Zones of Interest for Conservation of Boreal Passerine Birds

Final Report

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Executive Summary

CWS initiated a "Zones of Interest" project to identify priority areas for boreal landbird species, which represent a conservation planning gap in Canada. We built on previous work by Carlson (2015), aiming to refine inputs and assumptions, and to identify conservation priorities across a range of scenarios. We developed 128 unique scenarios representing all possible combinations of the following six factors: (1) *Prioritization algorithm:* focus on individual species core areas vs. species richness; (2) *Stratification:* boreal-wide vs. BCR subregion-specific conservation priorities; (3) *Disturbance:* discounted by footprint proportion vs. not discounted; (4) *Climate change and uncertainty:* discounted by current and/or future uncertainty vs. not discounted (four alternatives); (5) *Species weights:* species weighted by conservation status vs. all equal; (6) *Species list:* all priority landbird species vs. forest-associated boreal species.

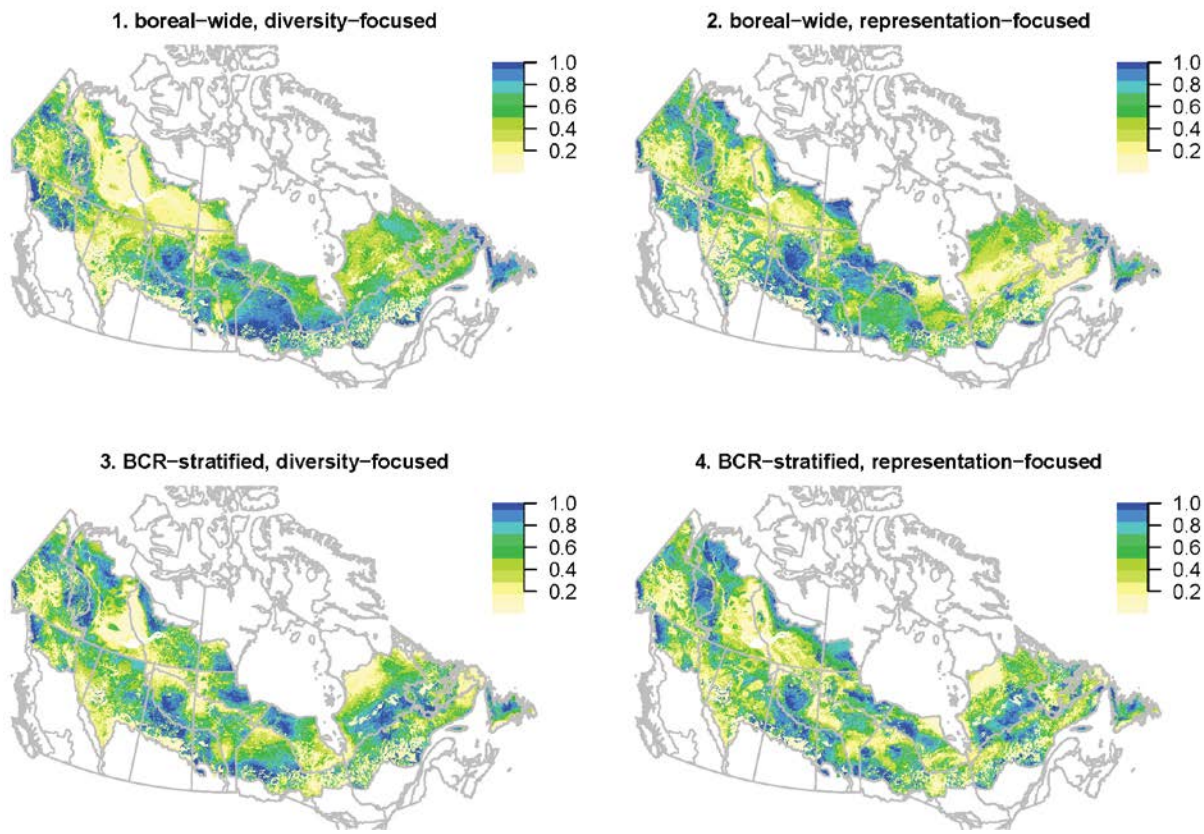
For the boreal region of Canada (bird conservation regions 4, 6, 7, and 8), we used the Zonation (Moilanen 2007) conservation planning software to rank 4-km x 4-km grid cells according to their conservation value for 63 priority landbird species, resulting in a set of nested conservation "solutions" for a range of land percentage targets. Based on recommendations of the International Boreal Conservation Science Panel (Badiou et al. 2013), we used a 50% target as a starting point for evaluating scenario efficiency. As inputs to Zonation we used spatially explicit density and uncertainty predictions based on data from the Boreal Avian Modelling Project (Stralberg et al. 2015b) to represent avian conservation value, and best available maps of human footprint (Hansen et al. 2013, Pasher et al. 2013) to represent existing levels of disturbance.

