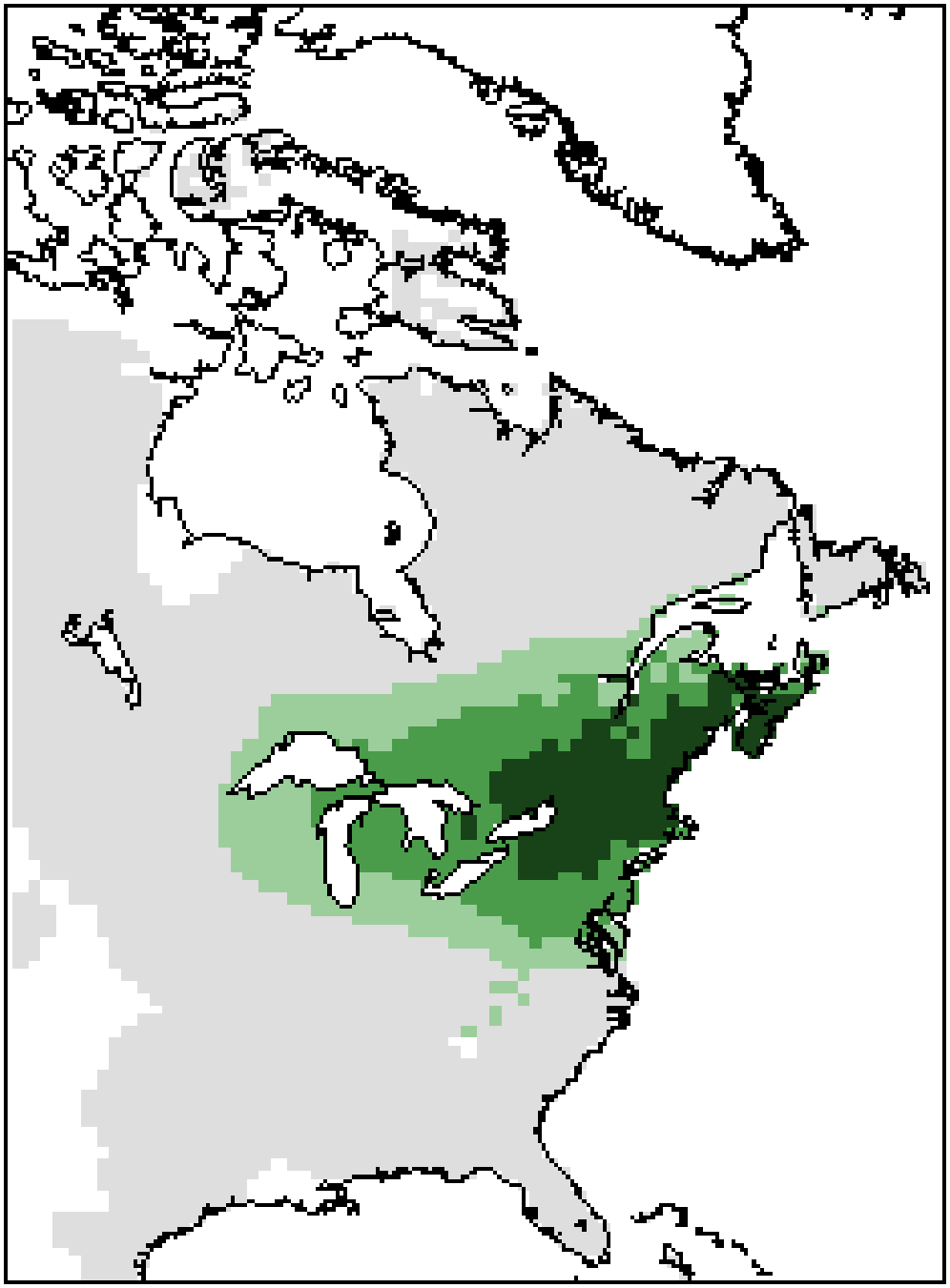

