

Supplementary Material

Evaluating a simulation-based wildfire burn probability map for the conterminous US

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Supplementary Material

Table S1: List of pyromes in the conterminous U.S., with Omernik Level 1 ecoregion groupings and broader regional grouping (Western/Eastern U.S.).

| Region | Ecoregion | Pyrome # | Pyrome name |
|---------|---------------------------------|----------|--|
| Western | Marine West Coast Forest | 1 | Marine Northwest Coast Forest |
| Western | Marine West Coast Forest | 32 | Outer North Coast Ranges and Redwoods |
| Western | Mediterranean California | 28 | Southern Sierran and Tehachapi Foothills |
| Western | Mediterranean California | 29 | Northern Sierran Foothills and Tuscan Flows |
| Western | Mediterranean California | 30 | Central California Valley |
| Western | Mediterranean California | 31 | North Central California Foothills and Coastal Mountains |
| Western | Mediterranean California | 33 | South Central California Foothills and Coastal Mountains |
| Western | Mediterranean California | 34 | Southern California Mountains/Northern Baja Coast |
| Western | Northwestern Forested Mountains | 2 | Northwest Cascades |
| Western | Northwestern Forested Mountains | 3 | Northeast Cascades |
| Western | Northwestern Forested Mountains | 4 | Middle Cascades |
| Western | Northwestern Forested Mountains | 6 | Eastern Cascades Slopes and Foothills |
| Western | Northwestern Forested Mountains | 7 | Northwest Rockies |
| Western | Northwestern Forested Mountains | 8 | Northern Rockies (Selkirk-St. Joe) |
| Western | Northwestern Forested Mountains | 9 | Northern Rockies (Salish-Ninemile) |
| Western | Northwestern Forested Mountains | 10 | Canadian Rockies |
| Western | Northwestern Forested Mountains | 11 | Middle Rockies (Townsend-Elkhorn) |
| Western | Northwestern Forested Mountains | 12 | Middle Rockies (Yellowstone) |
| Western | Northwestern Forested Mountains | 13 | Middle Rockies (Sedimentary Mts.) |
| Western | Northwestern Forested Mountains | 14 | Idaho Batholith |
| Western | Northwestern Forested Mountains | 16 | Blue Mountains |
| Western | Northwestern Forested Mountains | 17 | Klamath Mountains |

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|---------|---------------------------------|-----|--|
| Western | Northwestern Forested Mountains | 18 | Southern Cascades |
| Western | Northwestern Forested Mountains | 26 | Northern Sierra Nevada |
| Western | Northwestern Forested Mountains | 27 | Southern Sierra Nevada |
| Western | Northwestern Forested Mountains | 44 | Wasatch and Uinta Mountains |
| Western | Northwestern Forested Mountains | 45 | Southern Rockies (Upper Colorado River Basin) |
| Western | Northwestern Forested Mountains | 46 | Southern Rockies Front Range |
| Western | Northwestern Forested Mountains | 47 | Far Southern Rockies |
| Western | North American Deserts | 5 | Columbia Plateau |
| Western | North American Deserts | 15 | Snake River Plain |
| Western | North American Deserts | 19 | High Lava Plains |
| Western | North American Deserts | 20 | High Lava Plateau and Semiarid Hills |
| Western | North American Deserts | 21 | Upper Lahontan Basin and Humboldt Plains |
| Western | North American Deserts | 22 | Lahontan Salt Shrub Basin |
| Western | North American Deserts | 23 | Central Nevada High Valleys |
| Western | North American Deserts | 24 | Shadscale-Dominated Saline Basins |
| Western | North American Deserts | 25 | Carbonate Woodland and Sagebrush Valleys |
| Western | North American Deserts | 35 | Western Mojave Basin and Range |
| Western | North American Deserts | 36 | Eastern Mojave Basin and Range |
| Western | North American Deserts | 37 | Sonoran Basin and Range |
| Western | North American Deserts | 40 | Arizona/New Mexico Plateau |
| Western | North American Deserts | 41 | Sonoran Desert |
| Western | North American Deserts | 42 | Southern Colorado Plateaus |
| Western | North American Deserts | 43 | Northern Colorado Plateaus |
| Western | North American Deserts | 48 | Western Chihuahuan Deserts |
| Western | North American Deserts | 49 | Southern Chihuahuan Deserts |
| Western | North American Deserts | 59 | Bighorn Basins and Pryor-Bighorn Foothills |
| Western | North American Deserts | 77 | Tonopah Basin and Sagebrush Foothills |
| Western | North American Deserts | 78 | Sierra Nevada-Influenced Ranges, Hills, and Basins |
| Western | North American Deserts | 89 | Eastern Chihuahuan Deserts |
| Western | North American Deserts | 127 | Northwestern Arizona Plateau and Mountains |
| Western | North American Deserts | 128 | Wyoming Basin |
| Western | Southern Semi-Arid Highlands | 38 | Madrean Archipelago |

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|---------|-------------------|----|---|
| Western | Temperate Sierras | 39 | Arizona/New Mexico Mountains (Mogollon Rim) |
| Western | Temperate Sierras | 50 | South Central New Mexico Mountains |
| Eastern | Great Plains | 51 | Northeastern New Mexico Plains and Woodlands |
| Eastern | Great Plains | 52 | Colorado Piedmont Plains and Tablelands |
| Eastern | Great Plains | 53 | Canadian/Cimarron Breaks and High Plains |
| Eastern | Great Plains | 54 | Caprock Canyons, Badlands, and Breaks |
| Eastern | Great Plains | 55 | Llano Estacado and Shinnery Sands |
| Eastern | Great Plains | 56 | Northern High Plains |
| Eastern | Great Plains | 57 | Black Hills and Semiarid Pierre Shale Plains |
| Eastern | Great Plains | 58 | Powder River Basin and Casper Arch |
| Eastern | Great Plains | 60 | North Central Brown Glaciated Plains |
| Eastern | Great Plains | 61 | Glaciated Northern Grasslands and Dark Brown Prairie |
| Eastern | Great Plains | 62 | Missouri Coteau |
| Eastern | Great Plains | 63 | Northwestern Glaciated and Corn-Belt Plains |
| Eastern | Great Plains | 64 | Northern Glaciated Plains and Agassiz Basin |
| Eastern | Great Plains | 65 | Judith Basin, High Plains, and Forested Mountains |
| Eastern | Great Plains | 66 | Missouri Plateau and River Breaks |
| Eastern | Great Plains | 67 | Montana Central Grasslands |
| Eastern | Great Plains | 68 | Rolling Plains and Breaks/Smoky Hills |
| Eastern | Great Plains | 69 | Rolling Red Hills and Prairie Tableland |
| Eastern | Great Plains | 70 | Broken Red Plains and Red Prairie |
| Eastern | Great Plains | 71 | Flint Hills |
| Eastern | Great Plains | 72 | Northern Cross Timbers and Lower Canadian Hills |
| Eastern | Great Plains | 73 | Cross Timbers and Limestone Cut Plain |
| Eastern | Great Plains | 74 | Semiarid Edwards Plateau |
| Eastern | Great Plains | 75 | Edwards Plateau Woodland and Balcones Canyonlands |
| Eastern | Great Plains | 76 | Southern Texas Plains |
| Eastern | Great Plains | 80 | Northern Post Oak Savanna and Blackland Prairie |
| Eastern | Great Plains | 81 | Southern Gulf Coastal Prairies and Sand Plain |
| Eastern | Great Plains | 82 | Northern Gulf Coastal Prairies and Marshes |
| Eastern | Great Plains | 88 | Osage Cuestas and Osage/Cherokee Plains |
| Eastern | Great Plains | 90 | Nebraska Sand Hills |

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|---------|---------------------------|-----|--|
| Eastern | Great Plains | 94 | Western Corn-Belt and Central Irregular Plains |
| Eastern | Northern Forests | 95 | Northern Minnesota Peatlands and Lake Agassiz Plains |
| Eastern | Northern Forests | 96 | Boundary Lakes and Hills |
| Eastern | Northern Forests | 97 | Northern Minnesota Lakes and Forests |
| Eastern | Northern Forests | 98 | Michigan Upper Peninsula Lakes and Forests |
| Eastern | Northern Forests | 99 | Northern Wisconsin Lakes and Forests |
| Eastern | Northern Forests | 100 | Michigan Lower Peninsula Lakes and Forests |
| Eastern | Northern Forests | 123 | Acadian Plains and Hills and Far Northeastern Highlands |
| Eastern | Northern Forests | 124 | Northeastern Coastal Zone and Highlands |
| Eastern | Northern Forests | 125 | Eastern Great Lakes Lowlands and Atlantic Highlands |
| Eastern | Eastern Temperate Forests | 79 | Southern Post Oak Savanna and Blackland/Fayette Prairie |
| Eastern | Eastern Temperate Forests | 83 | Southern Tertiary Uplands and Flatwoods |
| Eastern | Eastern Temperate Forests | 84 | North Texas Tertiary Uplands |
| Eastern | Eastern Temperate Forests | 85 | Red River Bottomlands and Tertiary Uplands |
| Eastern | Eastern Temperate Forests | 86 | Boston/Ouachita Mountains and Arkansas Valley |
| Eastern | Eastern Temperate Forests | 87 | Ozark Highlands |
| Eastern | Eastern Temperate Forests | 91 | Southern Piedmont |
| Eastern | Eastern Temperate Forests | 92 | Central Piedmont |
| Eastern | Eastern Temperate Forests | 93 | Dissected Appalachian Plateau |
| Eastern | Eastern Temperate Forests | 101 | Central Minnesota Hardwood Forests |
| Eastern | Eastern Temperate Forests | 102 | Wisconsin Mixed Wood Plains |
| Eastern | Eastern Temperate Forests | 103 | Central and Southeastern Corn-Belt Plains |
| Eastern | Eastern Temperate Forests | 104 | Plains of Southern Michigan and Northern Indiana/Ohio |
| Eastern | Eastern Temperate Forests | 105 | Illinoian River Valleys and Hills |
| Eastern | Eastern Temperate Forests | 106 | Interior Plateau (Eastern Highland Rim and Bluegrass) |
| Eastern | Eastern Temperate Forests | 107 | Northern Mississippi Valley and Alluvial Plains |
| Eastern | Eastern Temperate Forests | 108 | Southern Mississippi Valley and Alluvial Plains |
| Eastern | Eastern Temperate Forests | 109 | Southern Pine Plains, Hills, and Coastal Plains |
| Eastern | Eastern Temperate Forests | 110 | Hilly Gulf Coastal Plains and Flatwoods/Blackland Prairie |
| Eastern | Eastern Temperate Forests | 111 | Atlantic Southern Loam Plains, Sand Hills, and Red Uplands |

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|---------|---------------------------|-----|--|
| Eastern | Eastern Temperate Forests | 112 | Florida Flatwoods/Okefenokee Swamp and Plains |
| Eastern | Eastern Temperate Forests | 114 | Mid-Atlantic Flatwoods and Rolling Coastal Plain |
| Eastern | Eastern Temperate Forests | 115 | Carolina Flatwoods and Sea Islands/Coastal Marsh |
| Eastern | Eastern Temperate Forests | 116 | Delmarva Uplands, Pine Barrens, and Coastal Plains/Marshes |
| Eastern | Eastern Temperate Forests | 117 | Northern Piedmont |
| Eastern | Eastern Temperate Forests | 118 | Southern Blue Ridge |
| Eastern | Eastern Temperate Forests | 119 | Northern Ridge and Valley and Central Appalachians |
| Eastern | Eastern Temperate Forests | 120 | Southern Ridge and Valley |
| Eastern | Eastern Temperate Forests | 121 | Western Allegheny Plateau and Erie Drift Plain |
| Eastern | Eastern Temperate Forests | 122 | Northern Allegheny Plateau and North Central Appalachians |
| Eastern | Eastern Temperate Forests | 126 | Southwestern Appalachians |
| Eastern | Tropical Wet Forests | 113 | Southern Florida Coastal Plain/Everglades |

Figure S1: Map of pyromes in the conterminous U.S. and Omernik Level 1 ecoregion groupings. Pyrome ID numbers correspond to pyrome names in Table S1.