Given the relatively even distributional characteristics of largely territorial boreal passerines, as well as the predominantly undisturbed quality of boreal habitats, we did not expect to identify distinct and universal conservation hotspots. However, after constraining our study area to the boreal region, removing hemiboreal portions, and adjusting our focal species accordingly, we did find that solutions were similar across species weightings and uncertainty assumptions. Consistent high value areas were found in western British Columbia, northern Saskatchewan, central Newfoundland, and undisturbed portions of southern Saskatchewan, Manitoba, Ontario, and Québec. The largest differences in Zonation rankings were driven by external factors such as disturbance and climate change, as well as *a priori* choices regarding ranking algorithm and study area stratification. This highlights the importance of establishing *a priori* assumptions and criteria to guide the interpretation of results and identification of conservation priorities and management strategies.

In terms of efficiency, the species diversity-focused algorithm ("additive benefit function") produced higher efficiency solutions than the species representation-focused algorithm ("core area zonation"), due to the inherent efficiencies of species substitutability. Furthermore, disturbance-and uncertainty-discounted scenarios were more efficient than their non-discounted counterparts, due to the coincidence of high uncertainty (and necessarily high disturbance) regions for multiple species. In contrast, stratification of conservation priorities by BCR subregion resulted in less efficient solutions, as expected given additional geographic constraints. Thus these scenarios do involve efficiency trade-offs.

Results from this study can cautiously be used to guide broad, continental-scale conservation priorities for boreal bird species. We suggest that more constrained scenarios, in terms of disturbance, climate

change, and priority species, are generally more informative and appropriate than simpler, unconstrained scenarios, although we recognize the validity of a range of assumptions. Although no single map can be viewed as prescriptive, our core constrained scenarios suggest four alternative options for meeting complementary conservation goals efficiently (see figure below). With specific conservation objectives, other scenarios may be preferable, and can be selected using the roadmap provided herein. However, the opportunistic nature of conservation opportunities must also be considered, especially given the high replaceability that we found. Each conservation decision must address a full range of considerations and principles that are nearly impossible to include in a single comprehensive analysis. Results herein provide objective, data-driven insights to guide conservation planning activities and principles.



Conservation priorities based on four core scenarios, with areas of higher disturbance and model uncertainty down-weighted, and species' influence weighted by conservation status. BCR-stratified = BCR subregion-specific; species diversity focus based on additive benefit function; species representation focus based on core area zonation algorithm. Highest ranks are in dark blue; lowest ranks are in light yellow.

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Preface

This report was prepared by the Boreal Avian Modelling Project under a contract between the University of Alberta and the Canadian Wildlife Service (CWS), contract number 3000602238, covering the grant period from 1 Feb 2016 to 31 Mar 2016.

The Boreal Avian Modelling (BAM) Project, based out of the University of Alberta, is an international collaboration of academic, government and non-government researchers. It works to improve understanding of the influence of environmental factors and human activities on boreal bird populations, combining statistical and simulation modeling with comprehensive, proactive assimilation of existing avian datasets. The intended areas of application of the project include conservation planning, monitoring, assessment of population status, environmental assessment, assistance to species-at-risk recovery, and protected areas management.

The Zones of Interest for Conservation of Boreal Passerine Birds contract includes the following three components that are addressed in this report (see main body for details):

1. A detailed description of how the uncertainty information was incorporated into the models and an interpretation of how inclusion of the uncertainty layers influences the final results.
2. Recommendations of how best to address the impacts of anthropogenic disturbance when identifying Zones of Interest and an interpretation of how differing approaches influence the final results.
3. A detailed description of how species weighting was incorporated into the models and an interpretation of how species weightings or using different functions within Zonation influence the final results.

