Erin Simons-Legaard

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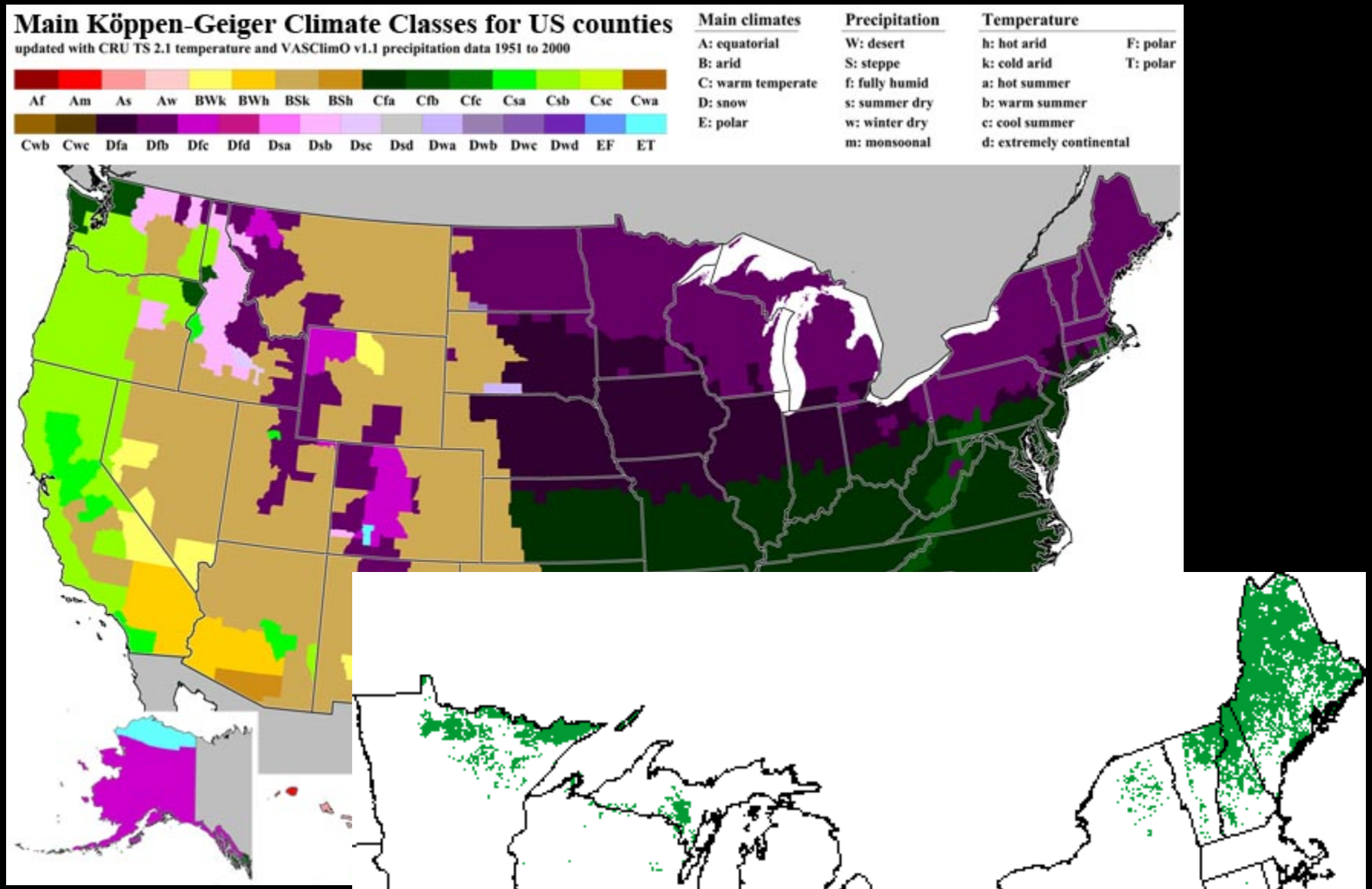
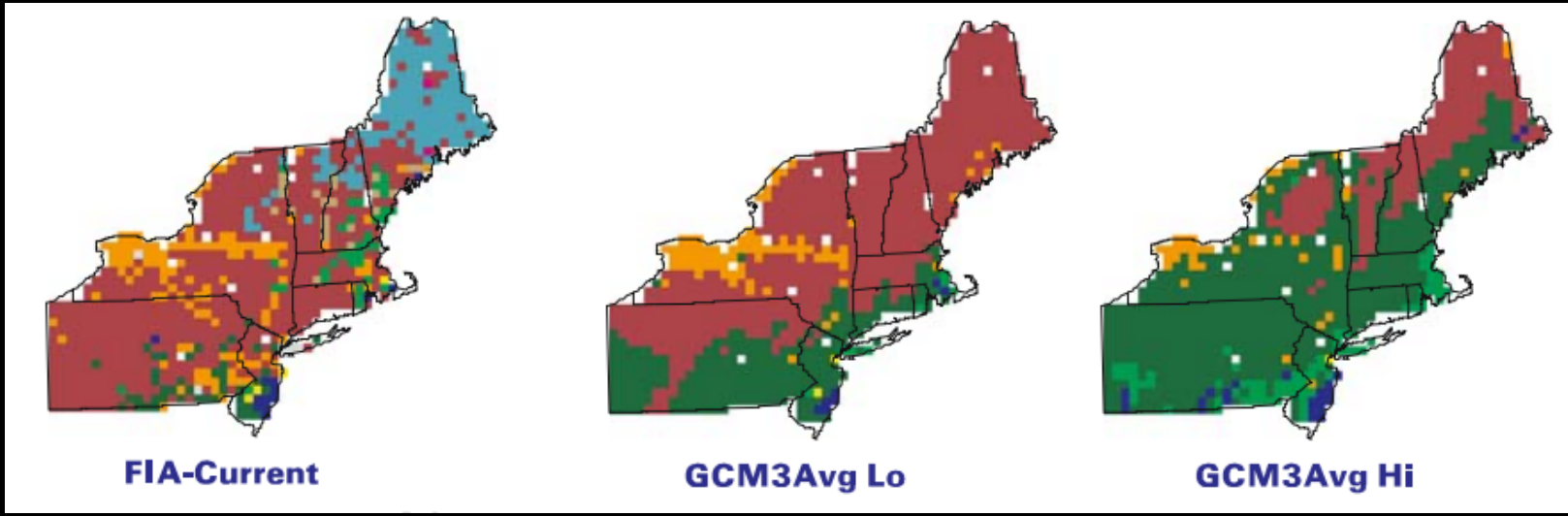


Fig 1. Distribution of the spruce-fir forest type group. Photo credit: US Forest Service, Northern Global Change Research Program (https://www.fs.fed.us/ne/global/index.html)

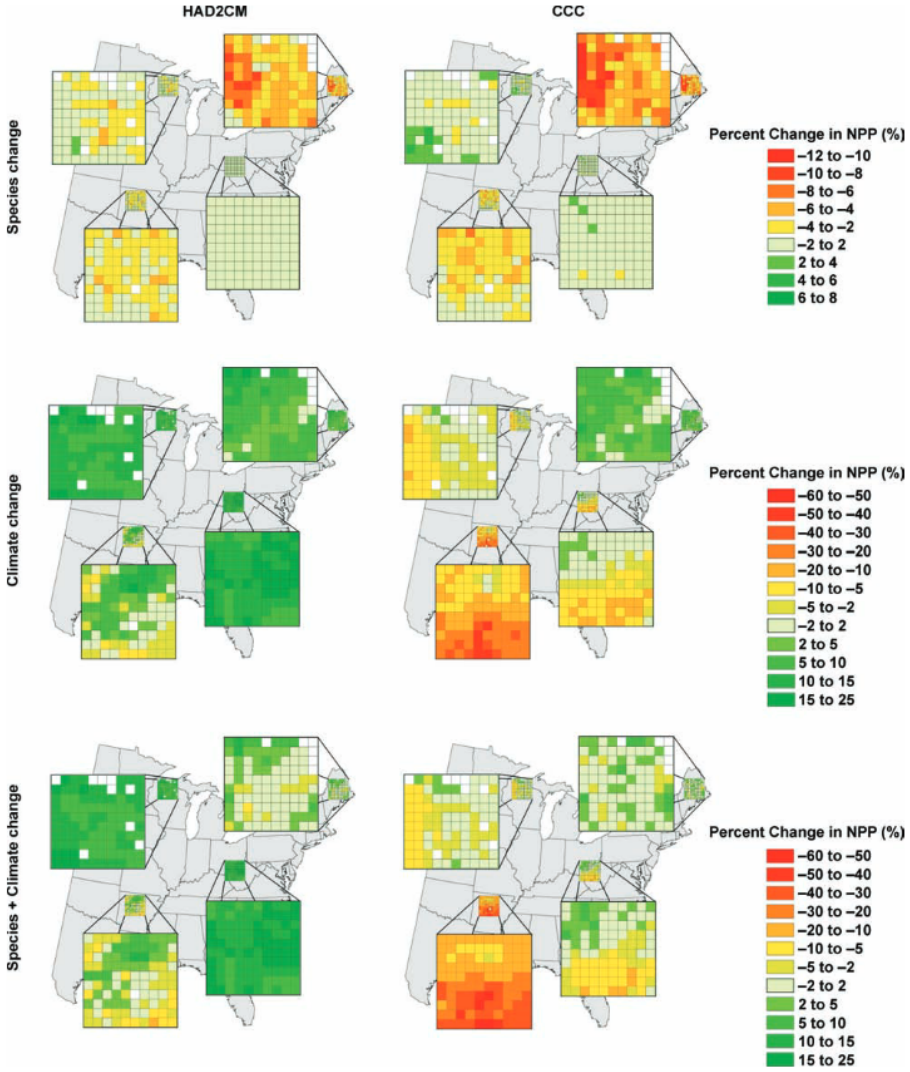
Modeling potential climate change impacts on the trees of the northeastern United States