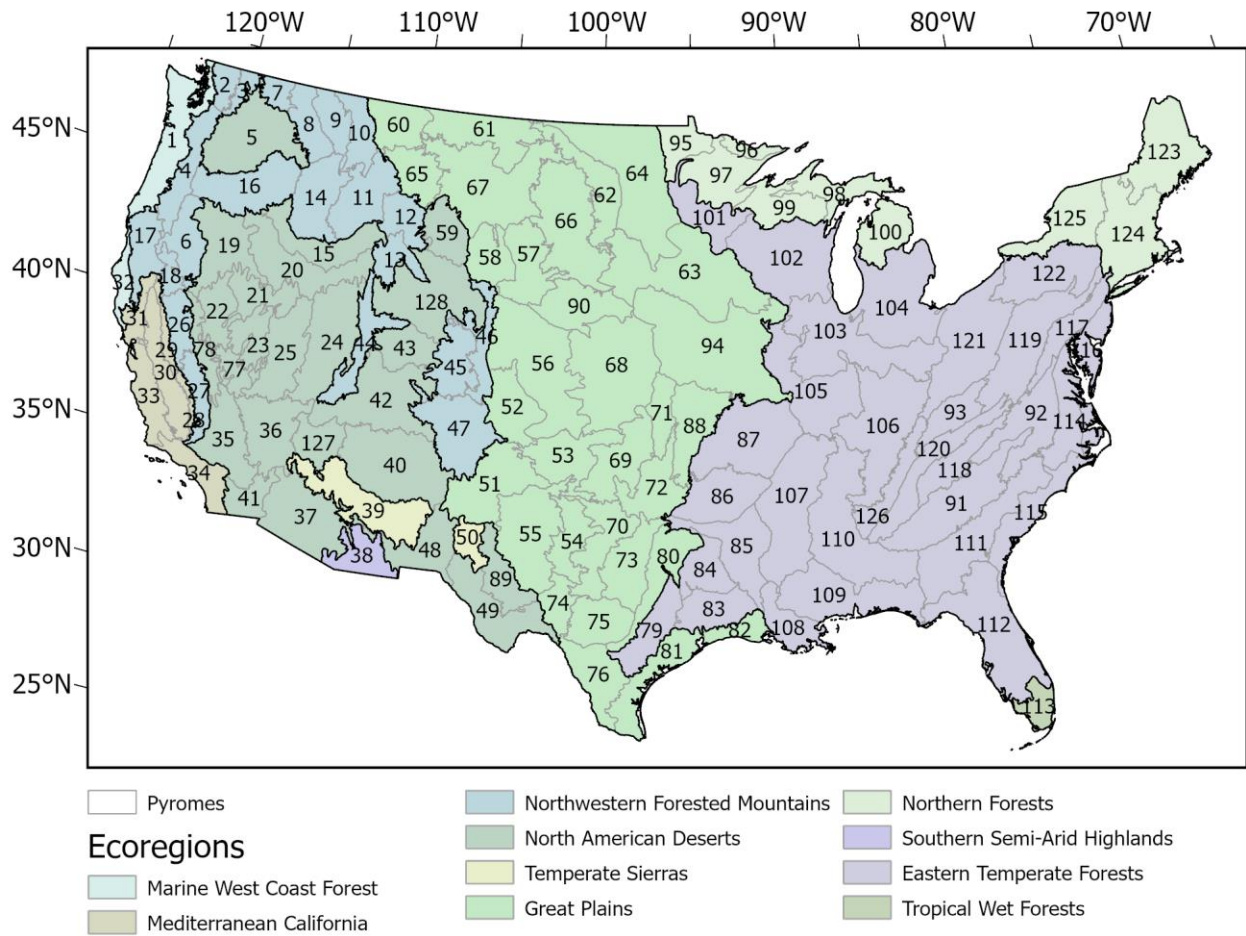


Figure S2: Plots comparing proportions of burned area in lower burn probability (BP) classes per pyrome, based on differing numbers of equal-area class divisions (three, four, or six), to proportions based on our selected number of five classes. Correlation scores are indicated (Pearson's r). For each number of classes, the proportion of burned area in the lower classes is strongly correlated to the proportion in the Low and Low-Med classes based on five divisions. This indicates that analysis of burned area proportions by BP class is robust to the number of class divisions selected.

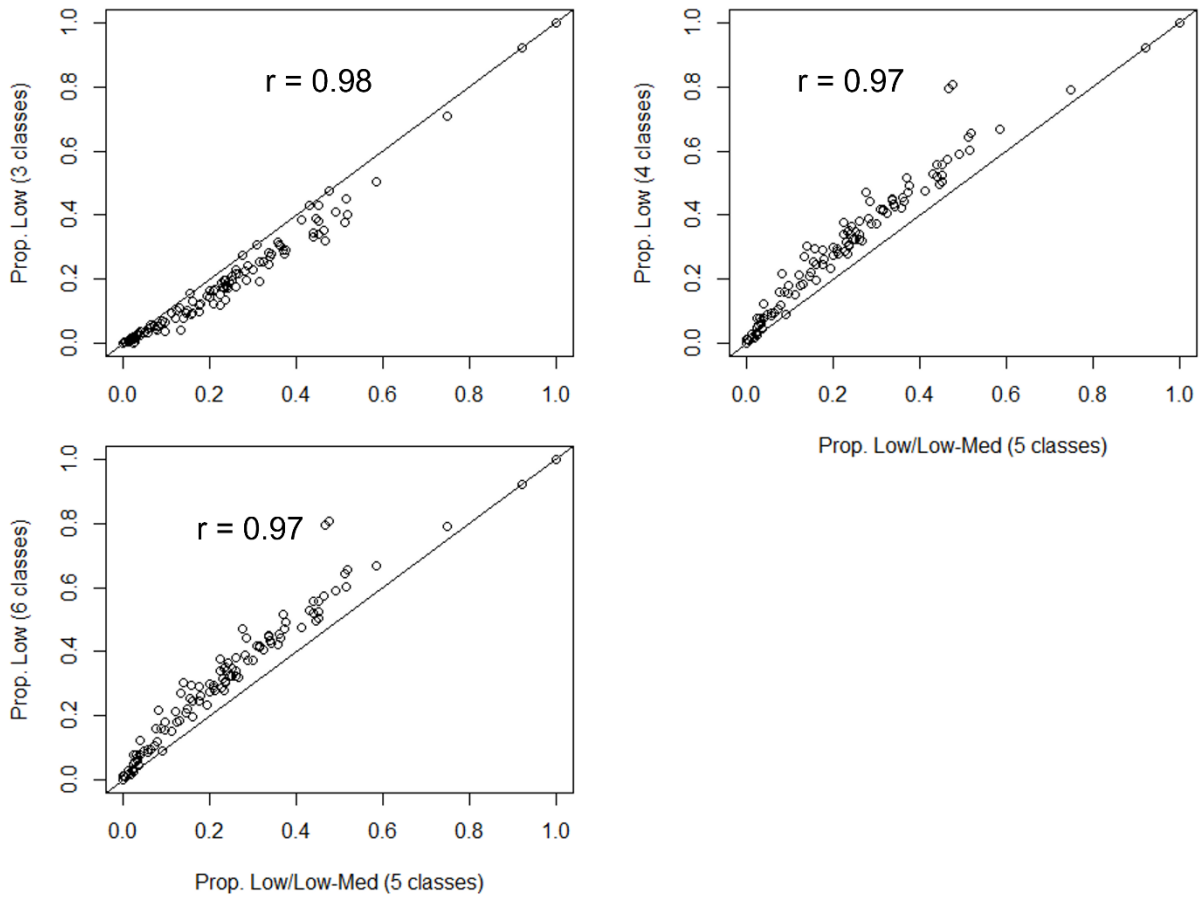


Figure S3: Maps comparing burn probability (BP) maps derived from different FSim model versions. Top panel shows the version released in 2020 and based on a 2014 LANDFIRE fuels map (LF2014); middle panel shows version released in 2023 and based on a 2020 LANDFIRE fuels map (LF2020). Bottom panel shows the difference in BP between the two versions, highlighting increases in BP throughout the northwestern mountains and southern Great Plains.

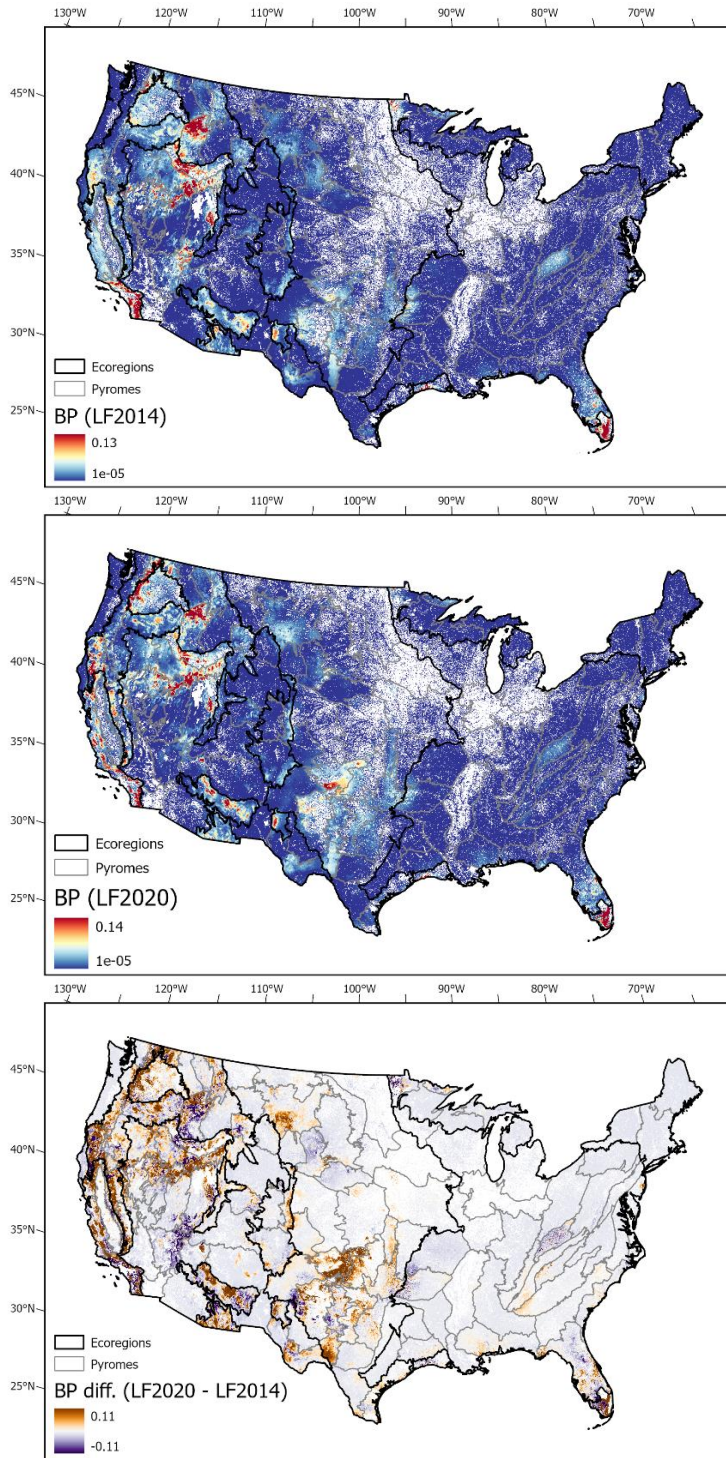
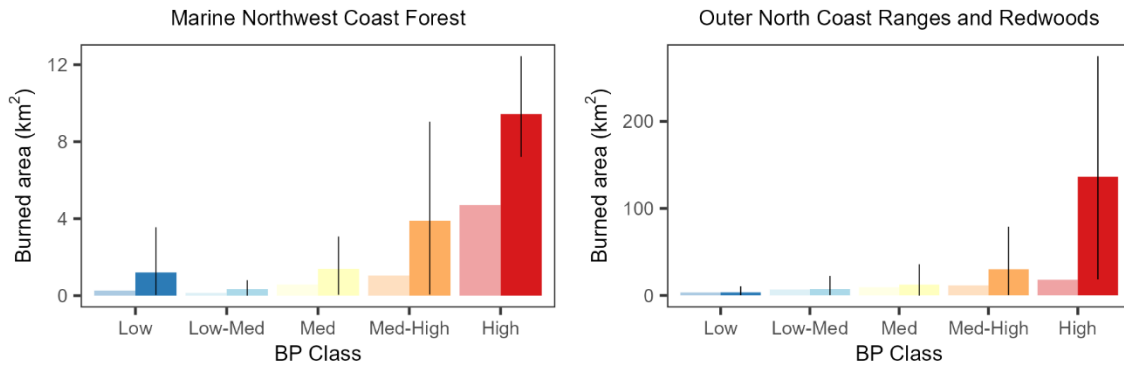
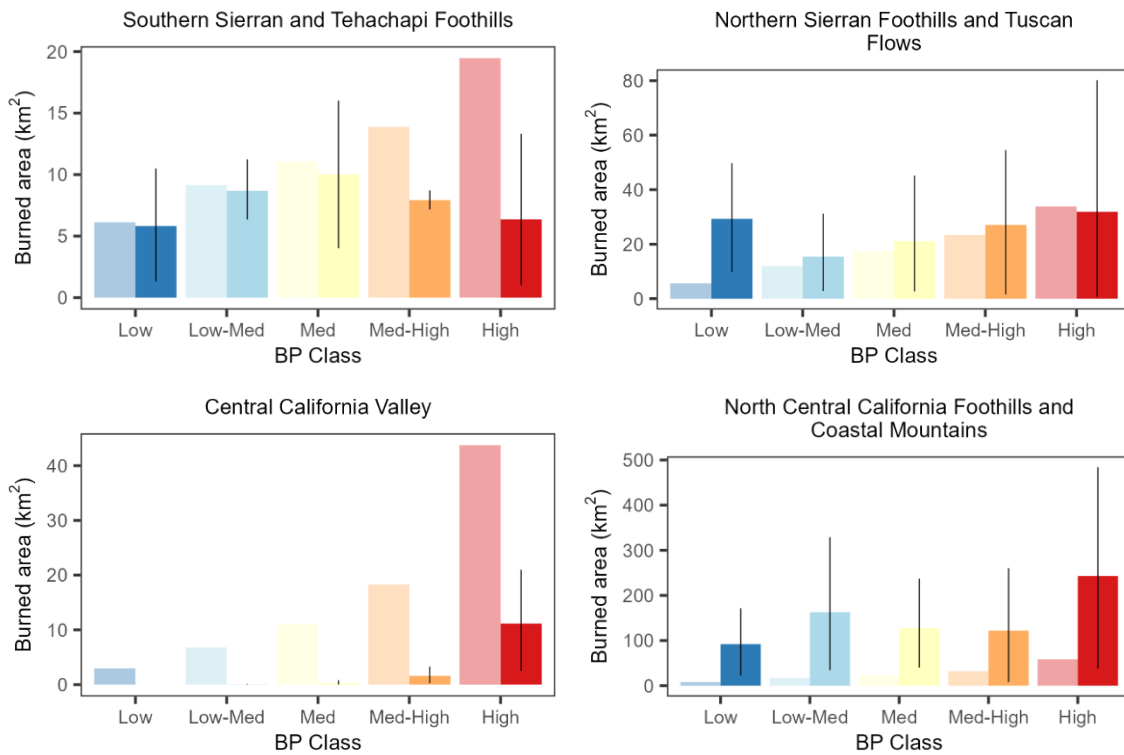


Fig. S4: Expected (translucent bars) and observed (opaque bars with confidence interval lines) mean annual burned areas for each of five equal-area burn probability (BP) classes, for all 114 pyromes in the conterminous U.S. with non-zero area burned from 2016-2022.