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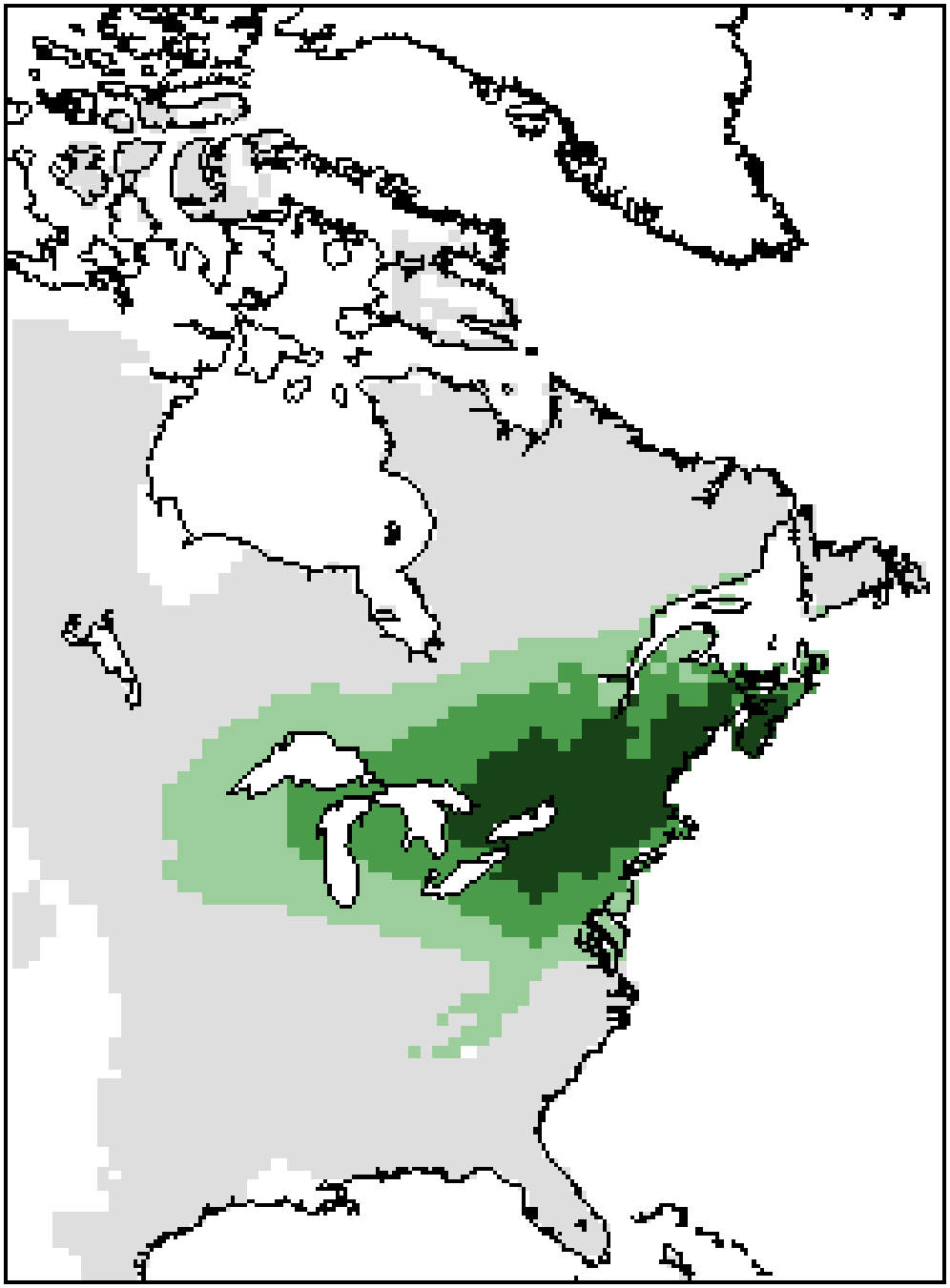
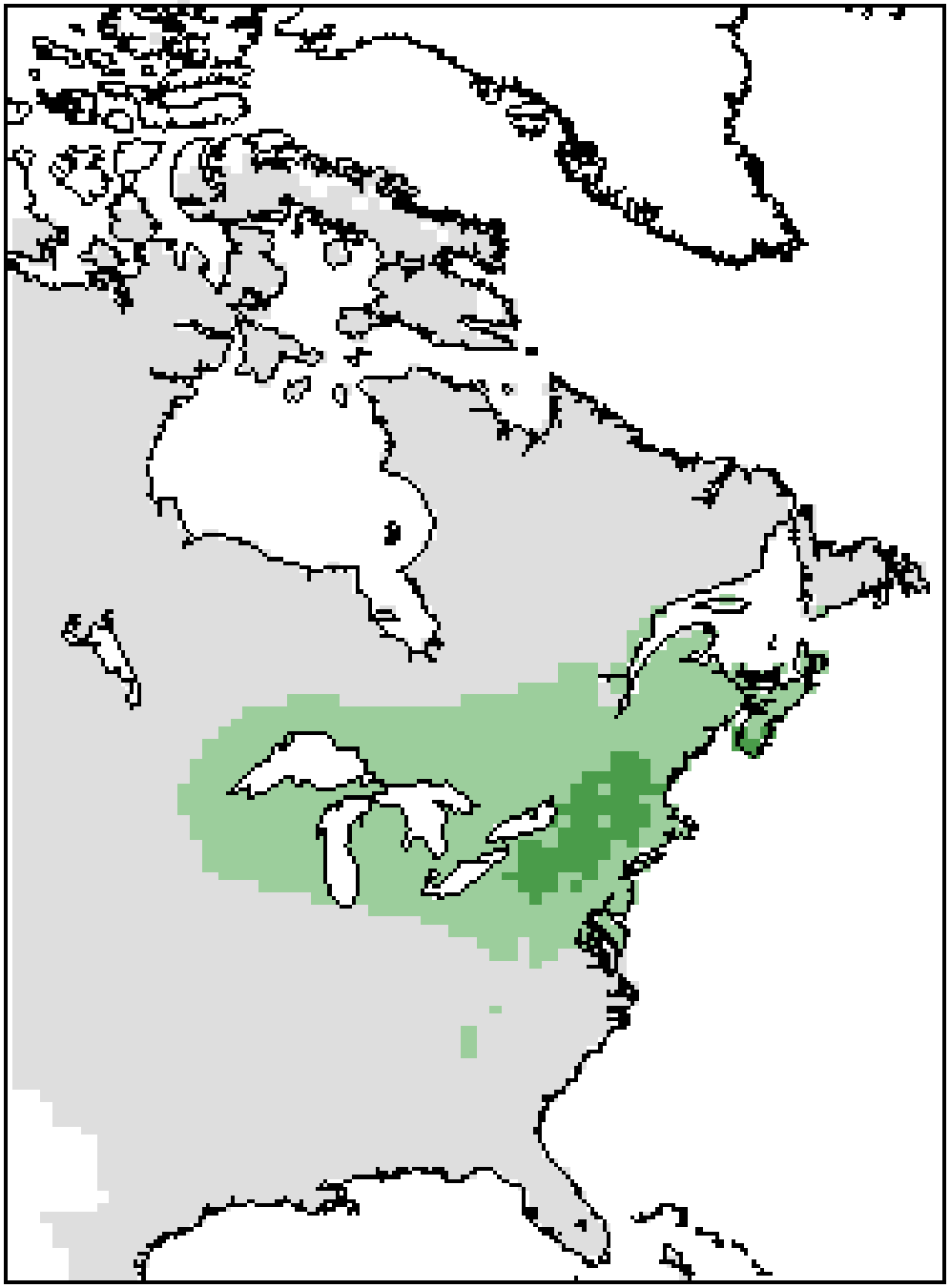