Introduction

In Canada, as elsewhere, the identification of priority areas for bird conservation: (a) tends to emphasize aggregations of colonial species; and (b) is biased toward areas that are easily accessible by birders, naturalists, and scientists. Unlike many waterbirds, most forest landbirds, especially passerine songbirds, exhibit territorial behavior on their breeding grounds and tend to be dispersed across the landscape, rather than clustered in large groups. The boreal region is also relatively inaccessible throughout much of its extent, requiring model-based estimates of species distribution and abundance. CWS initiated a "Zones of Interest" project to identify priority areas for boreal landbird species that may not be well represented by Important Bird Areas mapping and thus represent a gap in conservation strategies. Using the objective proposed by the International Boreal Conservation Science Panel (Badiou et al. 2013), a conservation target of 50% of the boreal region was used as a starting point.

Large-scale, complex conservation problems can benefit from systematic conservation planning algorithms (Margules and Pressey 2000), which simultaneously consider multiple conservation objectives and constraints to identify efficient and complementary conservation priorities across a study area. Zonation (Moilanen 2007) is among the most widely used of such tools. While the similar Marxan tool (Ball and Possingham 2000) requires setting quantitative targets for each species or other resource, Zonation creates a single priority ranking of the study area that can be used to identify priority conservation areas for any given fraction (e.g., top 5% or 10%). In this way, Zonation can identify, for example, the area that represents the best 50% according to given criteria, while also providing a pixel-level ranking that can be useful for phased conservation strategies.

Previous Zonation analyses initiated by CWS identified priority conservation areas for several scenarios, but also revealed that the boreal landbird distributions are diverse and dispersed, not clustered in "hotspots" that can conserve a high proportion of biodiversity value within relatively small areas (Carlson 2015). As a result, other conservation criteria, such as species of interest, regional representation, and anthropogenic disturbance and climate change, drive the priorities and are thus particularly important to articulate *a priori*. Follow-up analyses recommended by Carlson (2015) included: (1) exploring the overlap among conservation scenarios; (2) comparing landbird priority areas with those for other taxa such as caribou; (3) applying Zonation at the subregional level; and (4) explicitly incorporating uncertainty in the density inputs for individual species.

In this report, we addressed three of four of Carlson's recommendations (1, 3, and 4), leaving cross-taxa comparisons to future work. We attempted to reduce some of the extraneous variation observed across scenarios in previous results, since it hindered interpretation of results. The primary way we did this was by standardizing all scenarios to a single study area defined by boreal bird conservation regions (BCR), thereby eliminating high-diversity hemiboreal regions and a few southerly species that drove previous results. In addition, we revisited the previously-used anthropogenic disturbance and species weighting criteria, as requested by CWS (see Preface). Beyond this, we aimed to identify distinct alternative scenarios that would require planning choices on the part of CWS, and provide recommendations regarding the benefits and appropriateness of the different scenarios.

Study area and data

Our revised study area consisted of BCRs 4, 6, 7, and 8, which coincide with boreal and taiga level III ecoregions defined by the Commission for Environmental Cooperation, and the boreal region used by Stralberg et al. (2015b) for climate-change projection (Figure 1). Because this area is larger than the human footprint layer used in the previous analysis (Pasher et al. 2013), we supplemented the disturbance information by merging data on urban and agricultural land-use classes from the North American Land Cover Monitoring System 2005 landcover map, and disturbed areas mapped by the University of Maryland (Hansen et al. 2013), with large fire polygons removed. The proportion of anthropogenic disturbance (footprint) within a 4-km grid cell (coinciding with avian density predictions) was used to “discount” the value of that grid cell accordingly (Figure 2a).

Within each BCR, we also considered provincial subregions where established by CWS (i.e., Quebec, Ontario, and Newfoundland/Labrador), as well as new regional CWS divisions (i.e., splitting Prairie and Northern regions at the 60th parallel), resulting in 13 separate regions (Figure 1). As conservation objectives for consideration by Zonation, we used a combined list of 63 passerine species that were identified as priority species by one or more boreal BCR subregions, and that had spatially-explicit predicted densities (current and mid-century climate-change projections) modeled by the Boreal Avian Modelling Project (Stralberg et al. 2015b)—i.e., all passerine species with a boreal (vs. temperate or arctic) presence and with data containing multiple time intervals for estimation of density offsets (Sólymos et al. 2013) (Table 1). We also considered BCR subregion-specific priority lists for BCR-stratified scenarios (Table 1, see Methods).