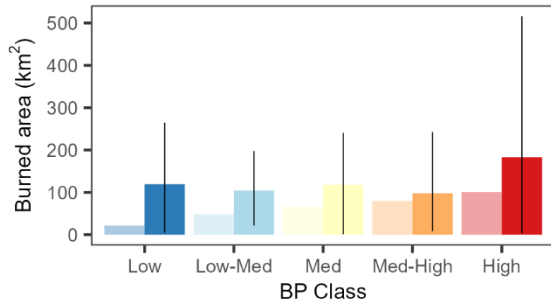
Marine West Coast Forest



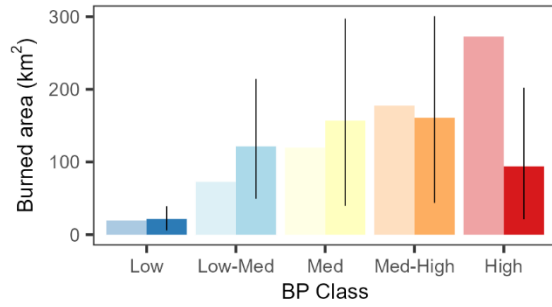
Mediterranean California



South Central California Foothills and Coastal Mountains

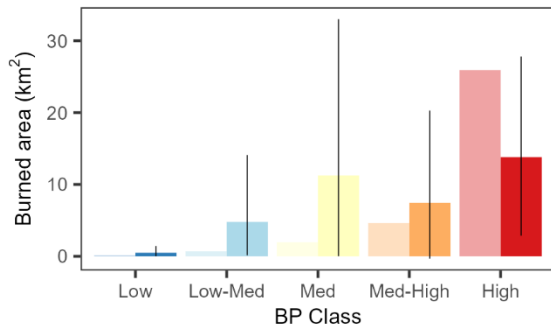


Southern California Mountains/Northern Baja Coast

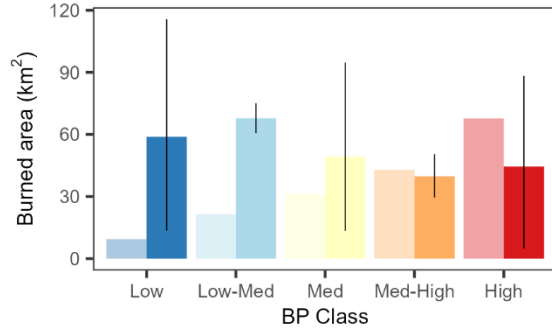


Northwestern Forested Mountains

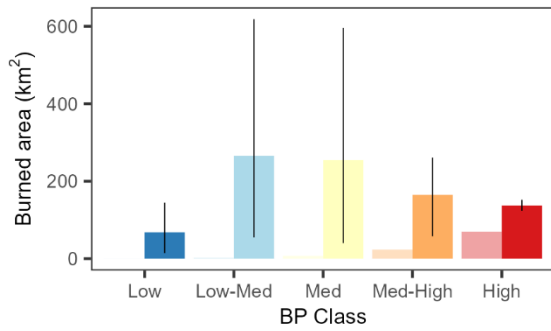
Northwest Cascades



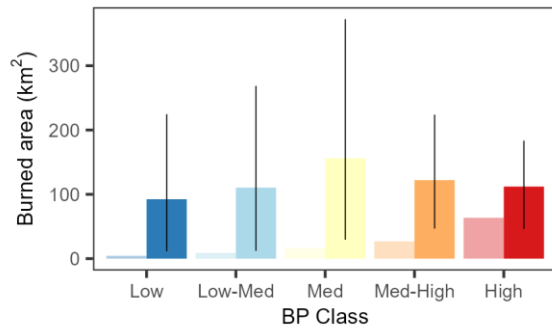
Northeast Cascades



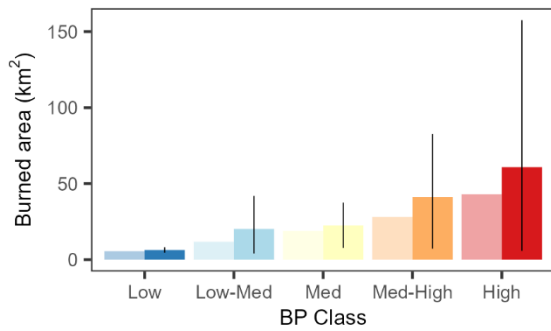
Middle Cascades



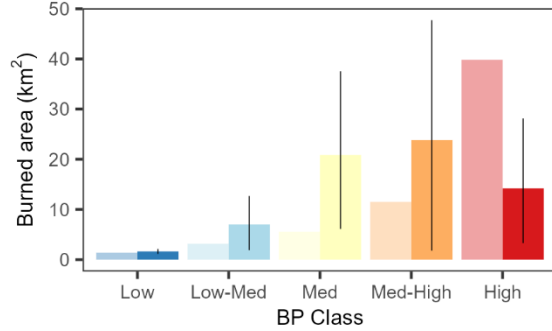
Eastern Cascades Slopes and Foothills

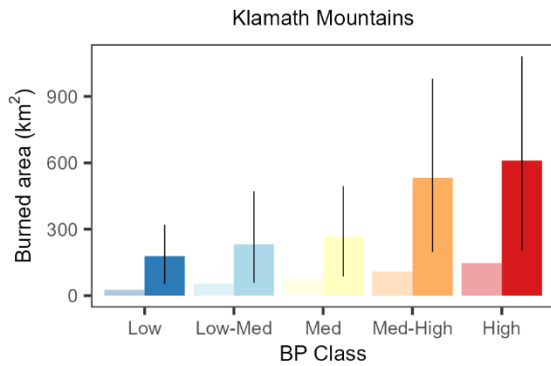
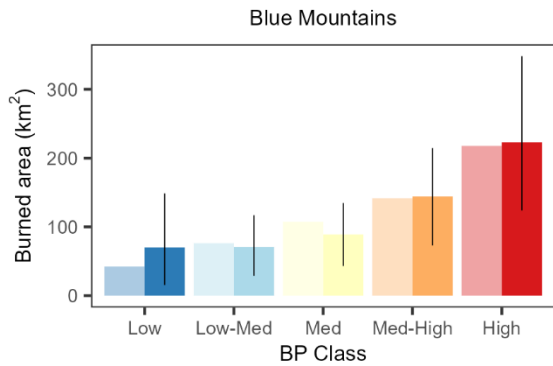
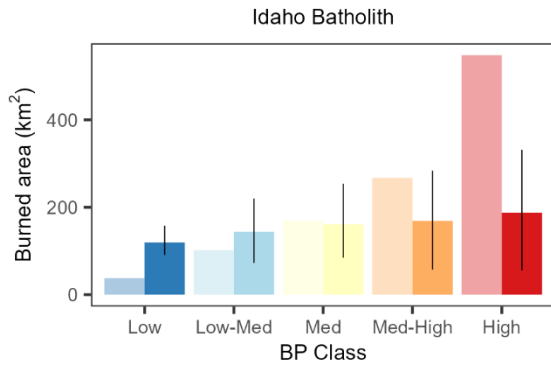
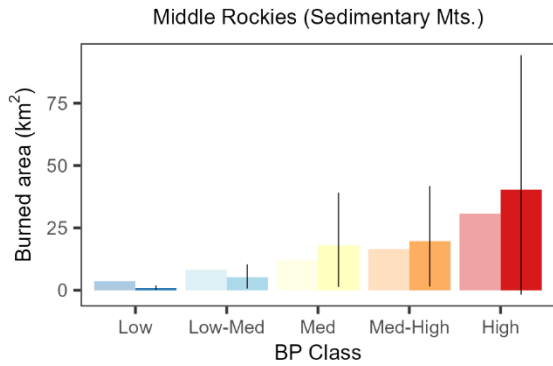
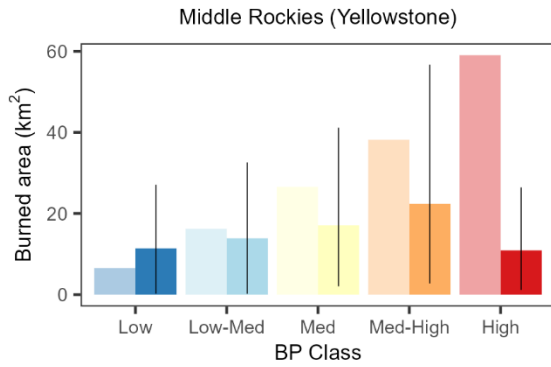
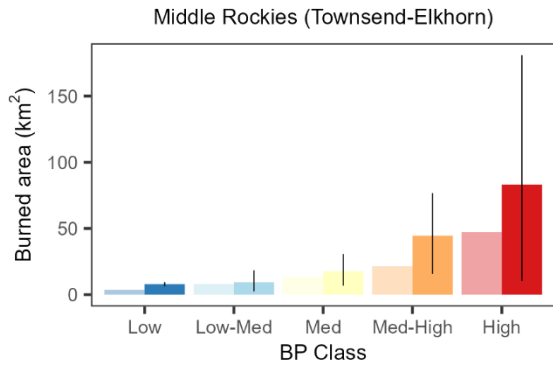
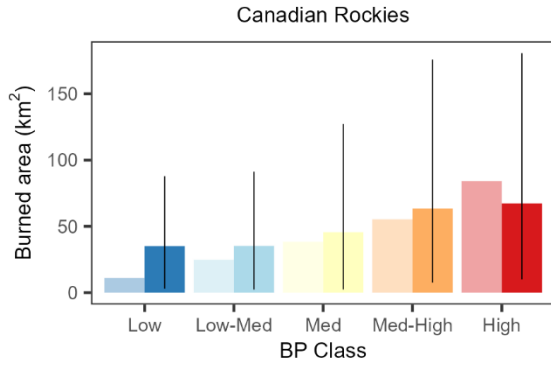
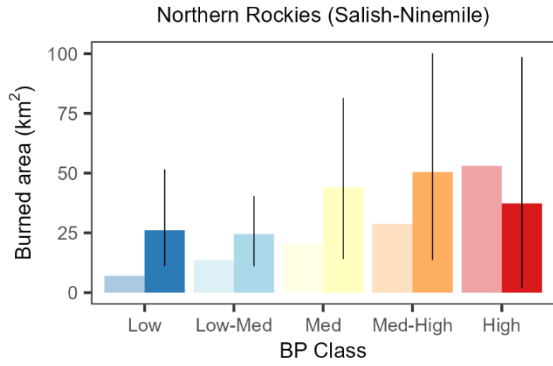