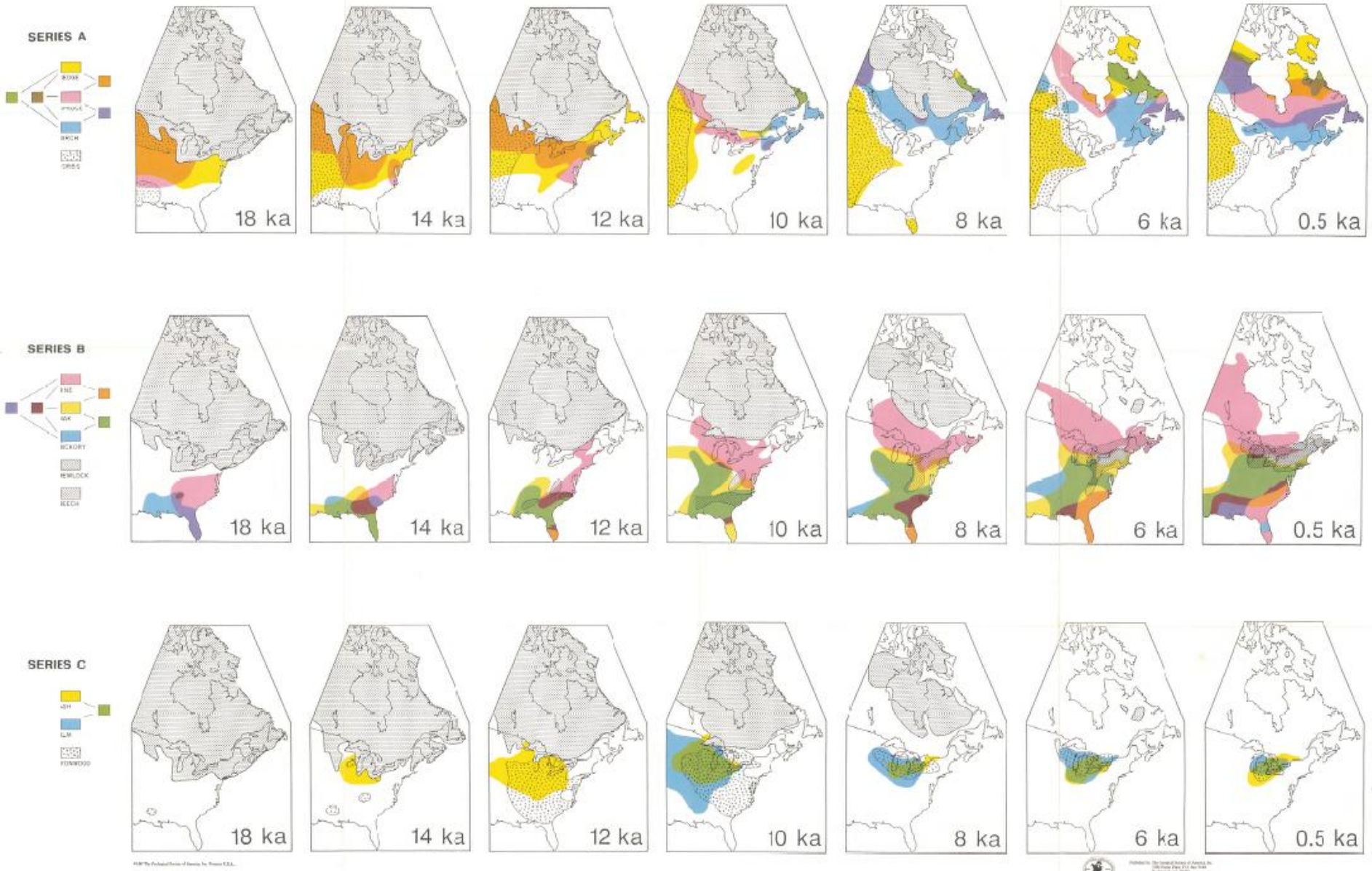