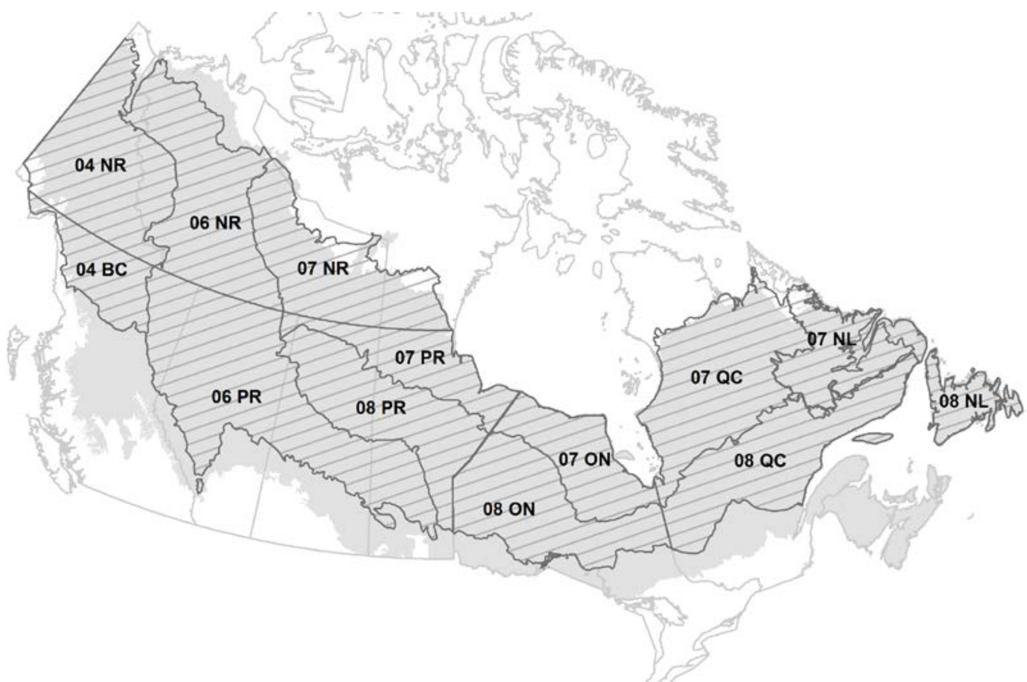

Figure 1. Study area map. BCR subregions outlined in dark gray and cross-hatched. NR = Northern Region; PR = Prairie Region. BC = British Columbia; ON = Ontario; QC = Québec; NL = Newfoundland and Labrador. Previous study region defined by Brandt’s boreal region shaded gray.

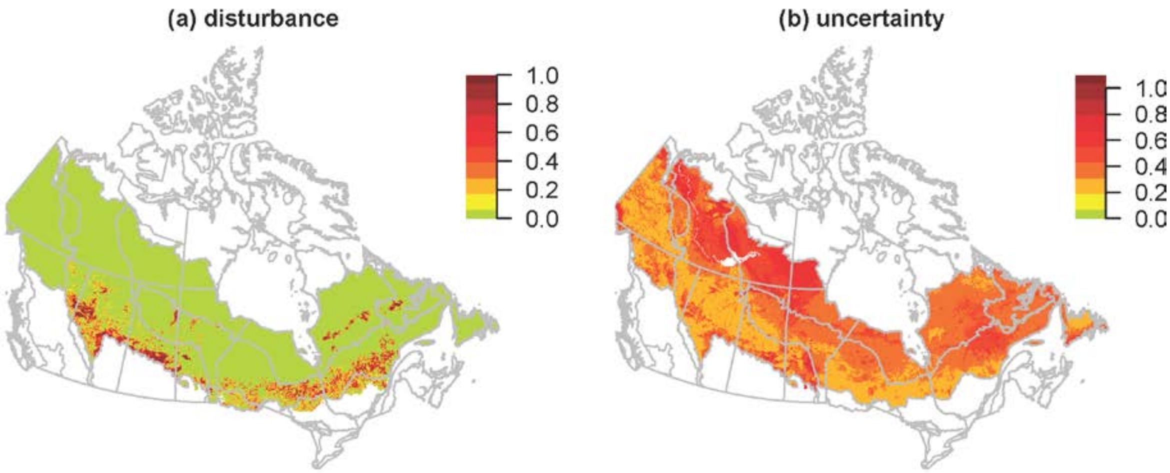

Figure 2. Combined disturbance and uncertainty discounting maps. (a) disturbed proportion; (b) current mean coefficient of variation (CV) across species (illustrative only; individual species' uncertainty layers used in analysis)