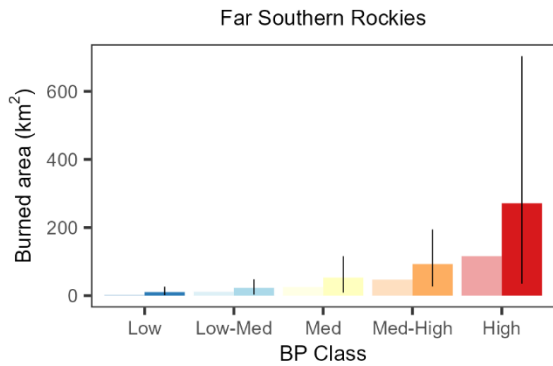
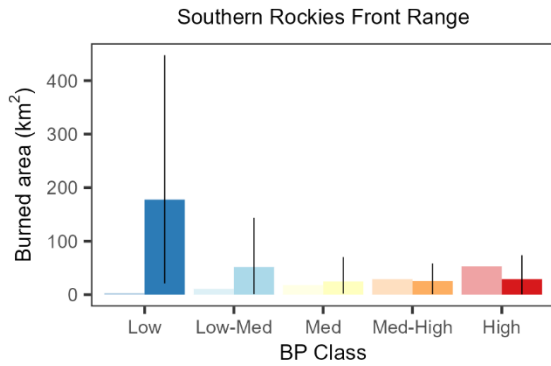
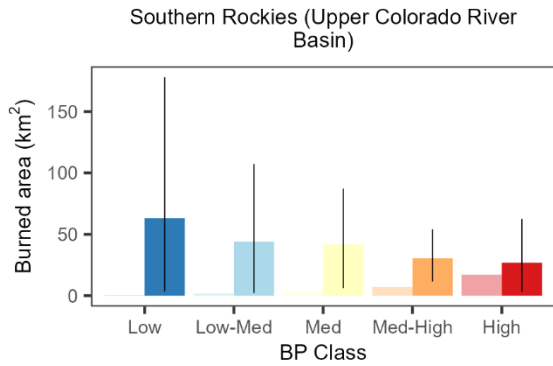
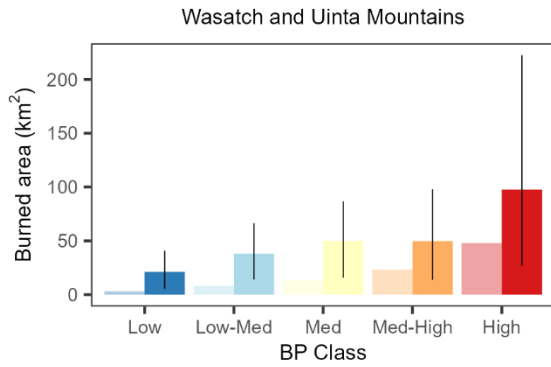
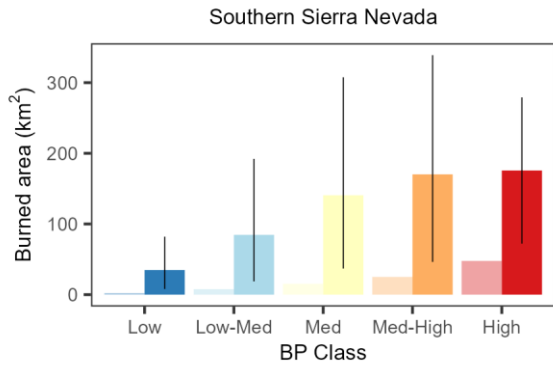
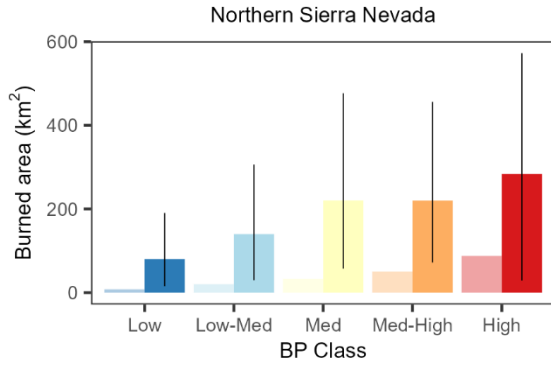
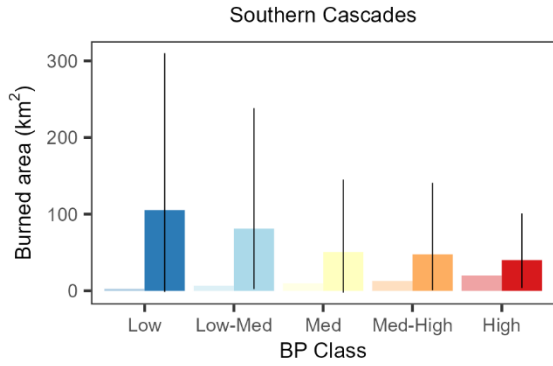
Northwest Rockies



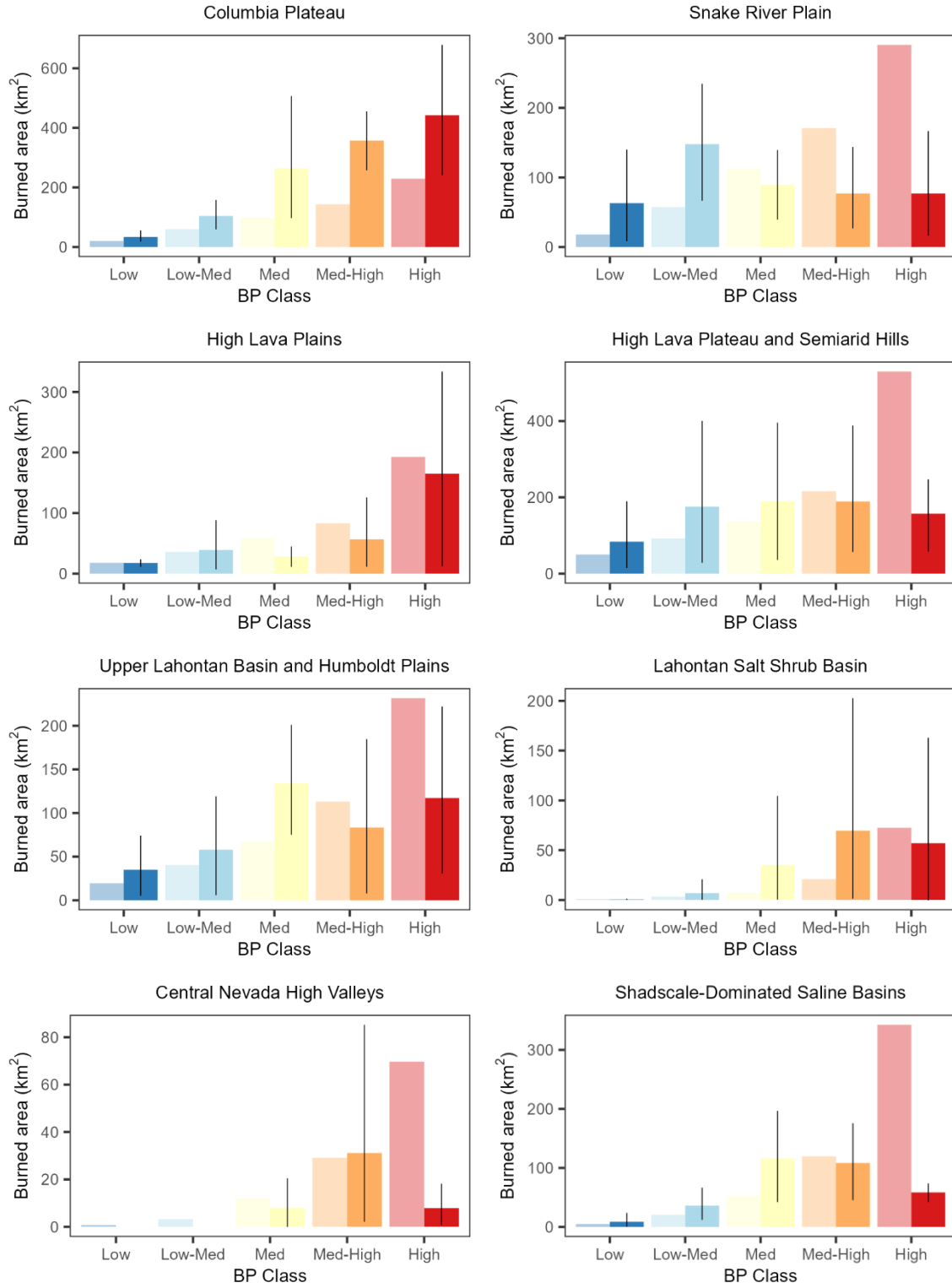
Northern Rockies (Selkirk-St. Joe)

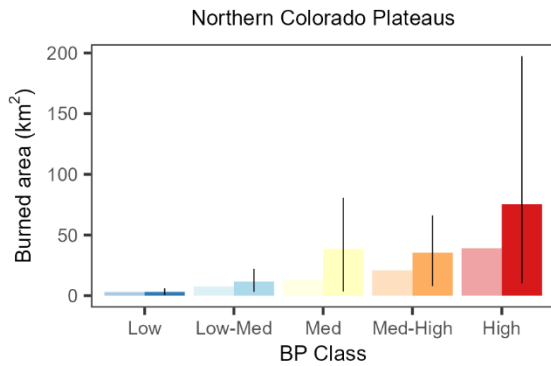
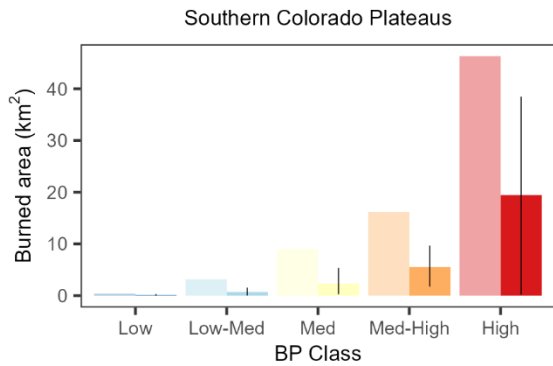
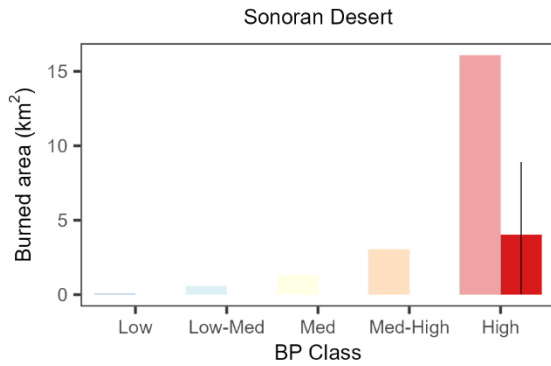
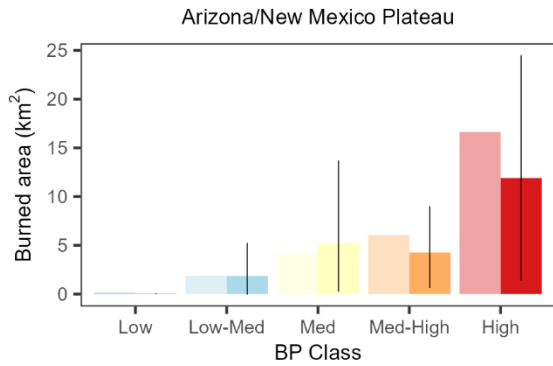
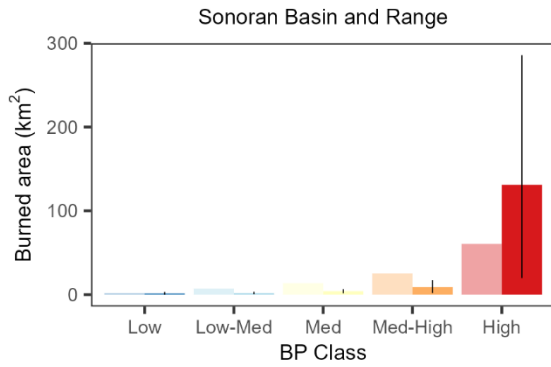
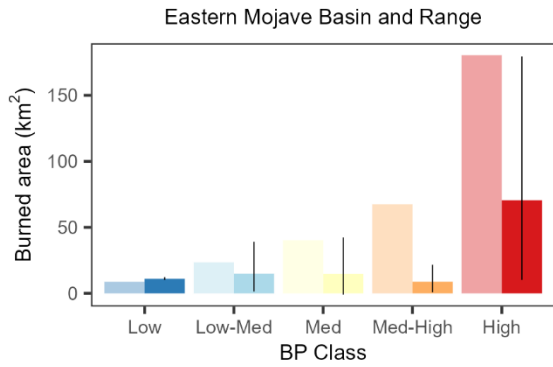
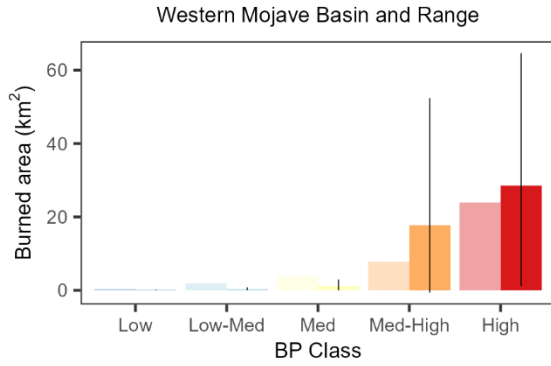
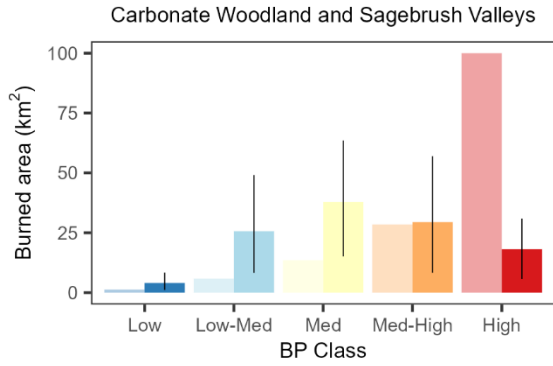