Louis Iverson • Anantha Prasad • Stephen Matthews



Effects of Climate Change and Shifts in Forest Composition on Forest Net Primary Production

Jyh-Min Chiang[1*], Louts R. Iverson[2], Anantha Prasad[†] and Kim J. Brown[1]



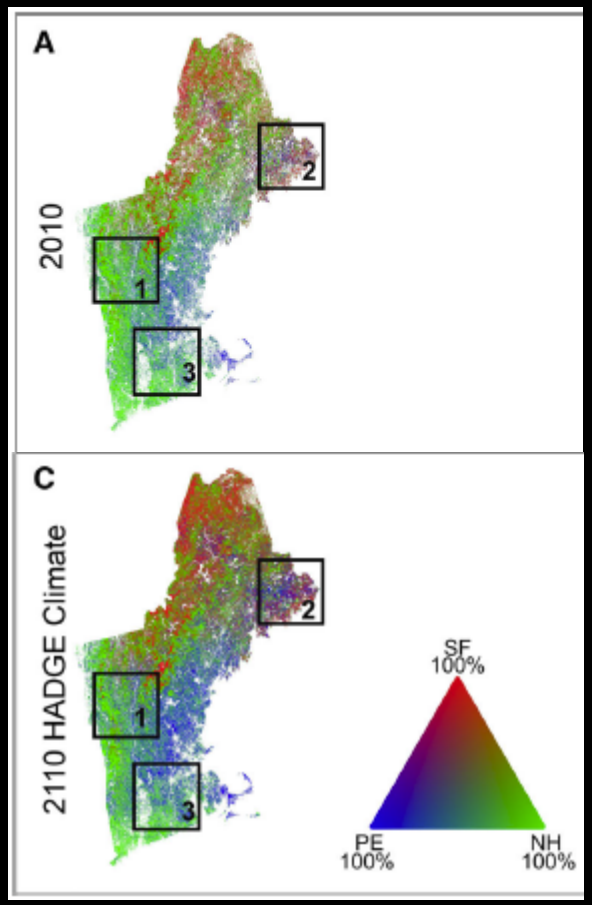
-12 to -2% from species change

2 to 25% from climate change

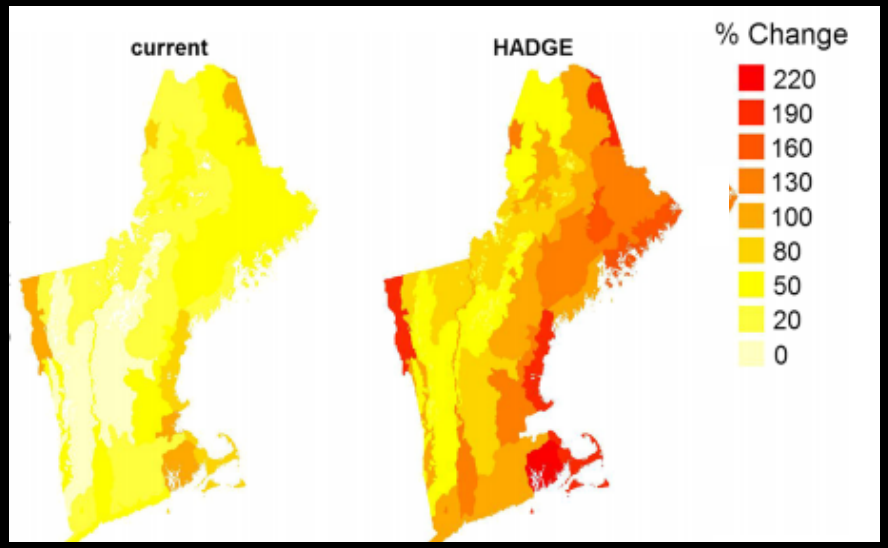
Net -5% to 5% NPP change

Recovery dynamics and climate change effects to future New England forests

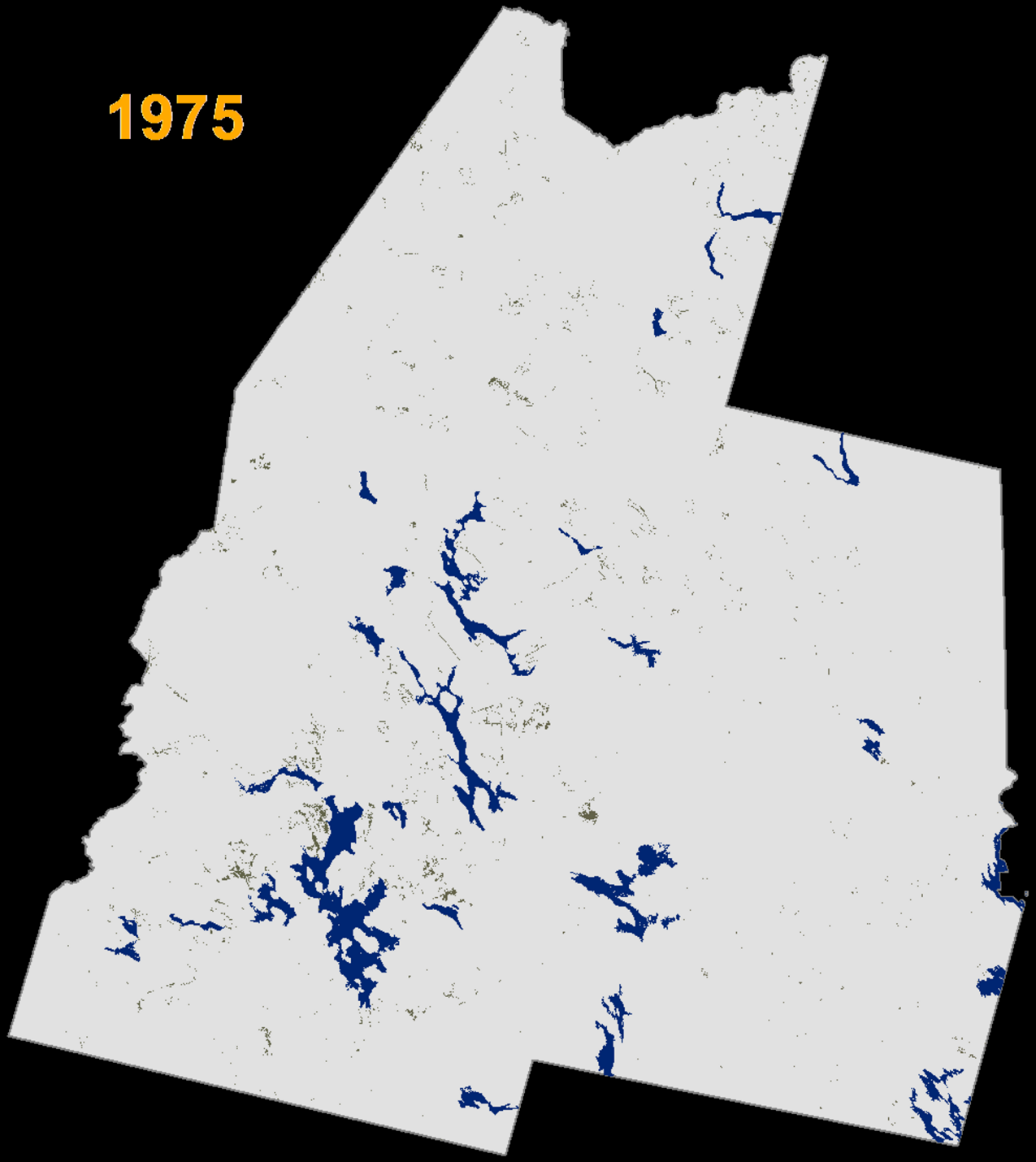
Matthew J. Duveneck · Jonathan R. Thompson · Eric J. Gustafson · Yu Liang · Arjan M. G. de Bruijn