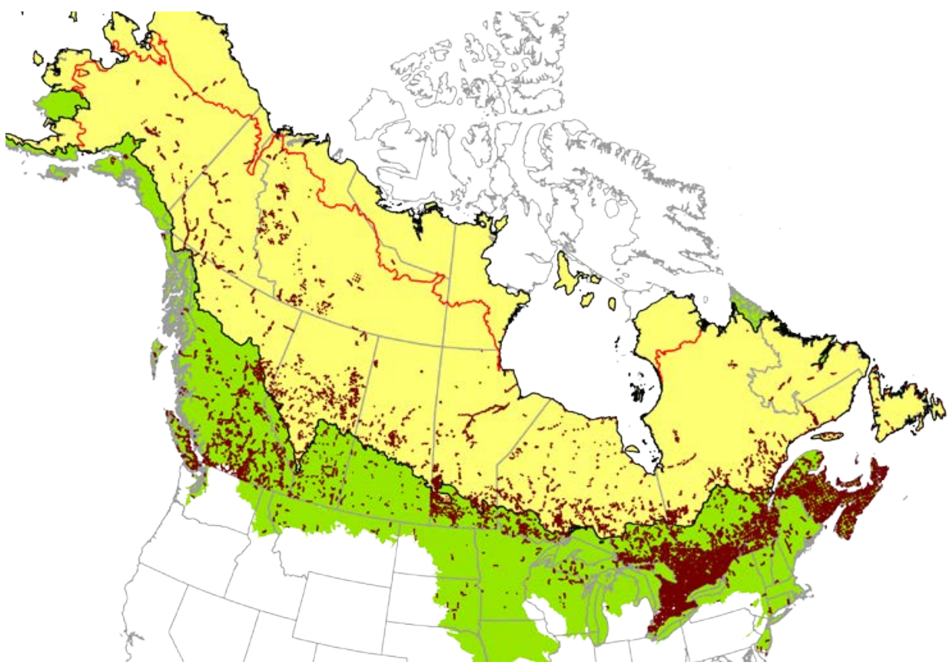

Figure 3. Boreal Avian Modelling Project point-count locations sampled for modelling (Stralberg et al. 2015b) are shown in dark red. Model-building area is shown in yellow with boreal/arctic boundary in red; ecoregions with climates projected to move into the study area by 2100 are depicted in light green.

Methods

As in previous analyses (Carlson 2015), we first used Zonation's "core area" algorithm to identify conservation solutions that most efficiently represent the 63 priority species considered. Core area Zonation (CAZ) focuses on identifying the hierarchical set of solutions that includes the most core (high-quality) habitat for each species simultaneously, irrespective of overlap among species. This has the effect of emphasizing areas of high density for individual species (especially less abundant species with unique distributions) at the expense of areas with high species richness, although high-diversity areas do still tend to be favoured given their efficiency for multiple species. For a second set of scenarios, however, we used the complementary "additive benefit function" (ABF) algorithm with a power function exponent of 0.25, which allows some species-level substitution, thereby favoring areas of high species diversity (Factor 1 below). Both of these algorithms are fundamentally different from each other, and from the "target-based" approach, which requires the specification of *a priori* quantitative targets for each species. The core area approach (hereafter "species representation") ensures that all species are covered by a given solution, which will necessarily emphasize rare, but also peripherally distributed (e.g., grassland-associated) species; whereas the additive benefit approach (hereafter "species diversity") focuses on areas of higher overall species richness, independent of species composition, which increases the spatial efficiency of solutions and provides greater potential for identification of "hotspots." As in Carlson (2015), we used a relatively low warp factor of 10 (number of cells removed per iteration) to improve the optimality of solutions.