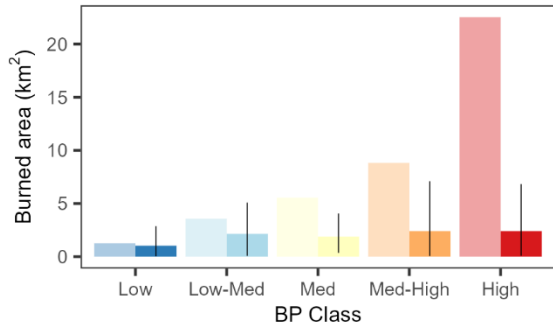


North American Deserts

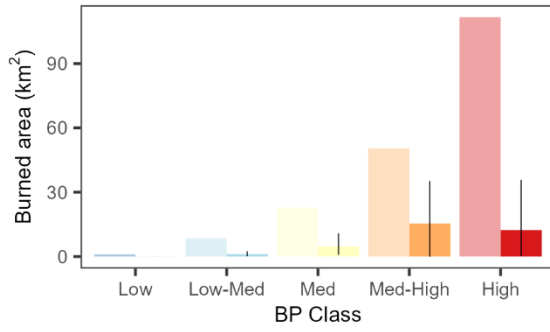




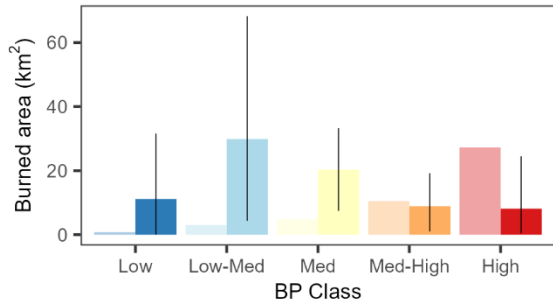
Western Chihuahuan Deserts



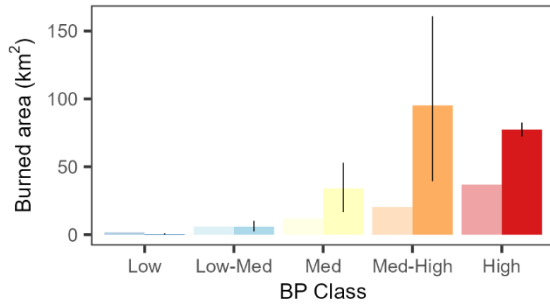
Southern Chihuahuan Deserts



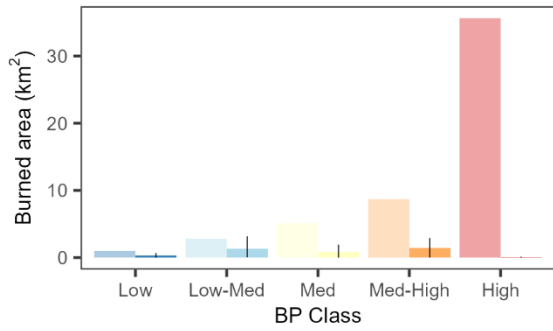
Bighorn Basins and Pryor-Bighorn Foothills



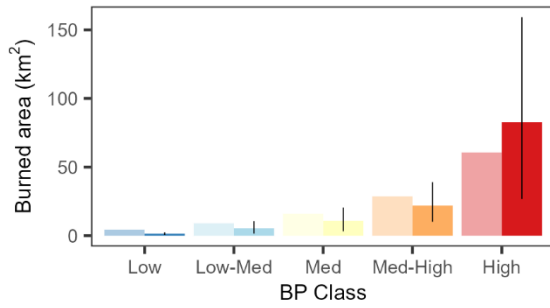
Sierra Nevada-Influenced Ranges, Hills, and Basins



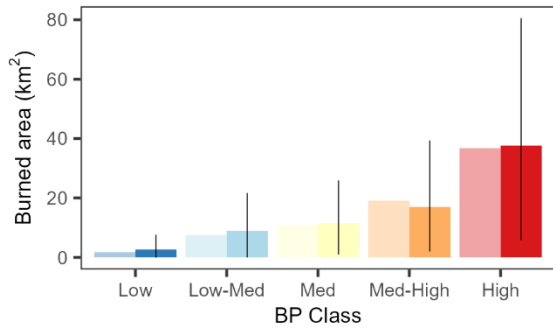
Eastern Chihuahuan Deserts



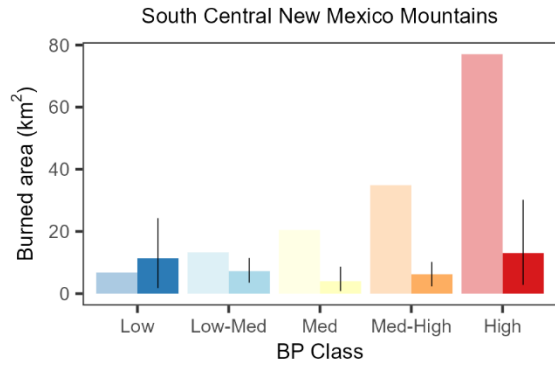
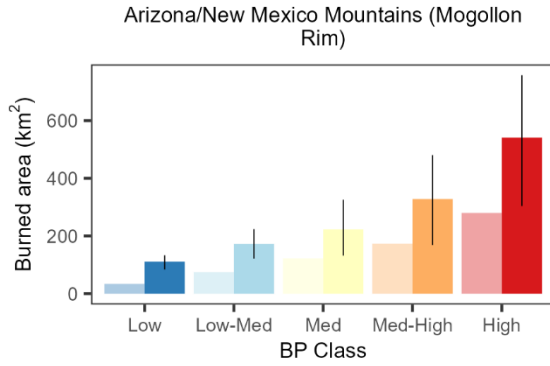
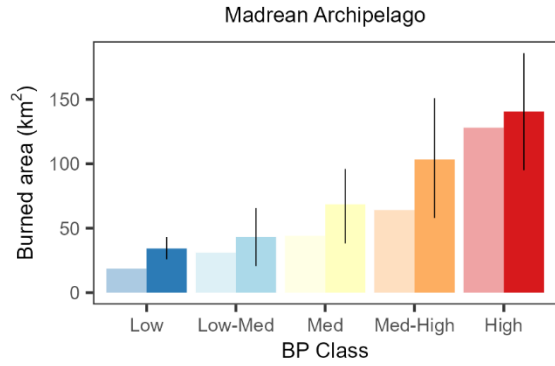
Northwestern Arizona Plateau and Mountains



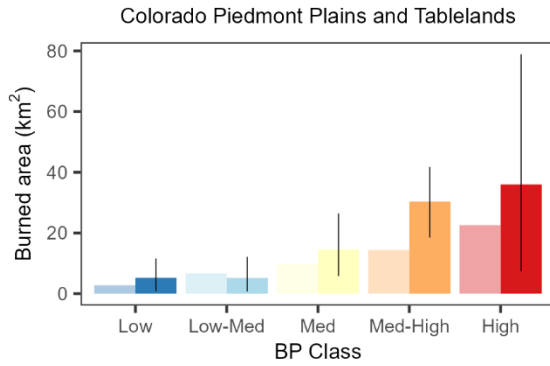
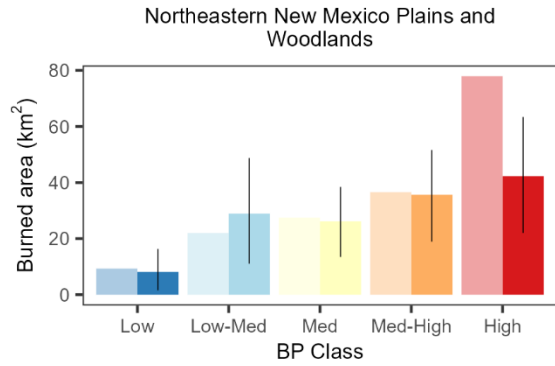
Wyoming Basin

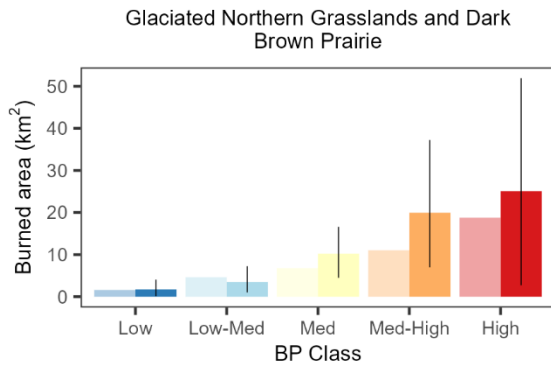
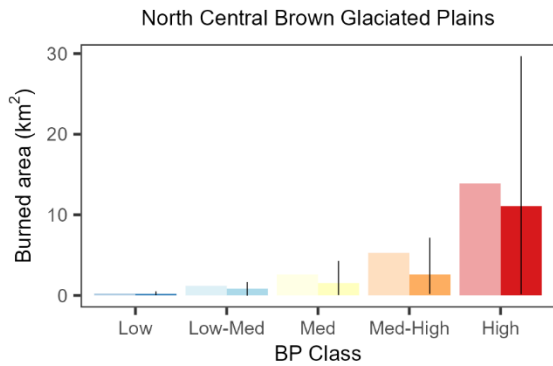
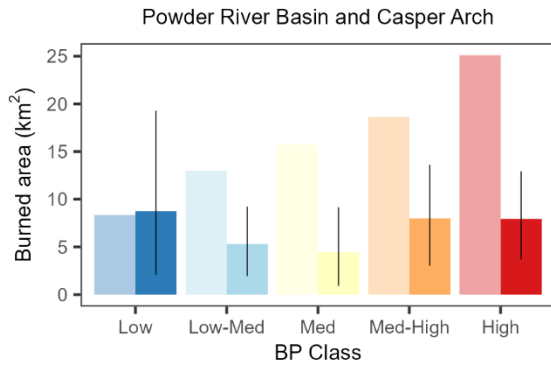
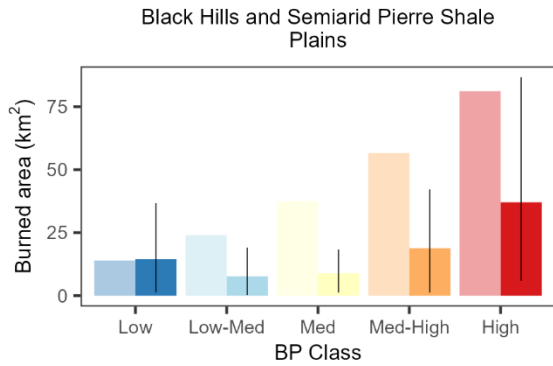
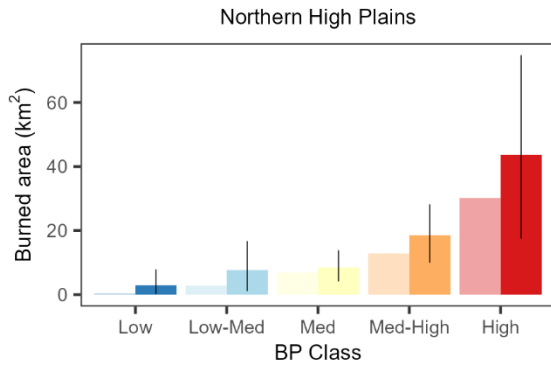
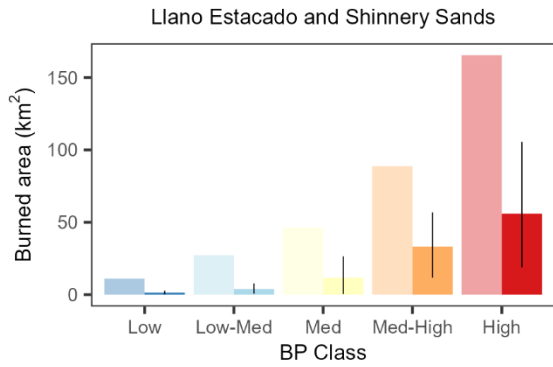
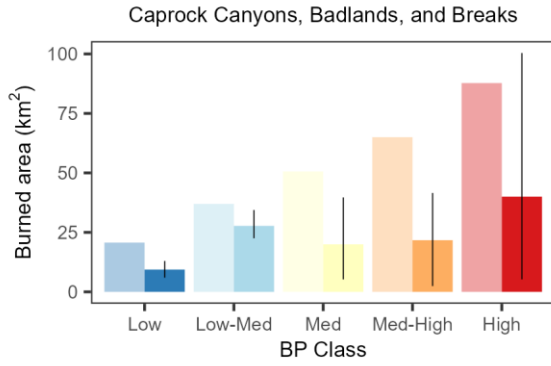
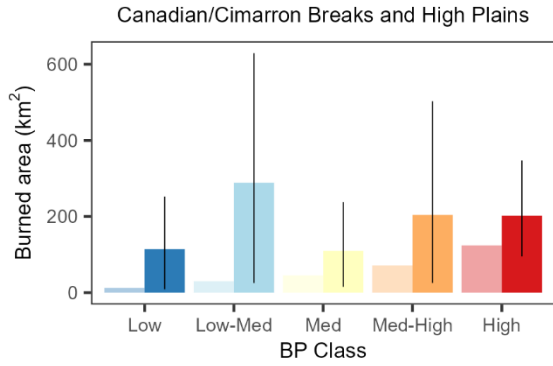