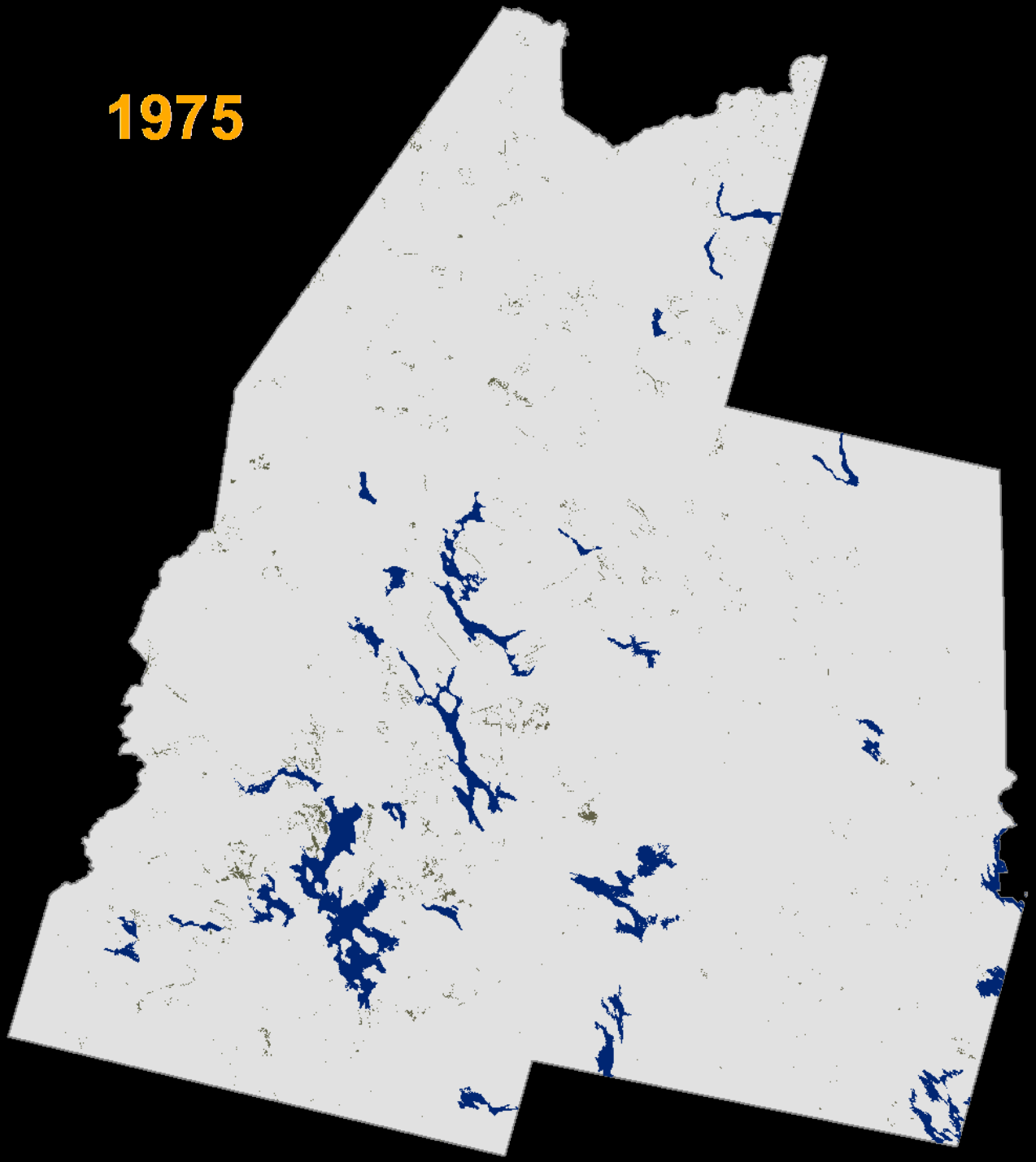


Spatial dominance of forest types largely unchanged



Increased AGB (Total and most species, including spruce-fir)


1975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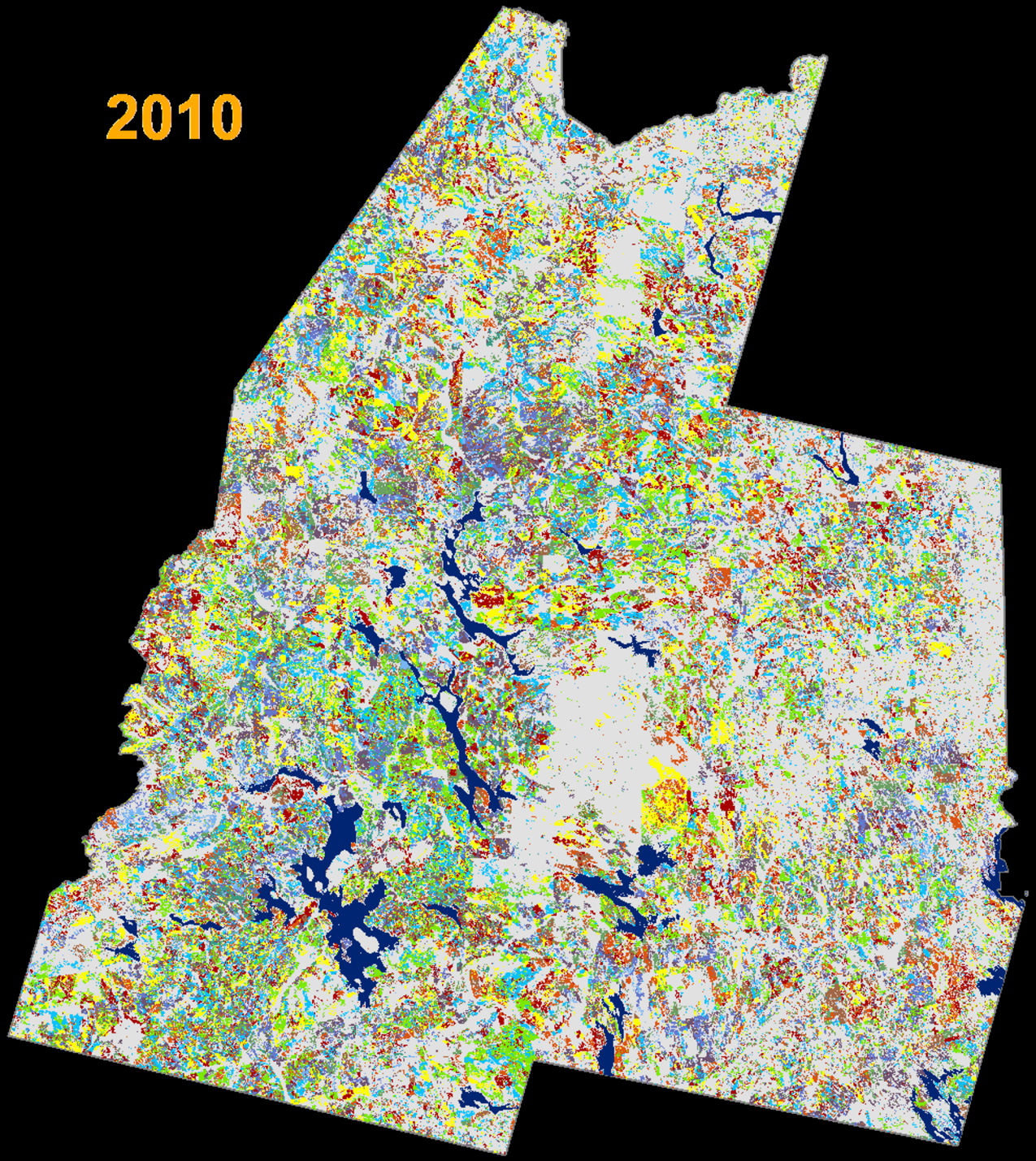
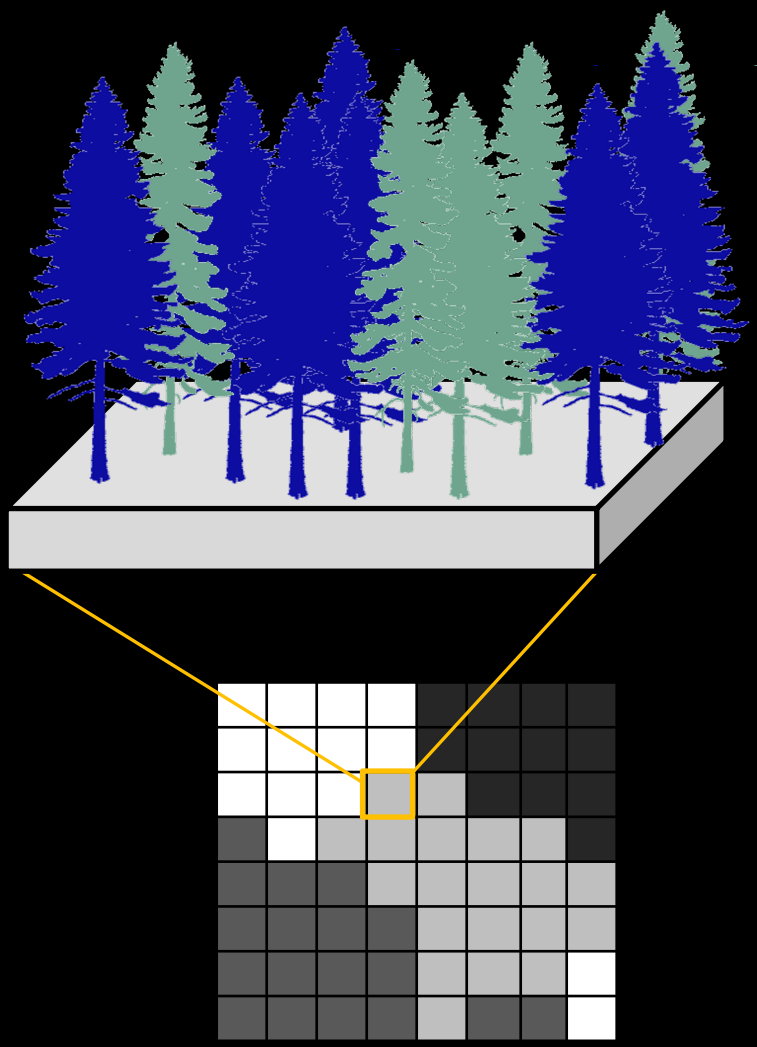
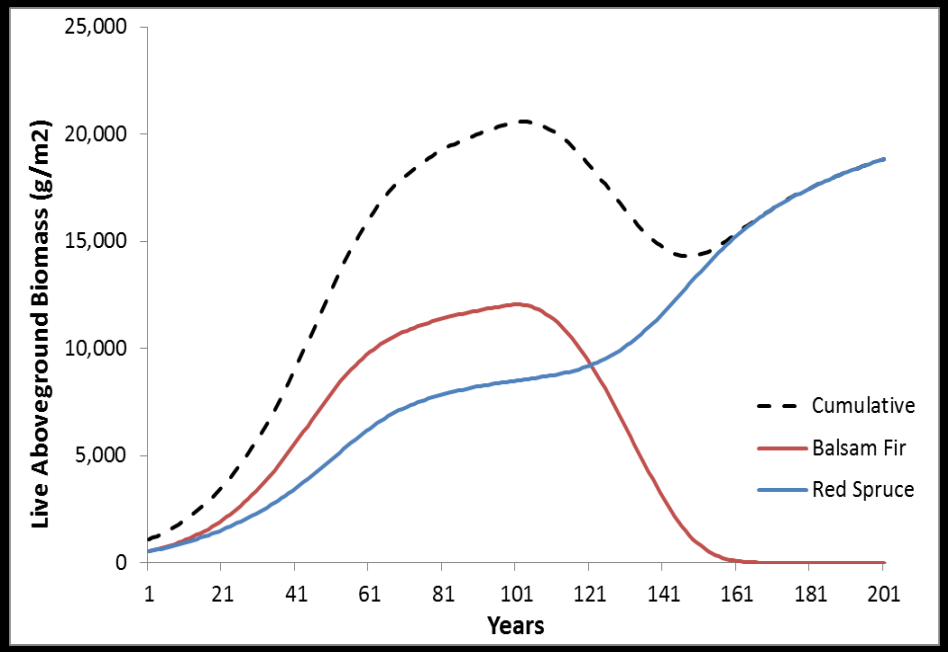