Hemlock Modern



From Jacobson et al. 1987 DNAG v.3



Journal of Paleolimnology (2005) 34: 283–310
DOI 10.1007/s10933-005-4958-8

Late-glacial and Holocene record of lake
and Whitehead Lake, northern Maine, U

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**Author for correspondence (e-mail: ann.dieffenbacher@u*

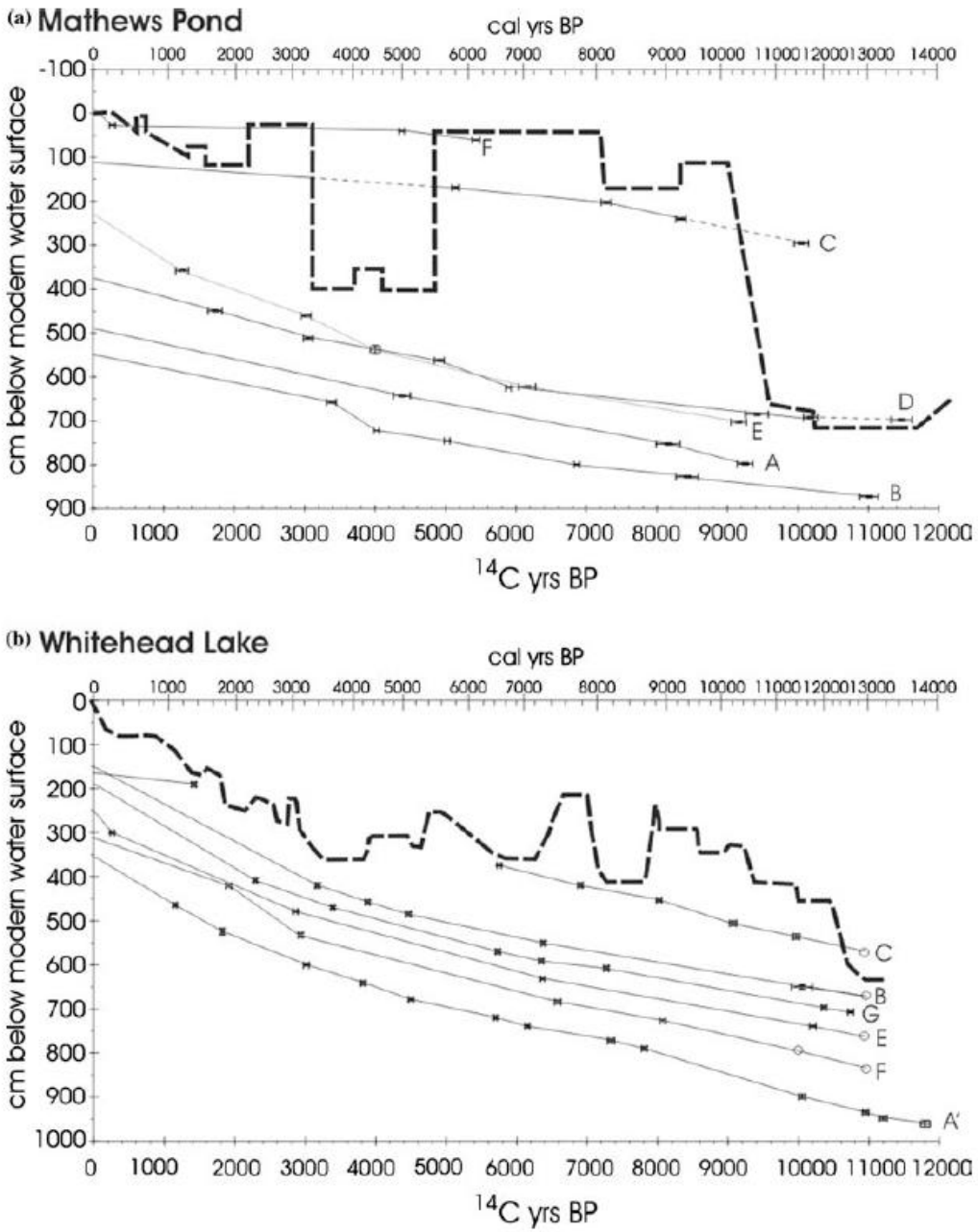

Figure 7. Mathews Pond (a) and Whitehead Lake (b) inferred lake-level changes (bold dashed lines) and age-depth curves. Fine dashed lines indicate possible disconformities. Radiocarbon dates, with error bars, are also shown. Circles indicate Whitehead Lake Younger Dryas dates inferred by comparison with other cores for which radiocarbon dates were obtained on this section.