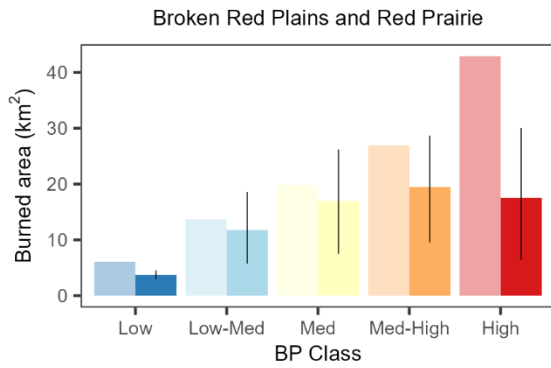
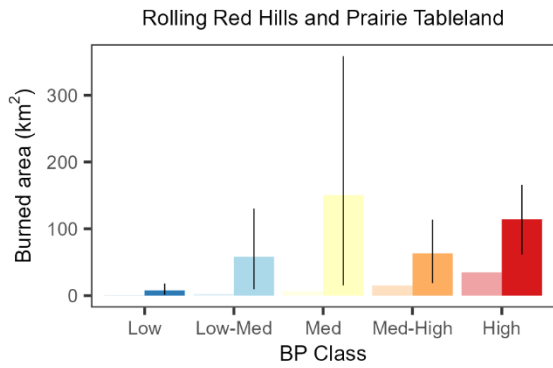
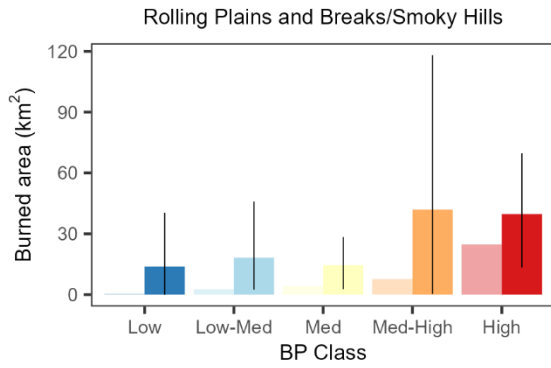
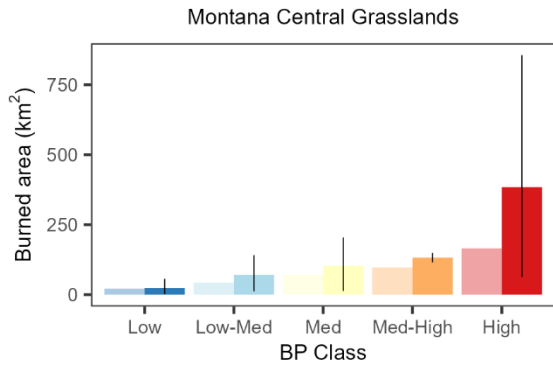
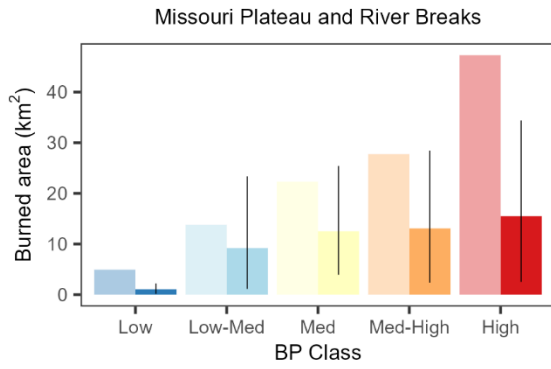
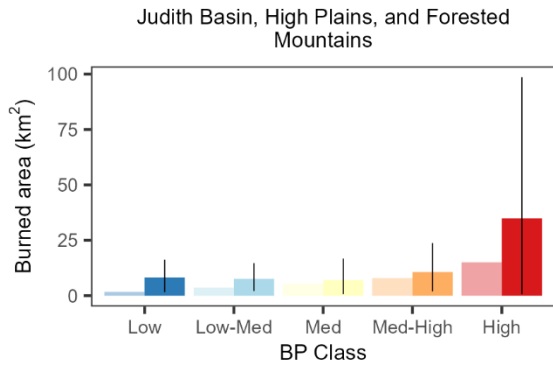
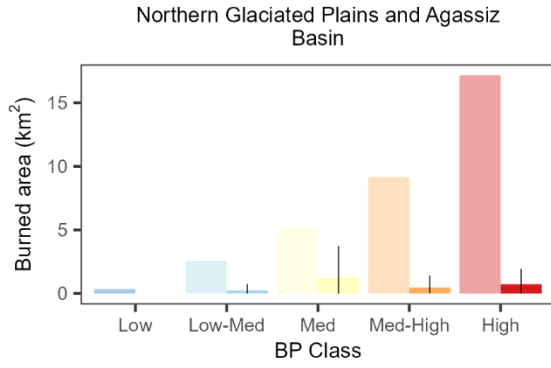
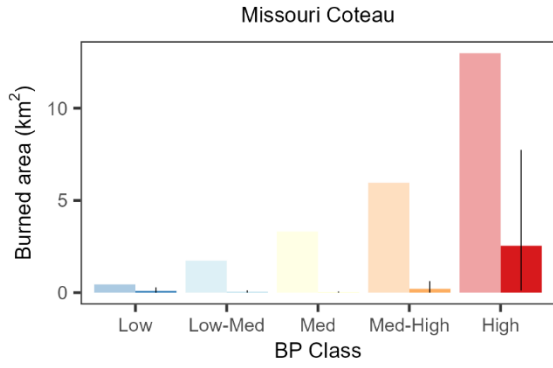
Southern Semi-Arid Highlands/Temperate Sierras

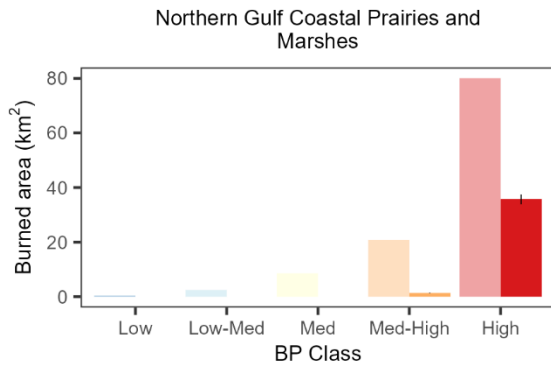
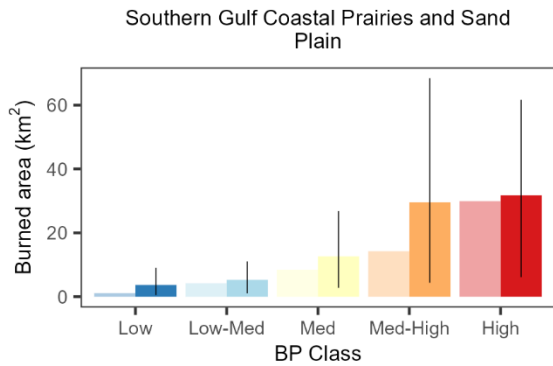
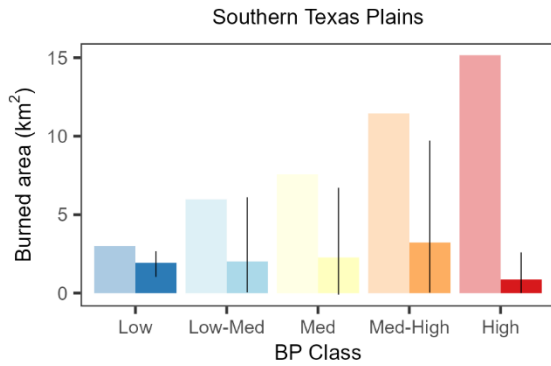
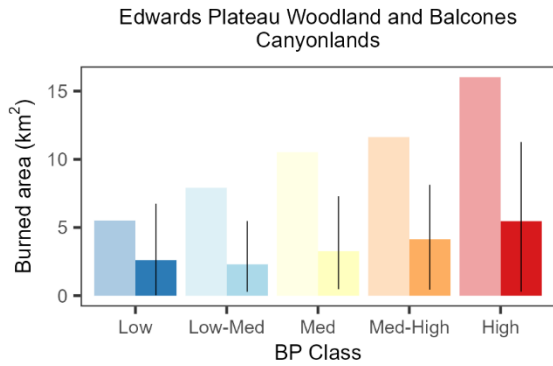
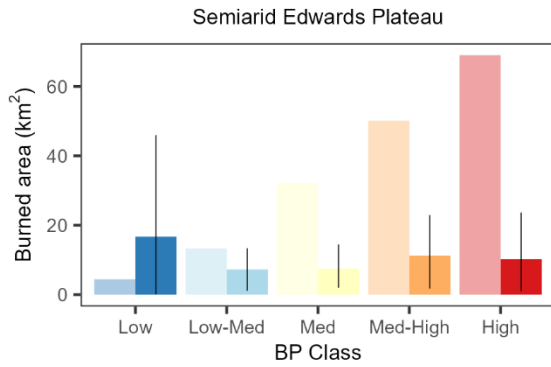
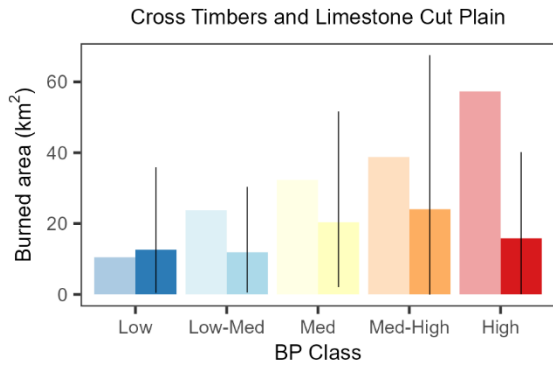
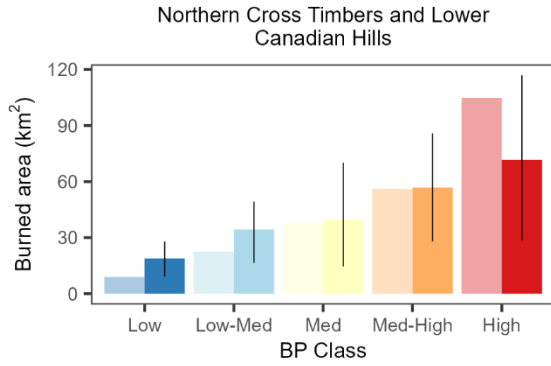
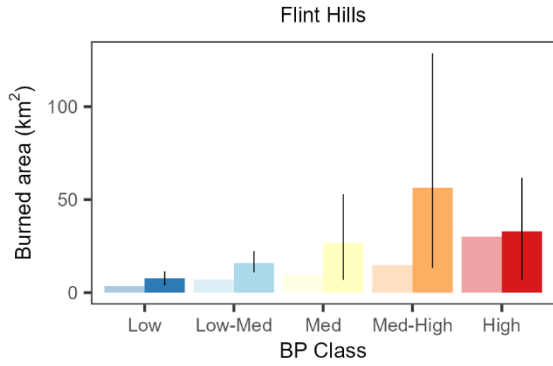


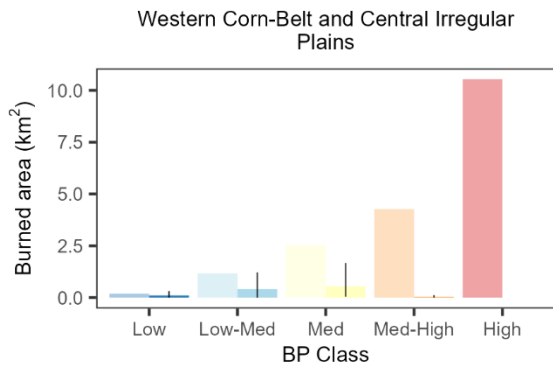
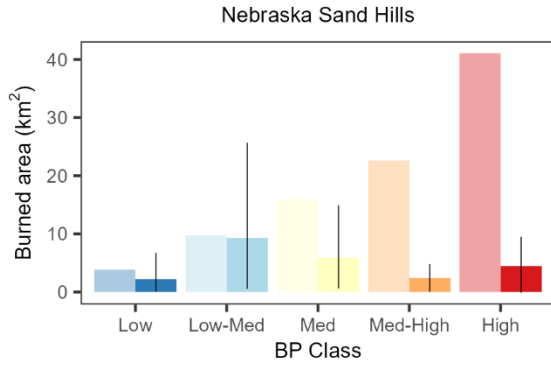
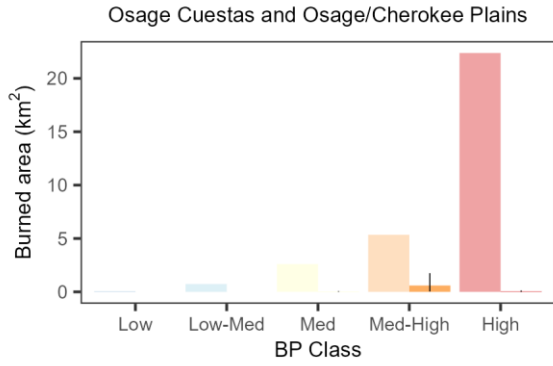
Great Plains



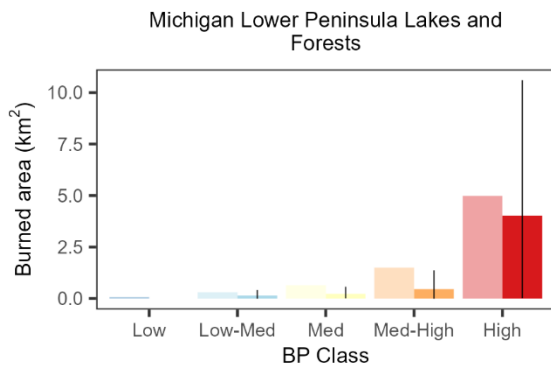
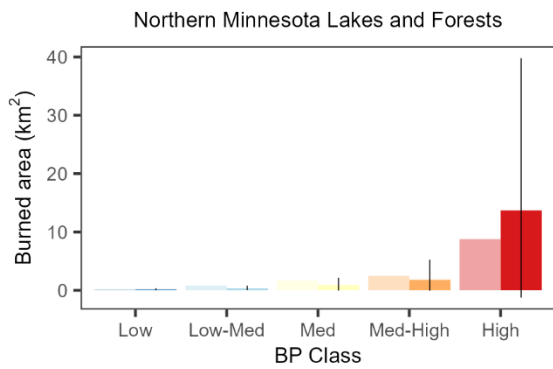
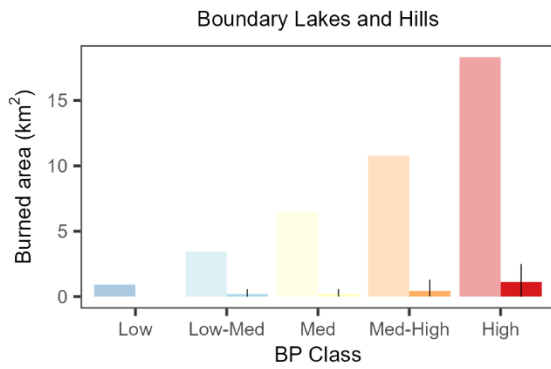
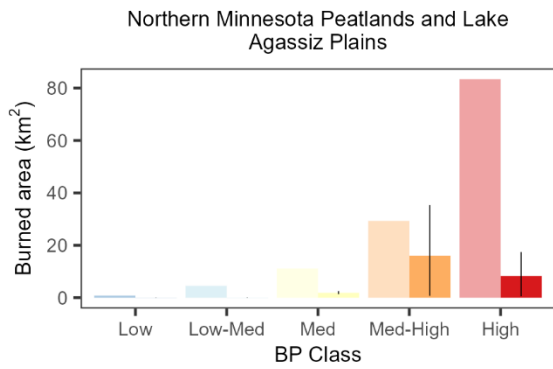