2010

LANDIS-II

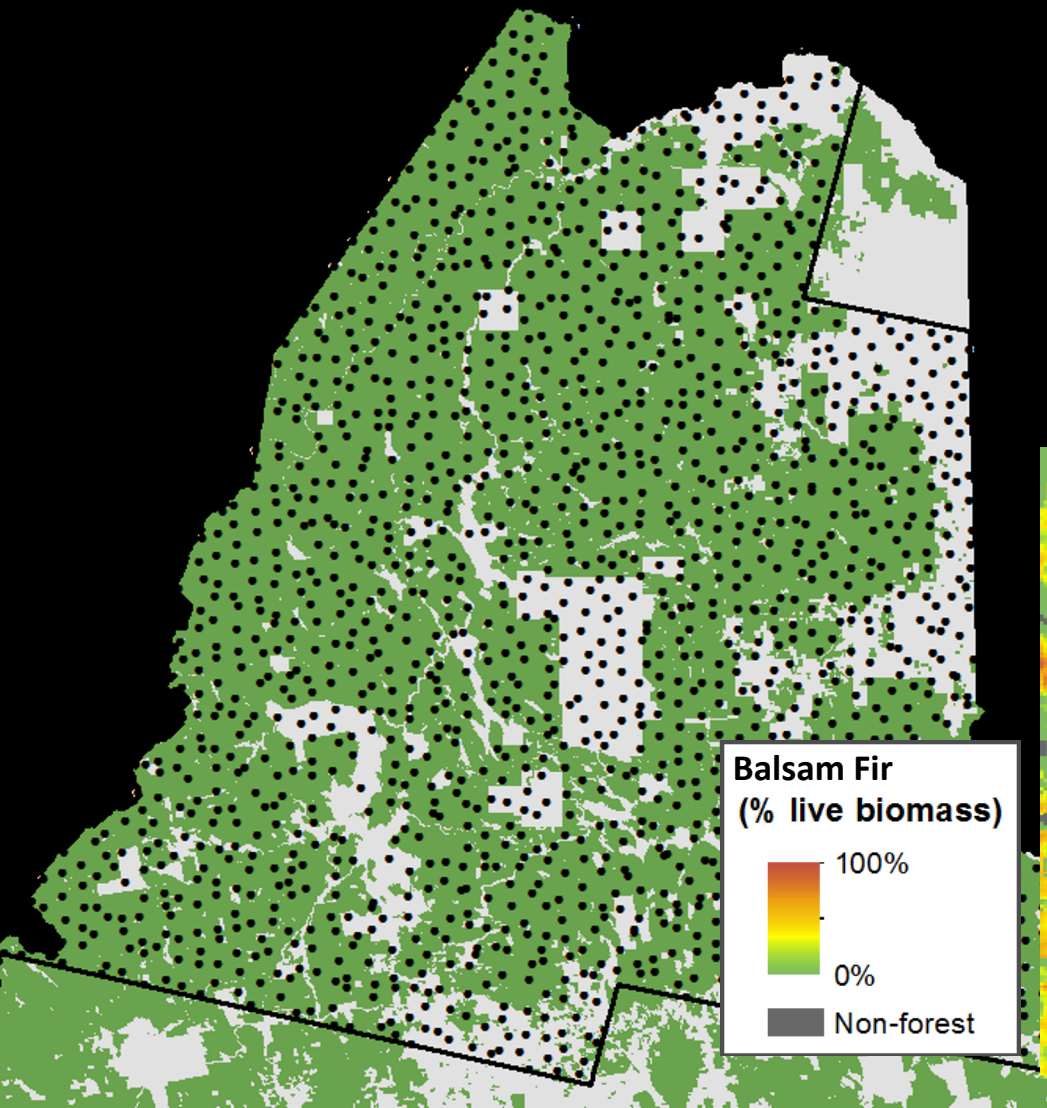
sponsored by



Red spruce, 100 years
Balsam Fir, 90 years

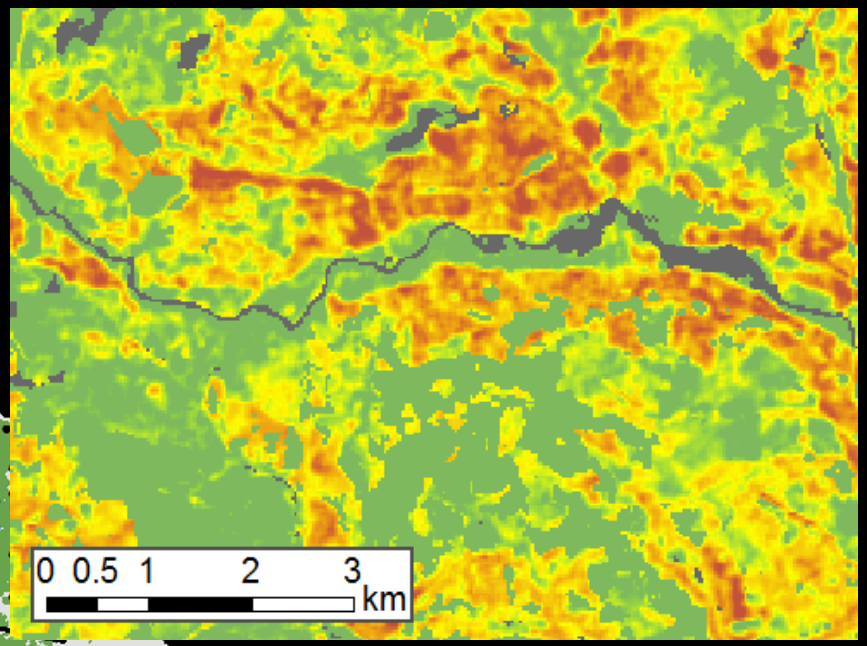


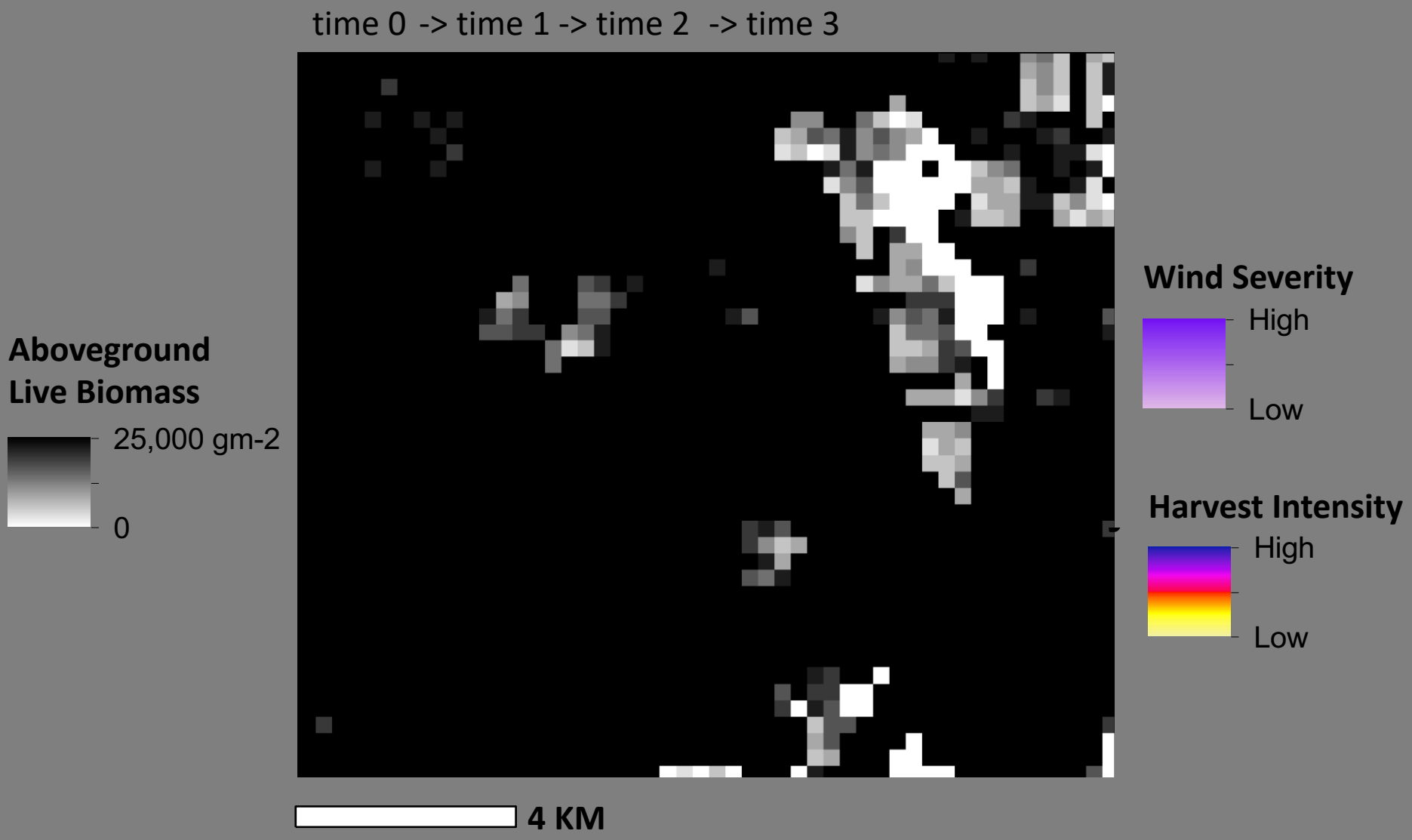