Paleoecology and the Coarse-Filter Approach to Maintaining Biological Diversity

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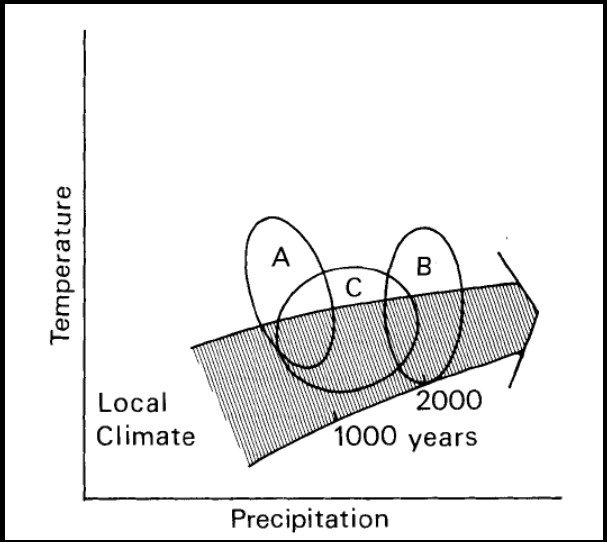
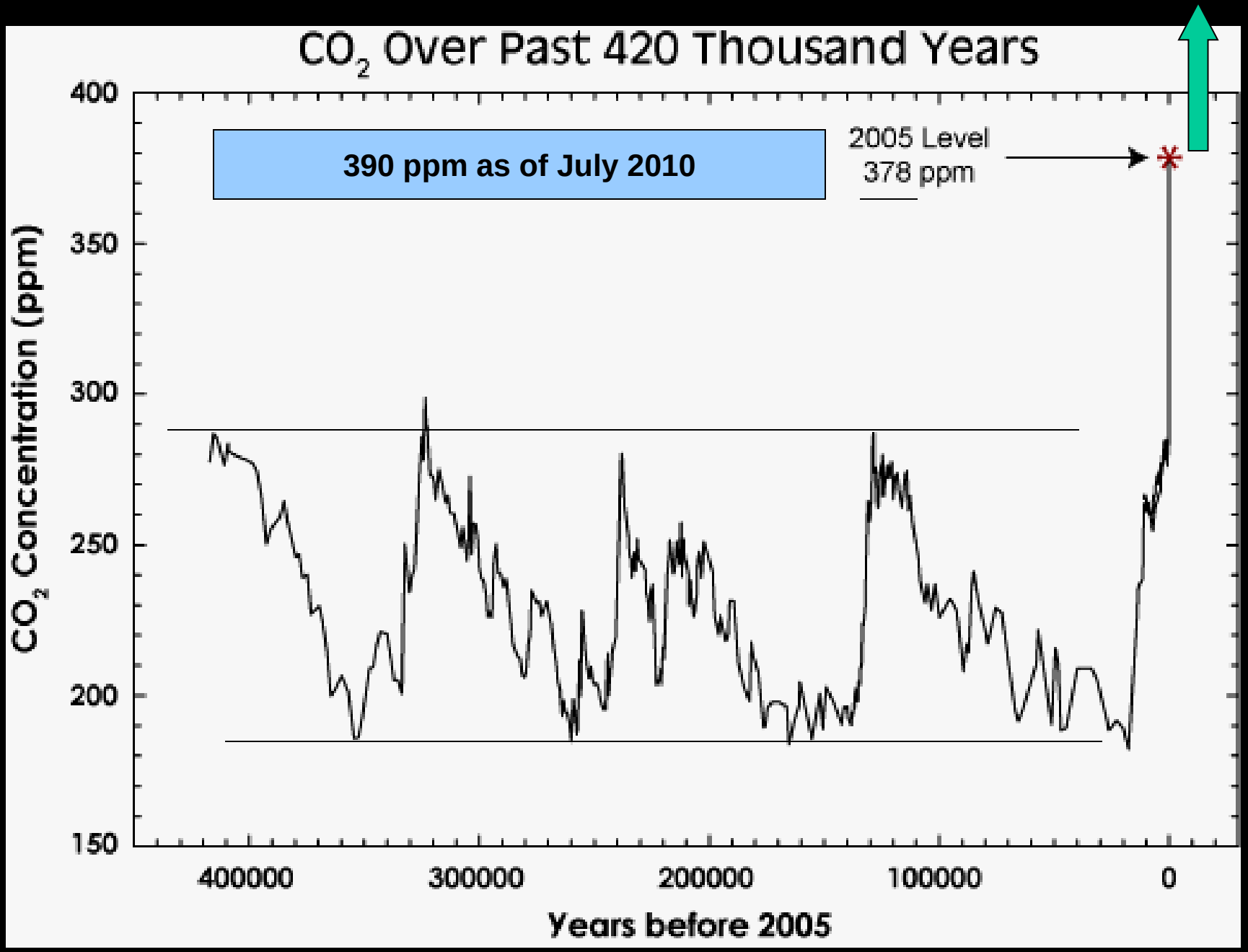
Conservation Biology 2:375-385. 1988.