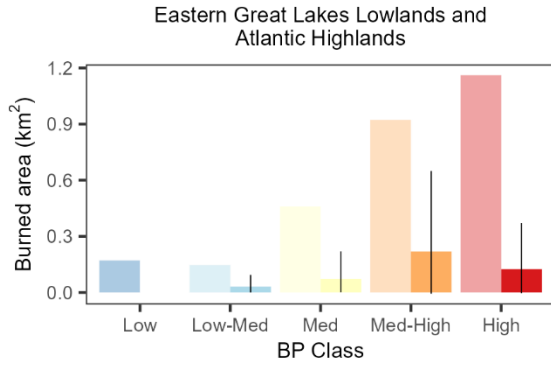
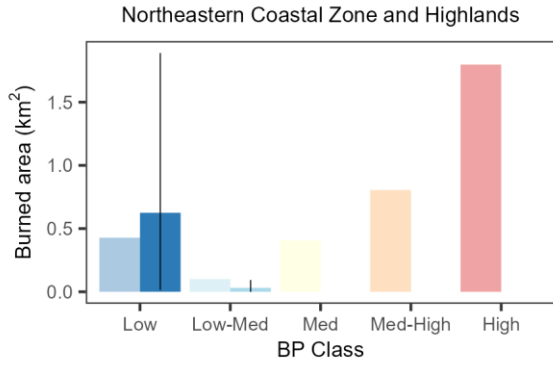




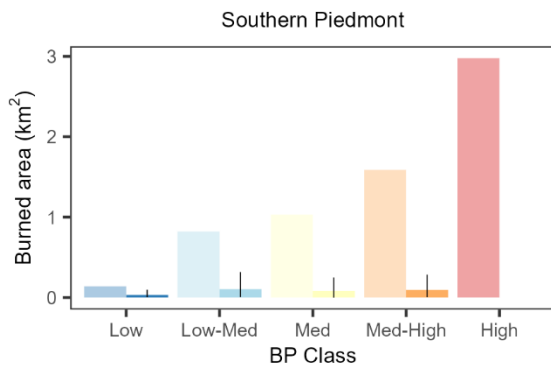
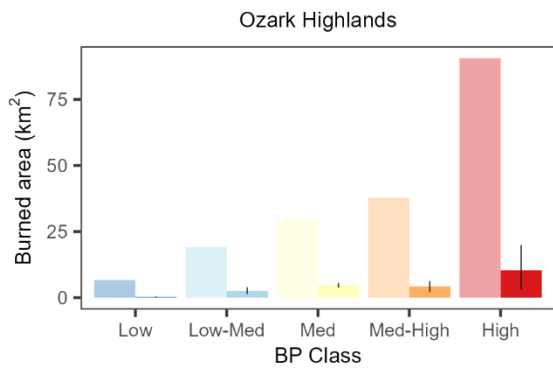
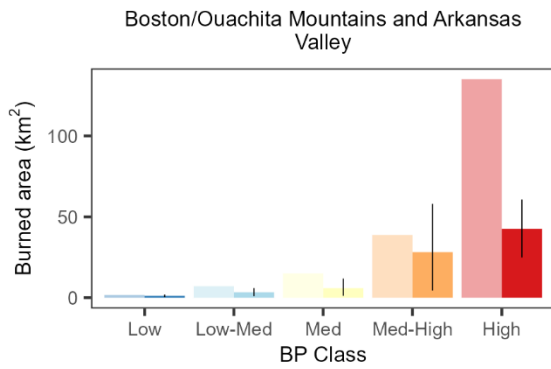
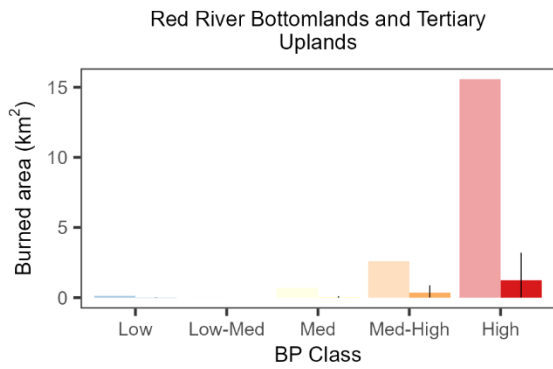
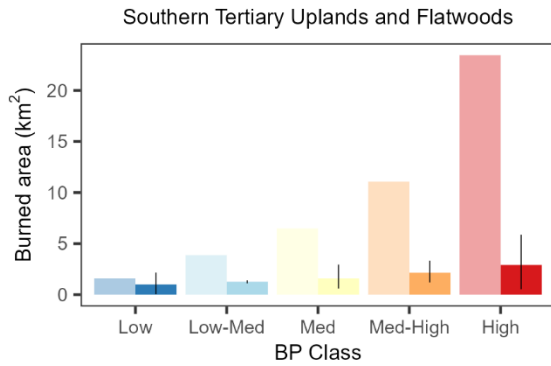
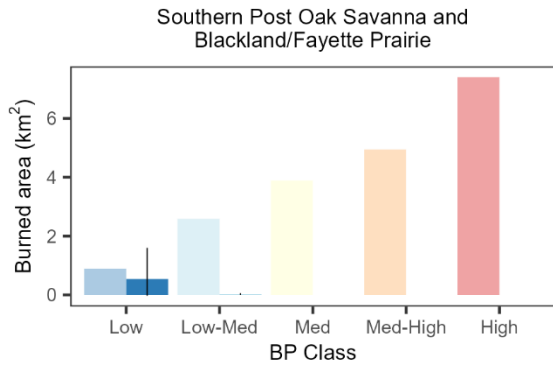


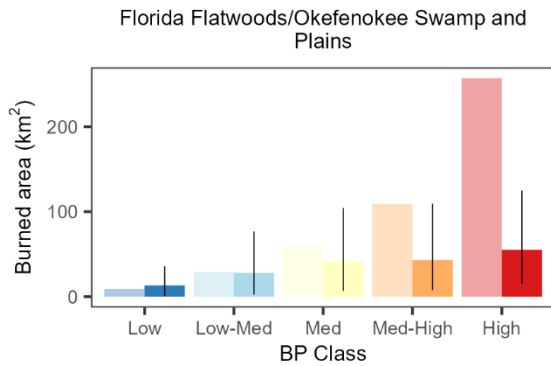
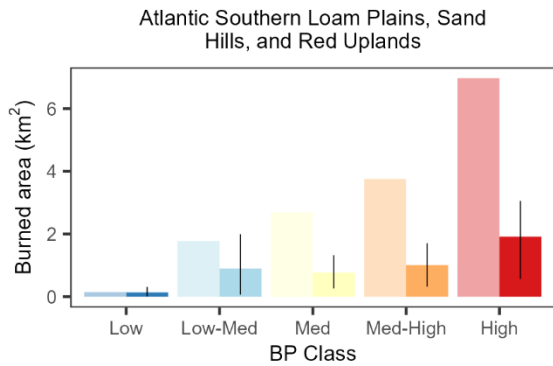
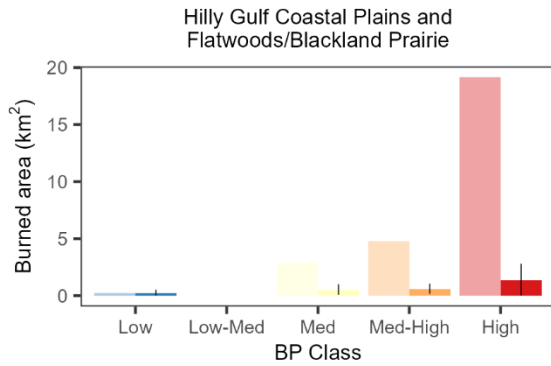
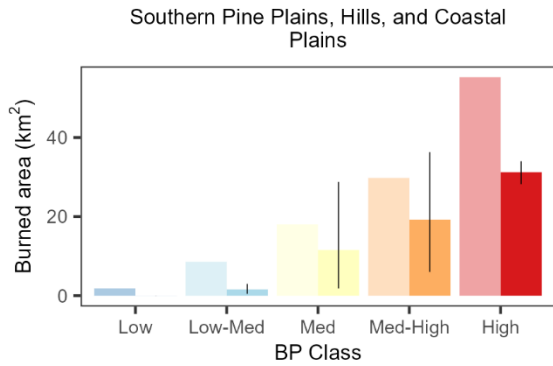
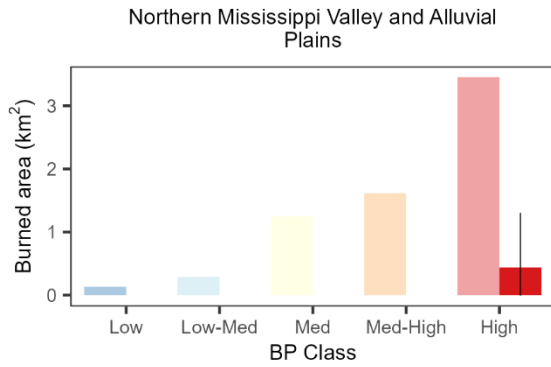
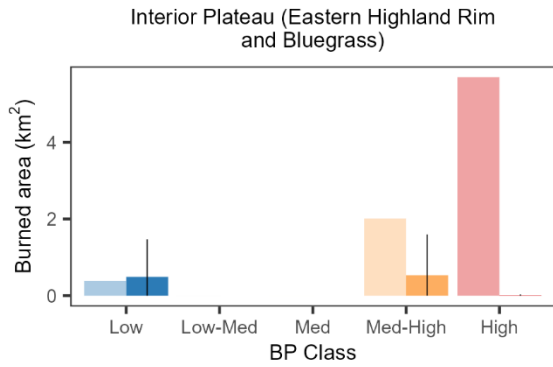
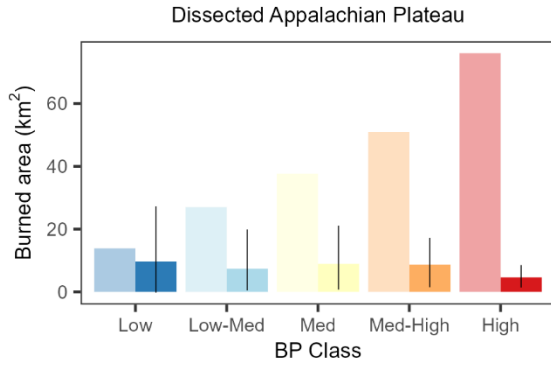
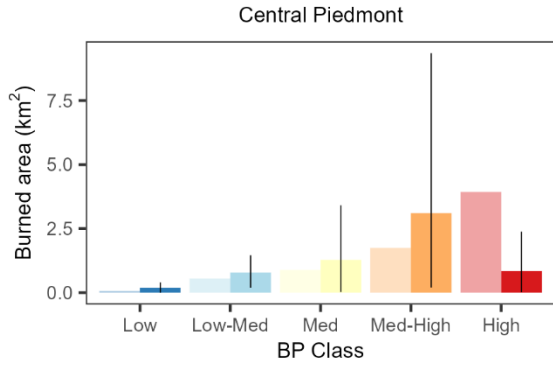
Northern Forests



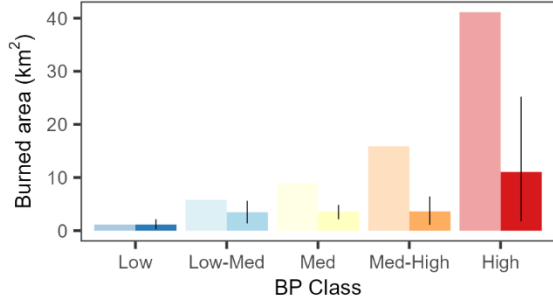


Eastern Temperate Forests

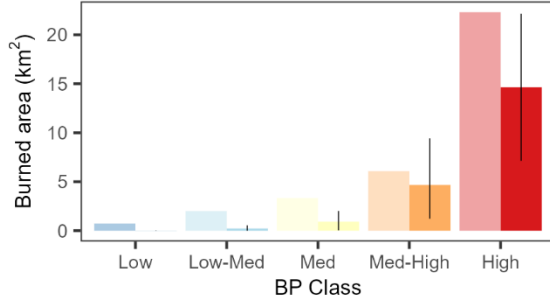




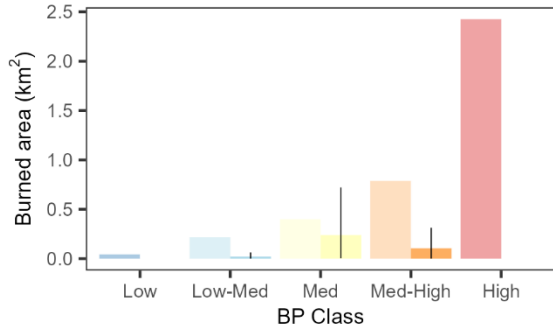
Carolina Flatwoods and Sea Islands/Coastal Marsh