Public FIA plot locations shown. True plot coordinates provided through a collaborative agreement with the USFS Northern Research Station FIA Program.

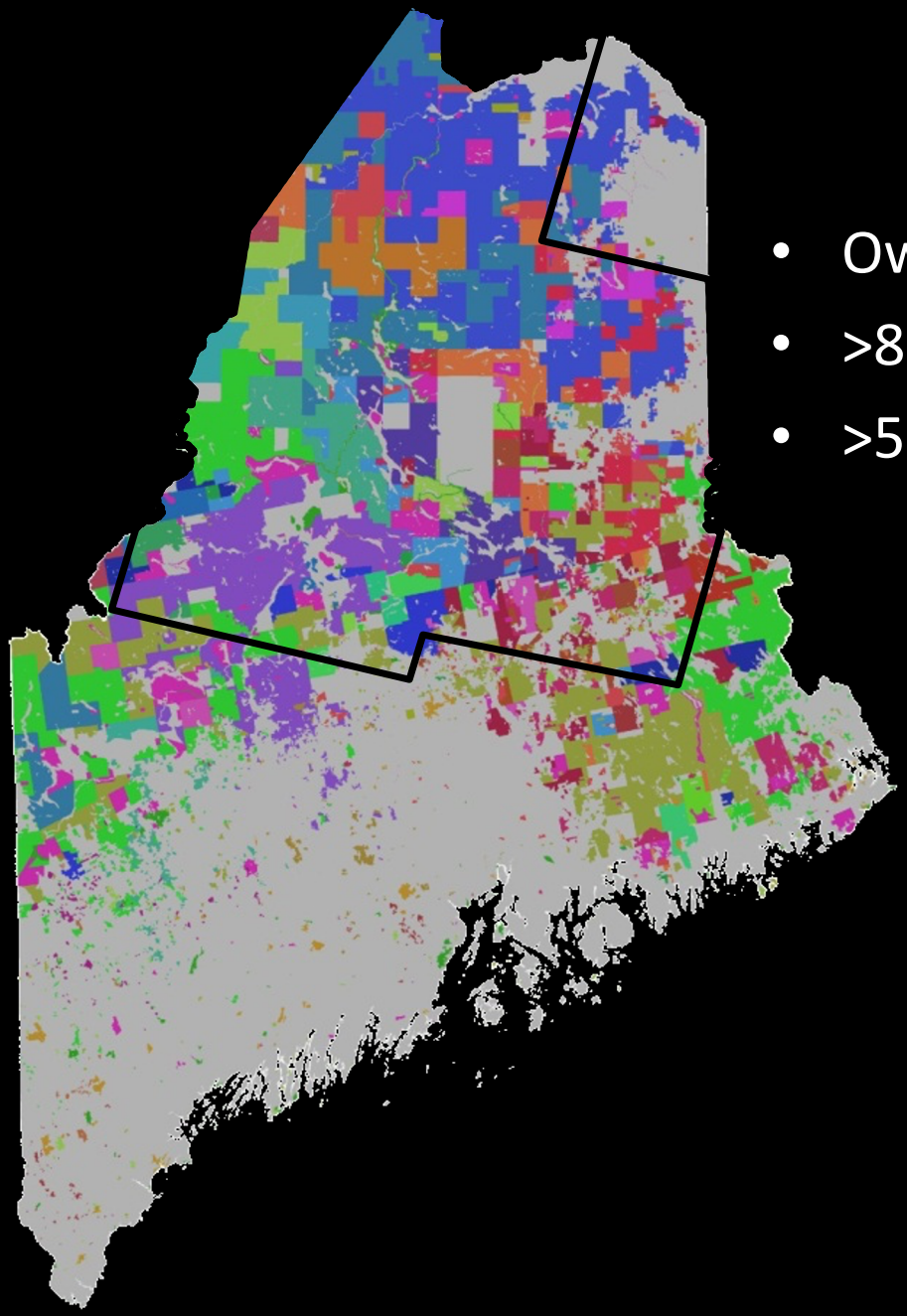


Species abundance (% biomass):