CO2 Over Past 420 Thousand Years
390 ppm as of July 2010
2005 Level
378 ppm
CO2 Concentration (ppm)
400
350
300
250
200
150
400000
300000
200000
100000
0
Years before 2005

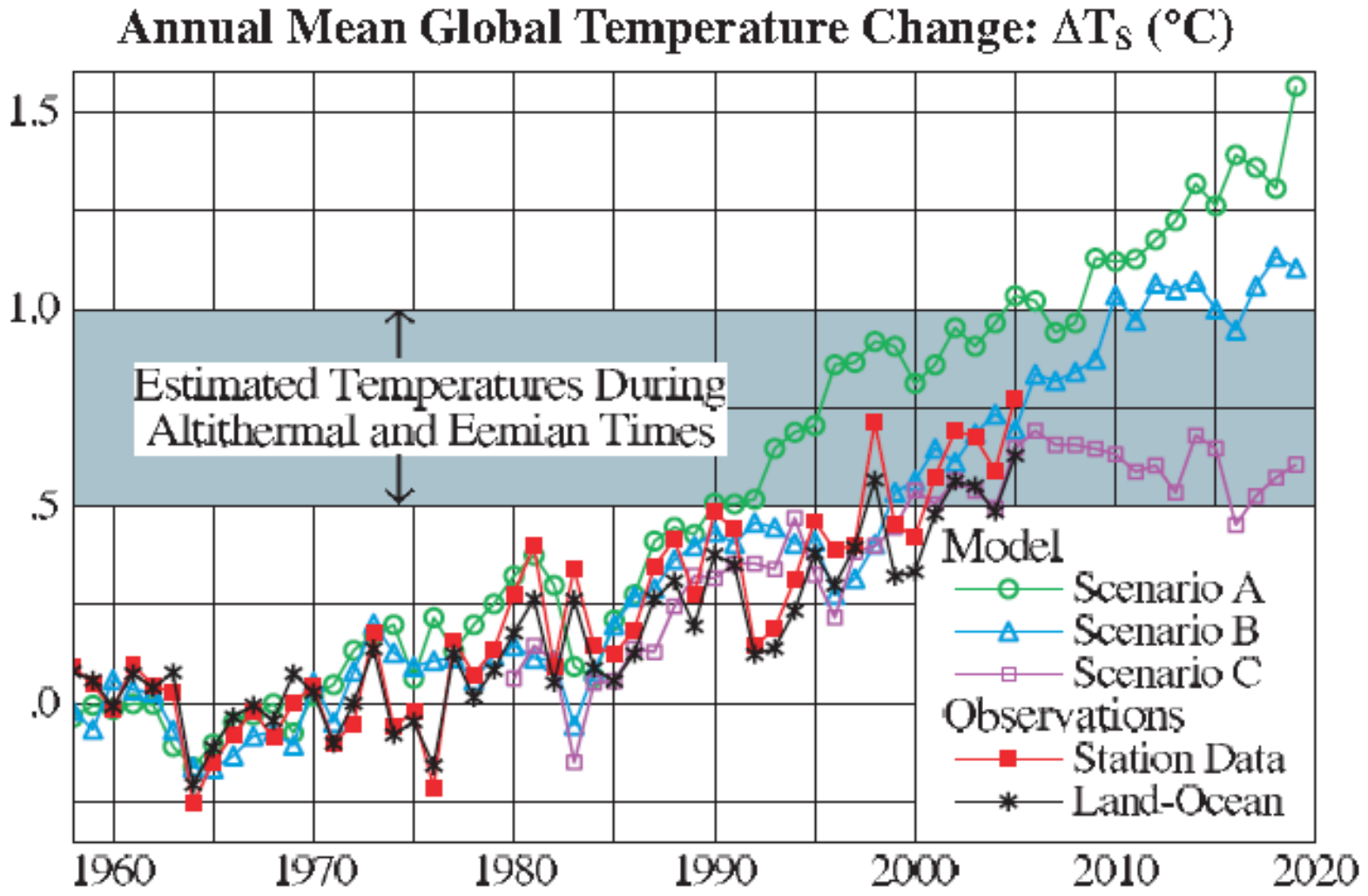


Fig. 2. Global surface temperature computed for scenarios A, B, and C (12), compared with two analyses of observational data. The 0.5°C and 1°C temperature levels, relative to 1951–1980, were estimated (12) to be maximum global temperatures in the Holocene and the prior interglacial period, respectively.