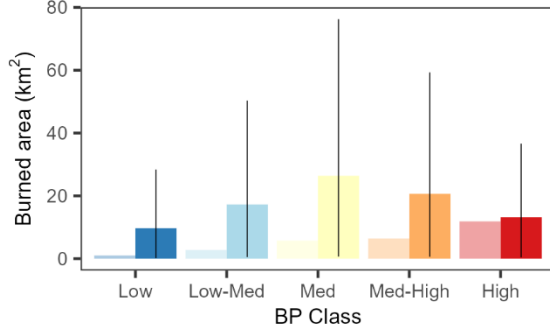
Delmarva Uplands, Pine Barrens, and Coastal Plains/Marshes



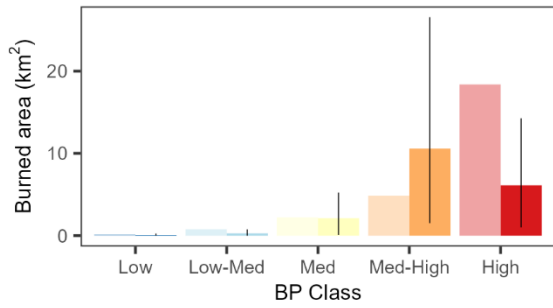
Northern Piedmont



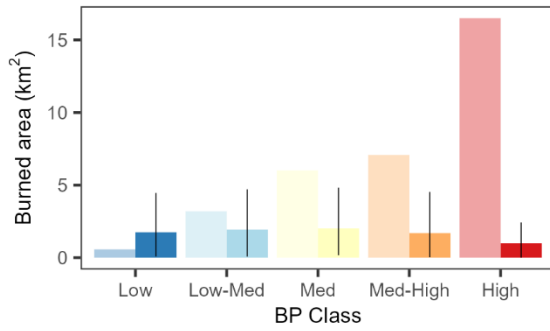
Southern Blue Ridge



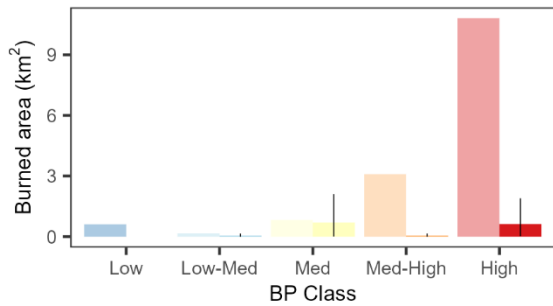
Northern Ridge and Valley and Central Appalachians



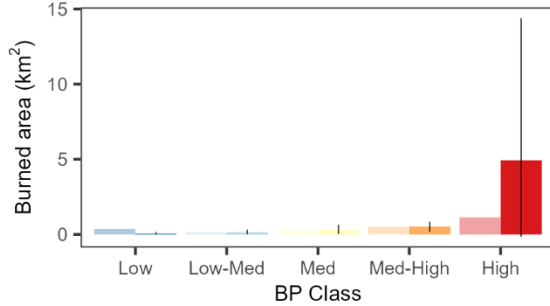
Southern Ridge and Valley



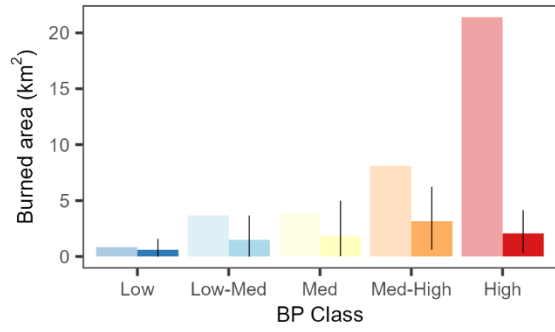
Western Allegheny Plateau and Erie Drift Plain



Northern Allegheny Plateau and North Central Appalachians



Southwestern Appalachians



Tropical Wet Forests

Southern Florida Coastal Plain/Everglades

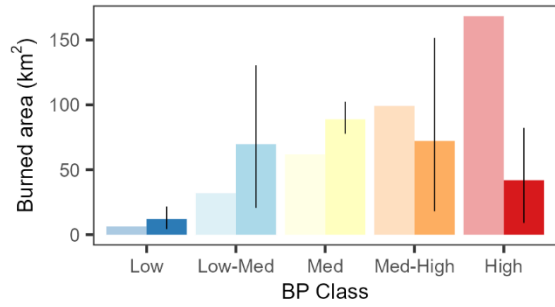


Figure S5: Proportional barplots showing 2016-2022 observed burned area per burn probability (BP) class for each pyrome in the western U.S., for three different wildfire size classes. Size classes are defined by three percentile ranges, based on final fire size (lower 95th percentile, 95th-99th percentile, and upper 99th percentile, or top 1% largest fires). Barplots are grouped by Omernik Level 1 ecoregion and ordered by total burned area over the observation period (as mean annual % of total burnable area, indicated by gray barplots on right).

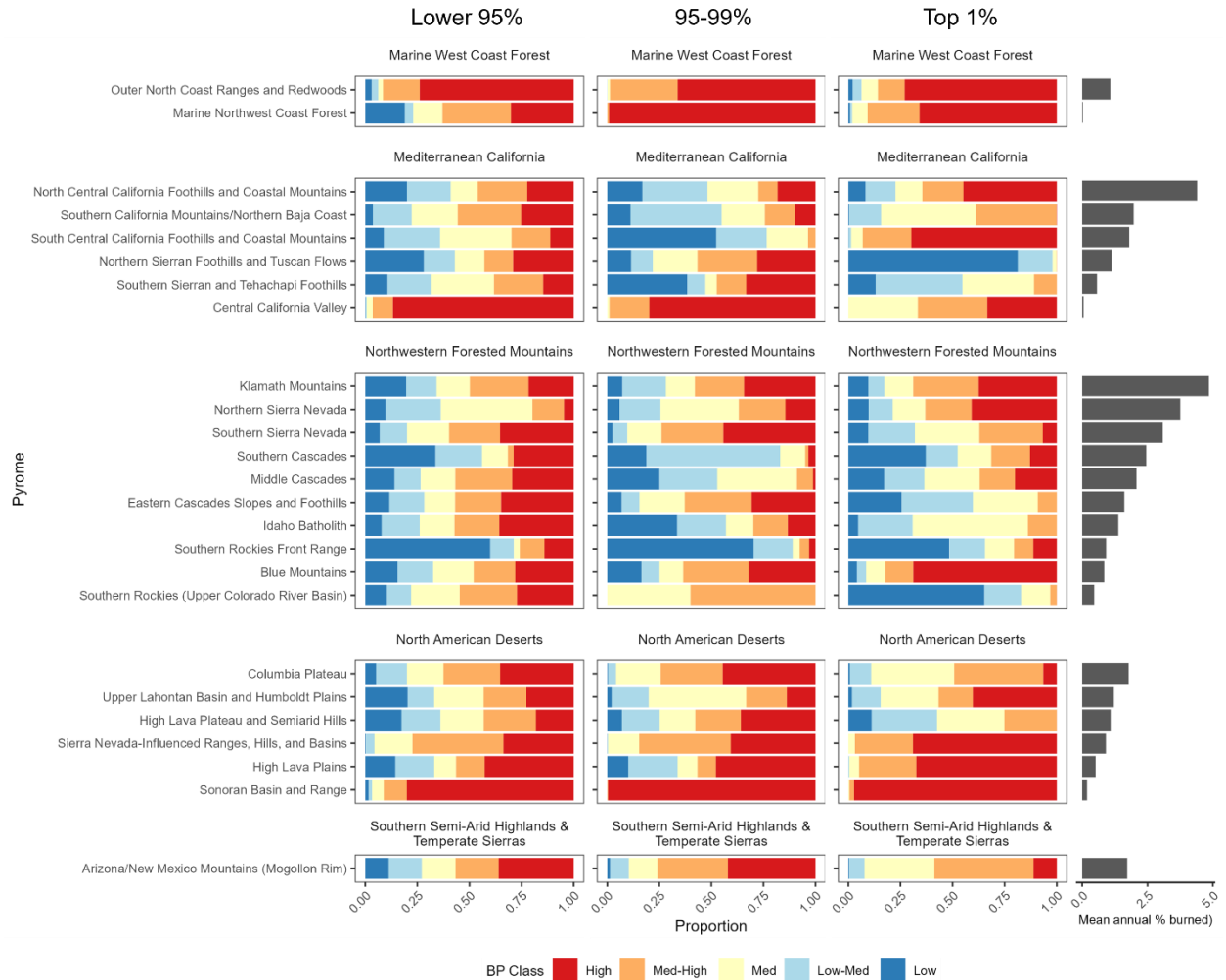


Figure S6: Proportional barplots showing 2016-2022 observed burned area per burn probability (BP) class for each pyrome in the western U.S., based on BP classes defined using two different versions of the U.S.D.A. Forest Service's BP map. LF2014 = version based on a 2014 LANDFIRE fuels map; LF2020 = version based on a 2020 LANDFIRE fuels map. Barplots are grouped by Omernik Level 1 ecoregion and ordered by total burned area over the observation period (as mean annual % of total burnable area, indicated by gray barplots on right).

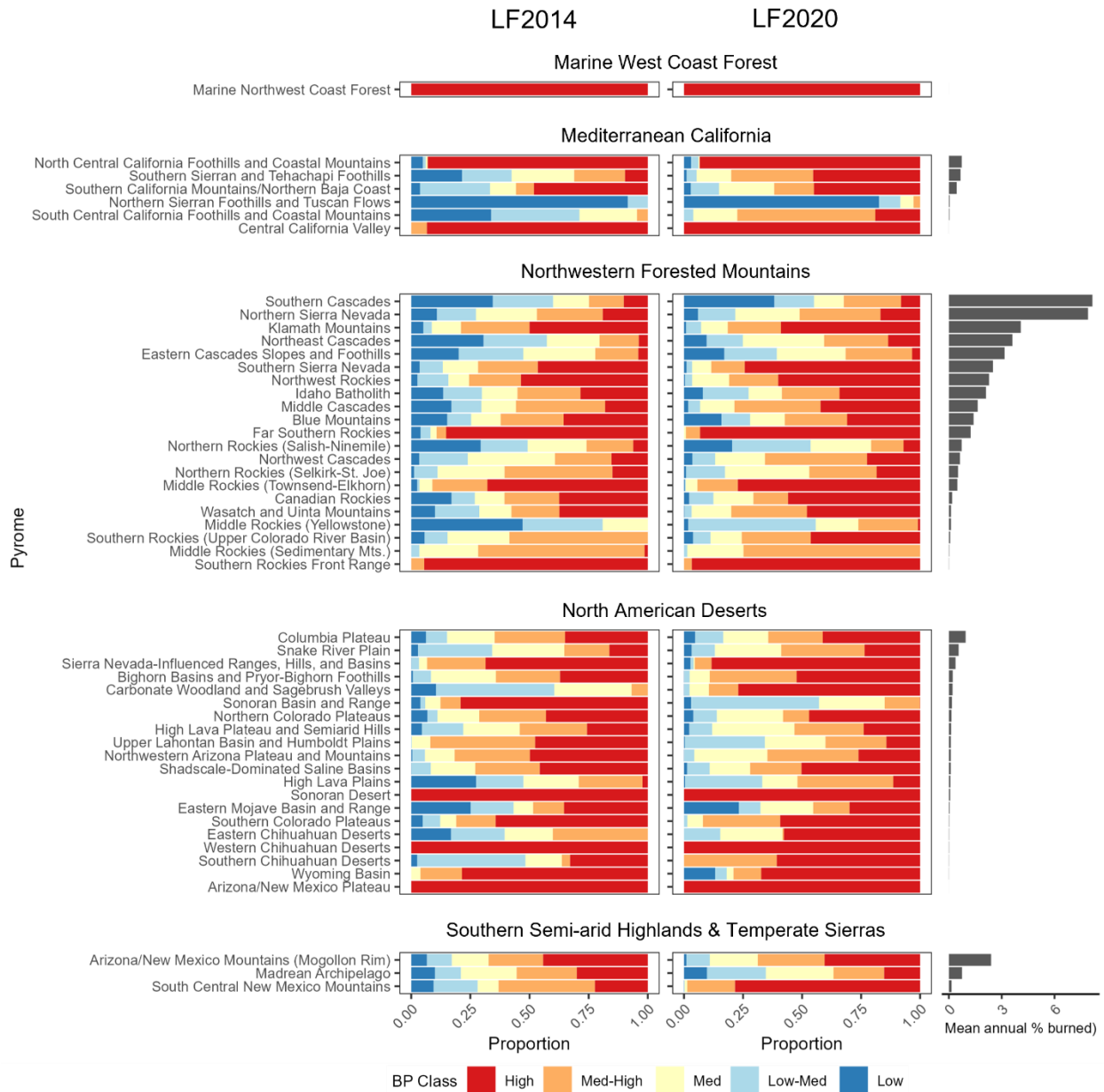


Figure S7: Proportional barplots showing 2021-2022 observed burned area per burn probability (BP) class for each pyrome in the eastern U.S., based on BP classes defined using two different versions of the U.S.D.A. Forest Service’s BP map. LF2014 = version based on a 2014 LANDFIRE fuels map; LF2020 = version based on a 2020 LANDFIRE fuels map. Barplots are grouped by Omernik Level 1 ecoregion and ordered by total burned area over the observation period (as mean annual % of total burnable area, indicated by gray barplots on right).