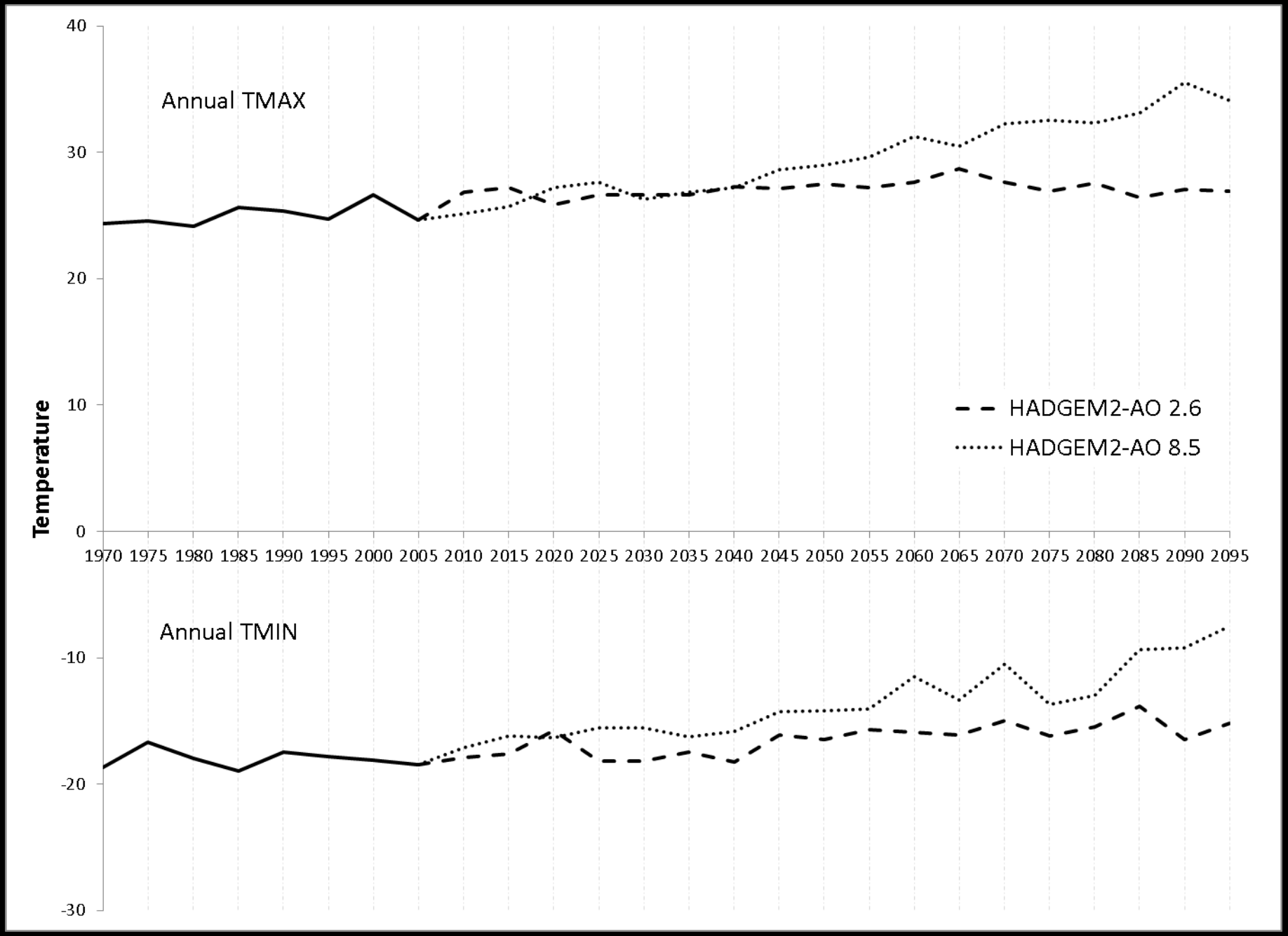
- Balsam fir
- Red, white, black spruce
- E. White pine
- N. White cedar
- Sugar and Red maple
- E. Hemlock
- American beech
- Yellow birch
- Paper birch
- Ash *sp.*

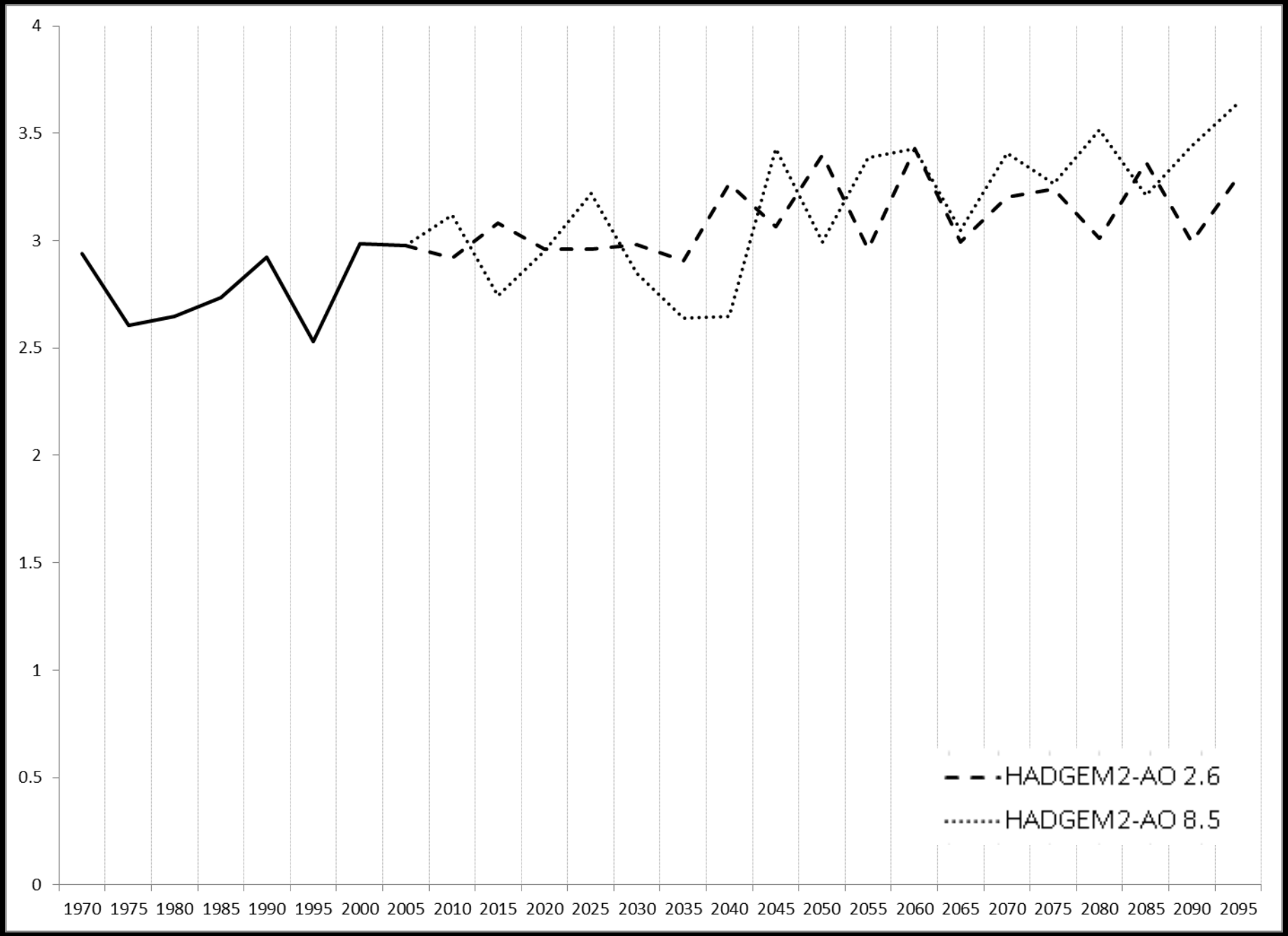


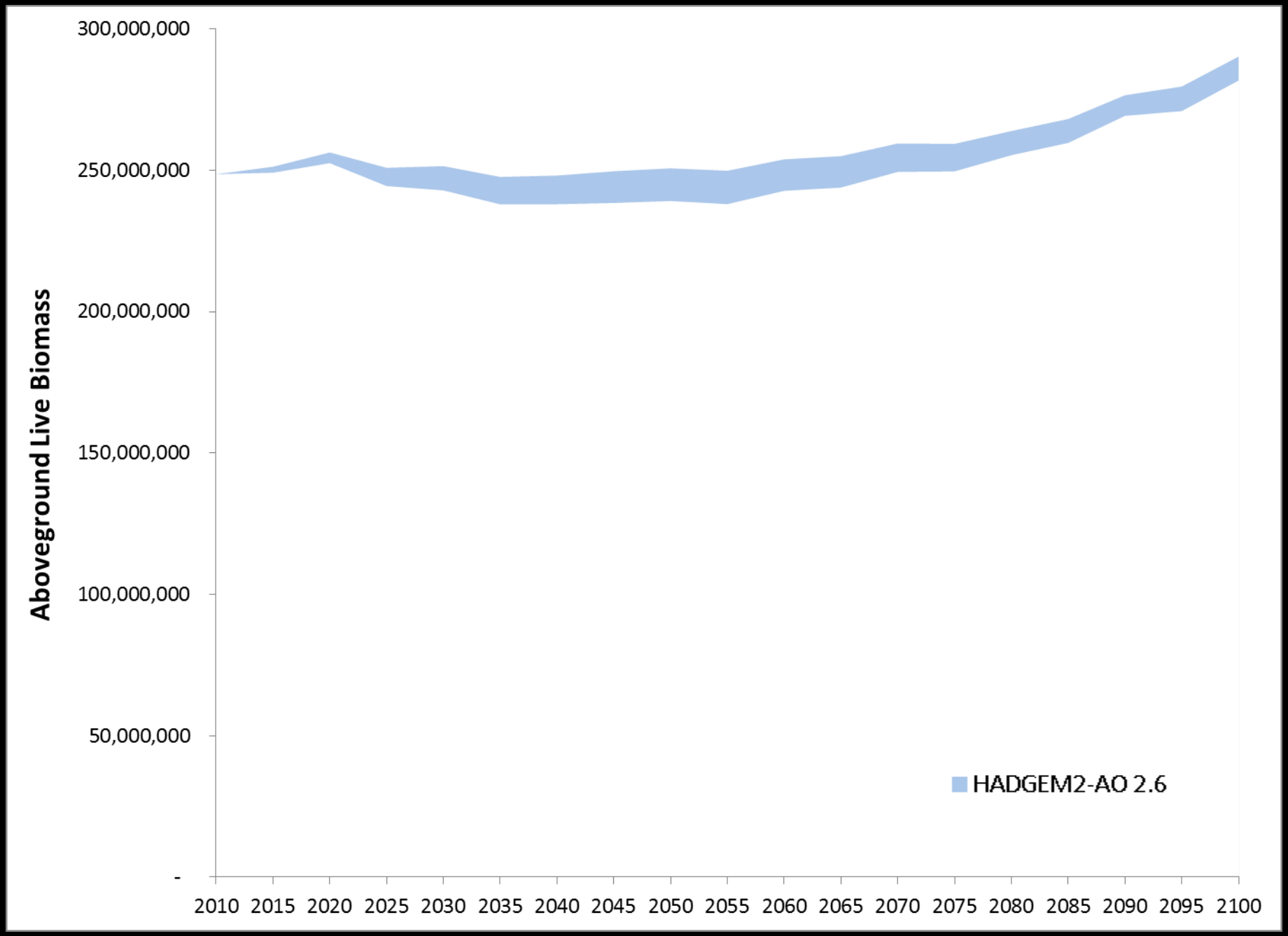

time 0 -> time 1 -> time 2 -> time 3
Aboveground Live Biomass
25,000 gm-2
0
Wind Severity
High
Low
Harvest Intensity
High
Low
4 KM

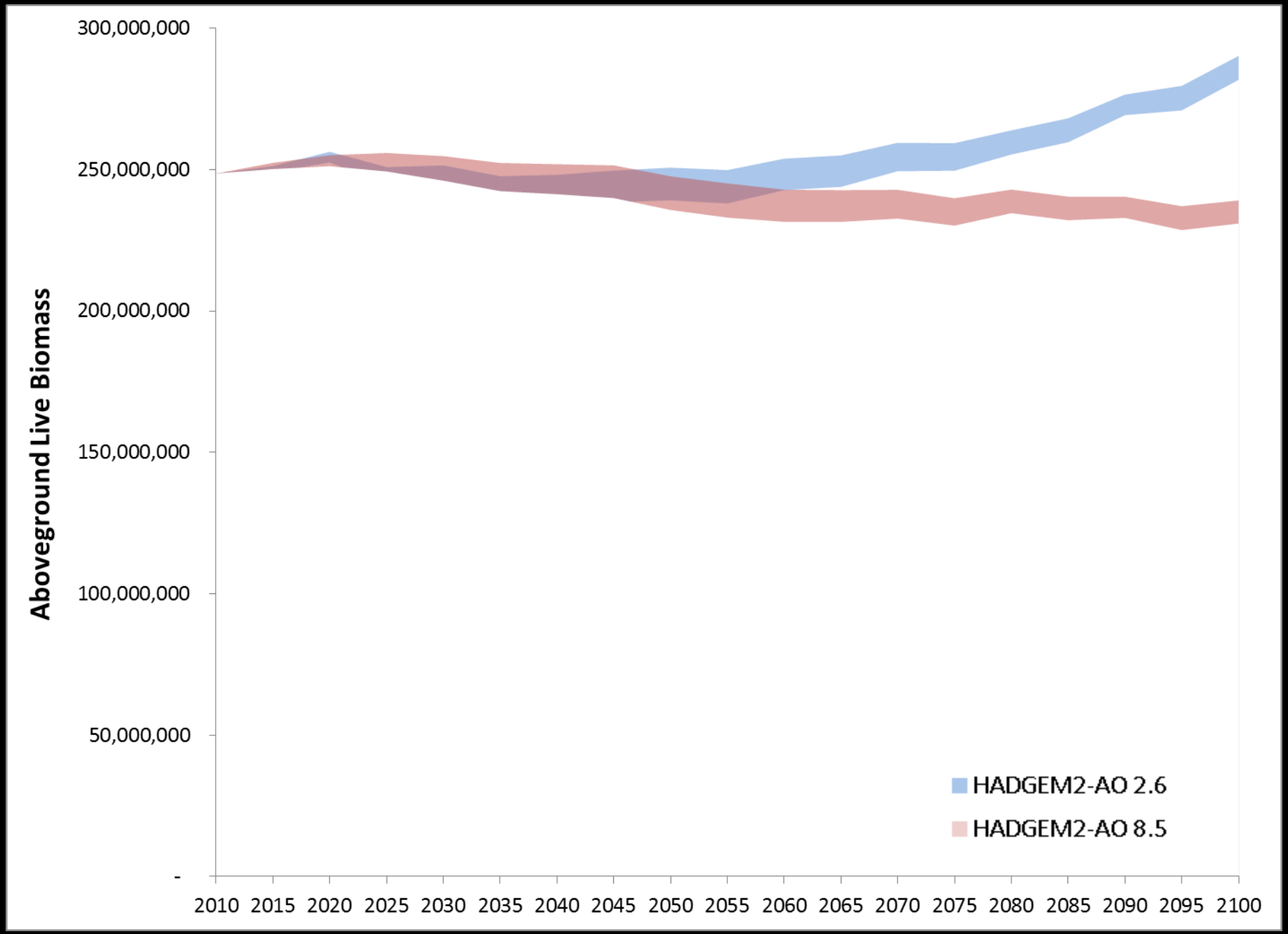


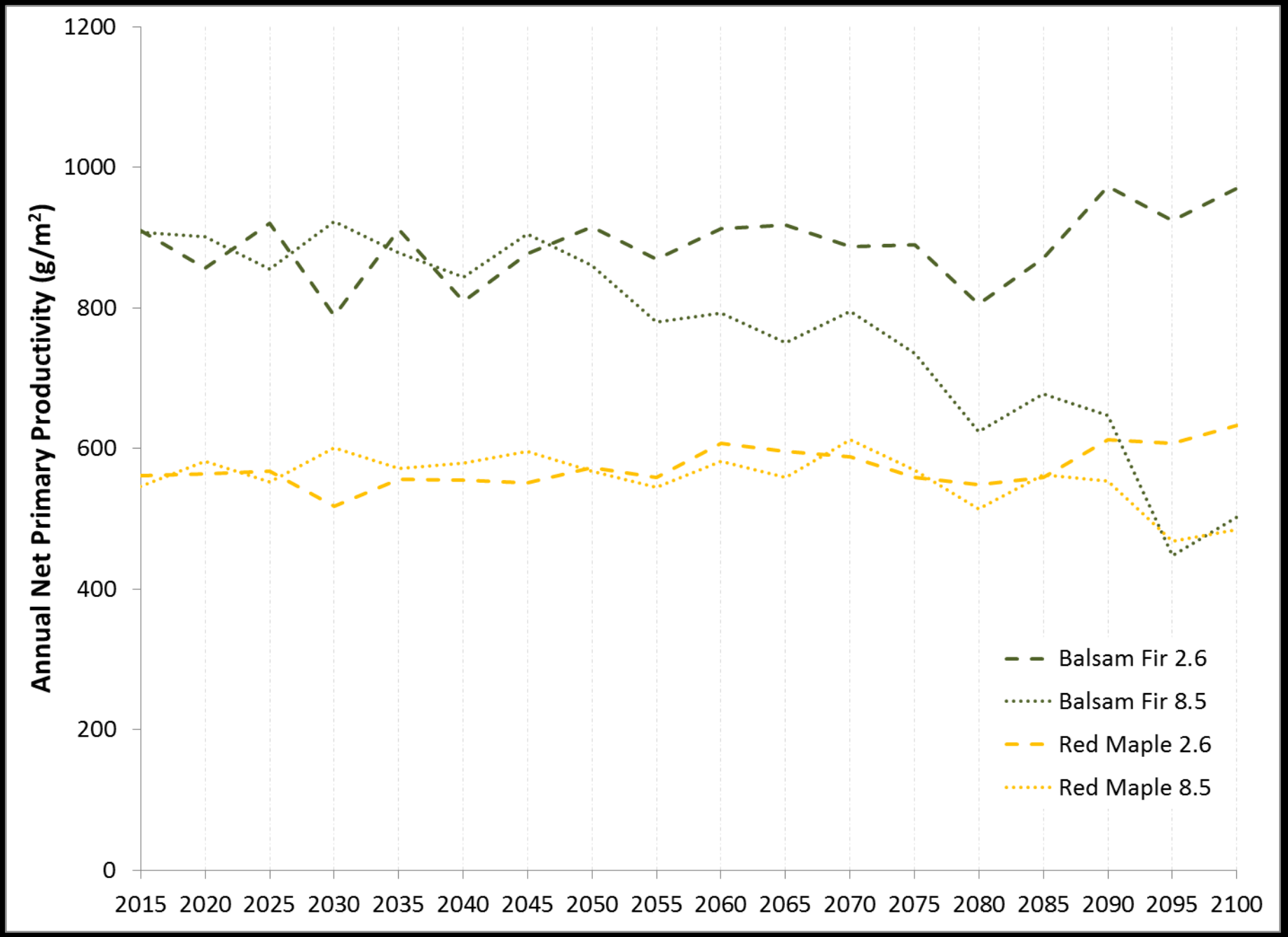
- Ownership ca. 2010
- >80 owners
- >500 parcels

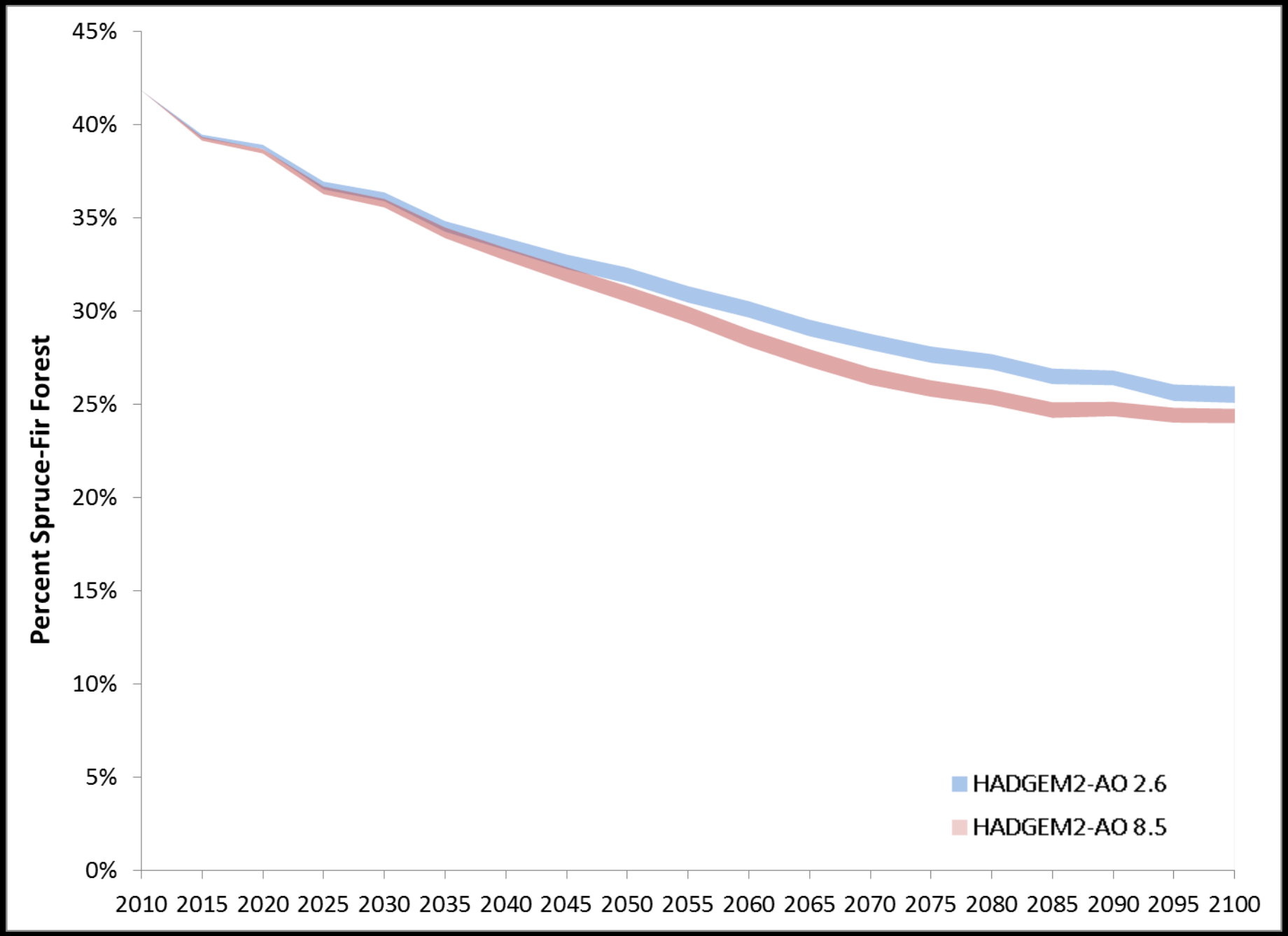

Annual TMAX
Temperature
40
30
20
10
0
HADGEM2-AO 2.6
HADGEM2-AO 8.5
1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025 2030 2035 2040 2045 2050 2055 2060 2065 2070 2075 2080 2085 2090 2095
Annual TMIN
-10
-20
-30

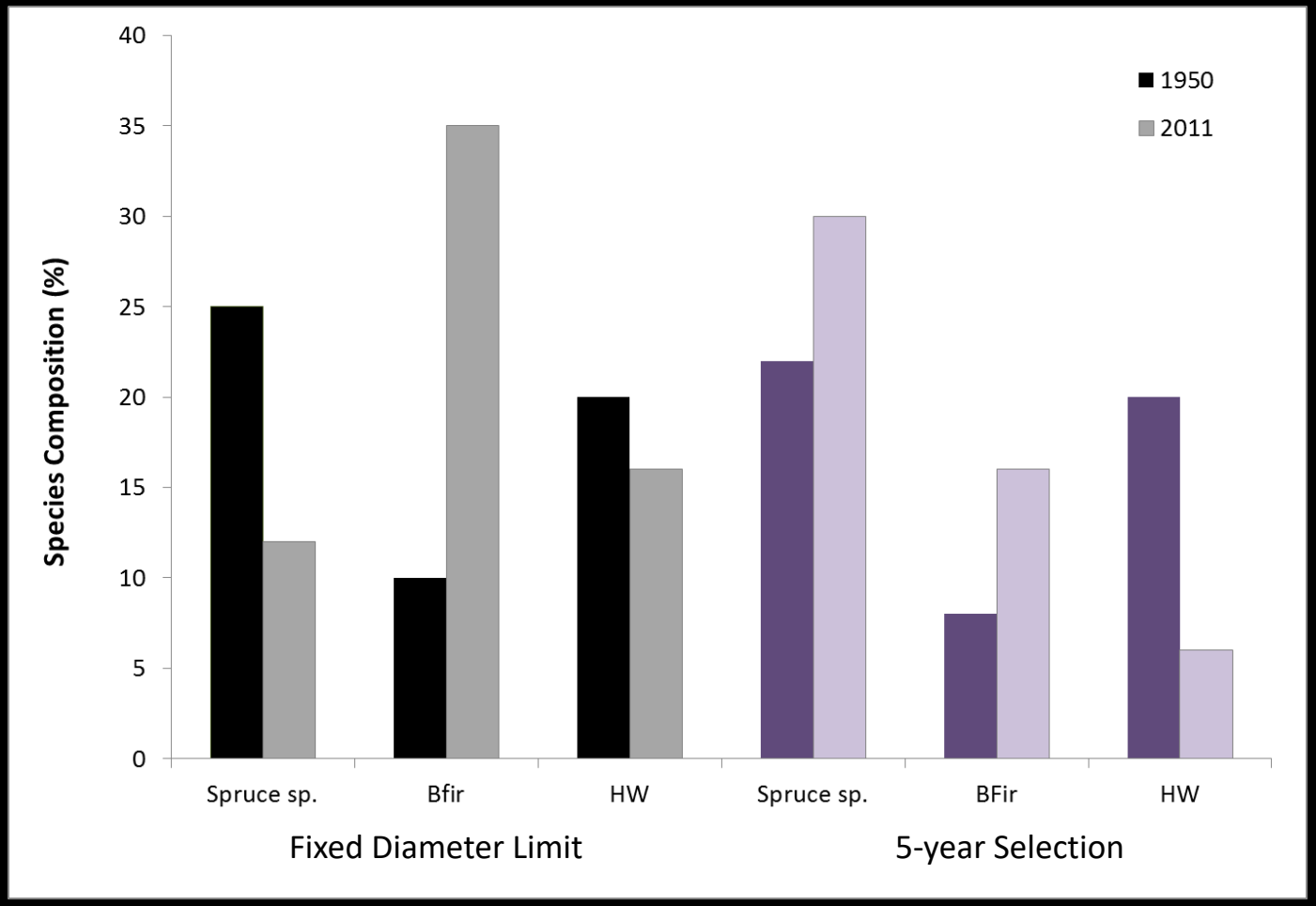

4
3.5
3
2.5
2
1.5
1
0.5
0
1970 1975 1980 1985 1990 1995 2000 2005 2010 2015 2020 2025 2030 2035 2040 2045 2050 2055 2060 2065 2070 2075 2080 2085 2090 2095
HADGEM2-AO 2.6
HADGEM2-AO 8.5


Aboveground Live Biomass
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
-
2010 2015 2020 2025 2030 2035 2040 2045 2050 2055 2060 2065 2070 2075 2080 2085 2090 2095 2100
HADGEM2-AO 2.6


Aboveground Live Biomass
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
-
2010 2015 2020 2025 2030 2035 2040 2045 2050 2055 2060 2065 2070 2075 2080 2085 2090 2095 2100
HADGEM2-AO 2.6
HADGEM2-AO 8.5


Annual Net Primary Productivity (g/m²)
1200
1000
800
600
400
200
0
2015
2020
2025
2030
2035
2040
2045
2050
2055
2060
2065
2070
2075
2080
2085
2090
2095
2100
Balsam Fir 2.6
Balsam Fir 8.5
Red Maple 2.6
Red Maple 8.5


45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Percent Spruce-Fir Forest
2010 2015 2020 2025 2030 2035 2040 2045 2050 2055 2060 2065 2070 2075 2080 2085 2090 2095 2100
HADGEM2-AO 2.6
HADGEM2-AO 8.5

Sixty Years of Silviculture in a Northern Conifer Forest in Maine, USA

Nicole S. Rogers, Laura S. Kenefic, Mindy S. Crandall, Robert S. Seymour, and Paul E. Sendak