To compare the influence of *a priori* assumptions and approaches, and to evaluate commonalities among them, we developed 128 unique scenarios representing all possible combinations of the following six factors (Table 2):

1. **Prioritization algorithm:** 0 = species representation (CAZ), 1 = species diversity (ABF);
2. **Stratification:** 0 = combined conservation priorities; 1 = separate conservation priorities by BCR subregion (based on separate priority species lists for each BCR subregion);
3. **Disturbance:** 0 = no discounting; 1 = discounted by footprint proportion;
4. **Climate change and uncertainty:** 0 = current distribution only, no uncertainty; 1 = current distribution, with uncertainty; 2 = current and future (2050s) distributions, with uncertainty; 3 = future distribution (2050s), with uncertainty;
5. **Species weights:** 0 = all equal; 1 = priority ranking (Table 1); and
6. **Species list:** 0 = all priority landbird species, 1 = forest-associated boreal species (Table 1).

For half of the 128 scenarios, we stratified by BCR subregion (Factor 2) using the "administrative units" feature in Zonation. That is, rather than treating the entire study area equally, we separately identified conservation priorities for each BCR subregion (adapted to align with new CWS regions), based on priority species for that subregion (Table 1). For newly split BCRs 6 and 7, we used the BCR 4 priority species list for the northern subregions and kept existing priority species lists for the southern portions. For newly split BCR 4, we used the BCR 6 priority species list for the southern subregion and kept the existing priority species list for the northern portion. Each subregion was weighted equally to ensure that priority areas were distributed across subregions in proportion to their area. These scenarios were intended to be used in a different planning context than the boreal-wide scenarios; namely, the development of BCR subregion-level conservation strategies.

For both uncertainty and disturbance discounting (Factors 3 and 4), we used Zonation's "info-gap" weighting option. For uncertainty, we used GIS layers representing the standard deviation of species density predictions (current or future) and for disturbance we used disturbance proportion multiplied by species mean density. Although we recognize that species are differentially affected by different levels and types of disturbance, we treated all forms of disturbance as being equal for all bird species. We used an "alpha" weight of one to encourage strong uncertainty and disturbance discounting, with pixels that are 100% disturbed having no value. Prior experimentation with different alpha values for uncertainty resulted in qualitatively similar spatial patterns; thus we chose the higher value for greater contrast with baseline solutions.

Species were either all weighted equally, or weighted according to conservation status (Factor 5); species weights were constant across BCR subregions. SARA-listed species (Canada Warbler, Olive-sided Flycatcher, and Rusty Blackbird) were assigned a weight of 4 and species with PIF global population trend scores of 4 or 5—which have declined more than 15% in recent decades (Rosenberg et al. 2016)—were assigned weights of 2 and 3, respectively, with all other species given a weight of 1 (Table 1). Species included (Factor 6) were either all 63 priority species or a subset of 46 forest-associated species as defined by the Cornell Laboratory of Ornithology website (allaboutbirds.org, Table 1).

Zonation results or "solutions" were evaluated visually based on mapped conservation priority ranks (values ranging from 0-low to 1-high) and maps representing the difference between the rank of a given pixel for a given scenario vs. a baseline reference scenario (values ranging from -1 for a large decrease in conservation priority to 1 for a large increase).

Results

Four different major approaches were evaluated herein, based on all possible combinations of prioritization algorithm (Factor 1) and stratification (Factor 2); that is, species representation-focused core area Zonation (CAZ) with and without BCR subregion stratification, and species diversity-focused additive benefit function (ABF) with and without BCR subregion stratification (Figure 4). Both the diversity vs. representation algorithms and boreal-wide vs. BCR-stratified scenarios had the effects of increasing priority ranks in northern regions (Figure 5). Other factors varied in their influence, but generally resulted in smaller modifications to the baseline solution. Results from all scenarios are shown in Appendices 1 (representation-focused) and 2 (diversity-focused) (see Table 2 for scenario numbers).

Using the original boreal-wide (unstratified) CAZ algorithm without further modification as a baseline, the proportional discounting of disturbed areas resulted in lower ranking of disturbed lands along southern boreal margins in particular (Figure 6). Incorporating species weighting by priority status resulted in lower ranking of many mid-boreal regions and higher ranking of northern boreal regions in particular (Figure 6). Discounting of high-uncertainty areas reduced rankings along southwestern margins in Alberta and Saskatchewan, and also in northern Quebec and Ontario, while the incorporation of mid-century climate change resulted in higher rankings in mid-boreal regions (Figure 6).

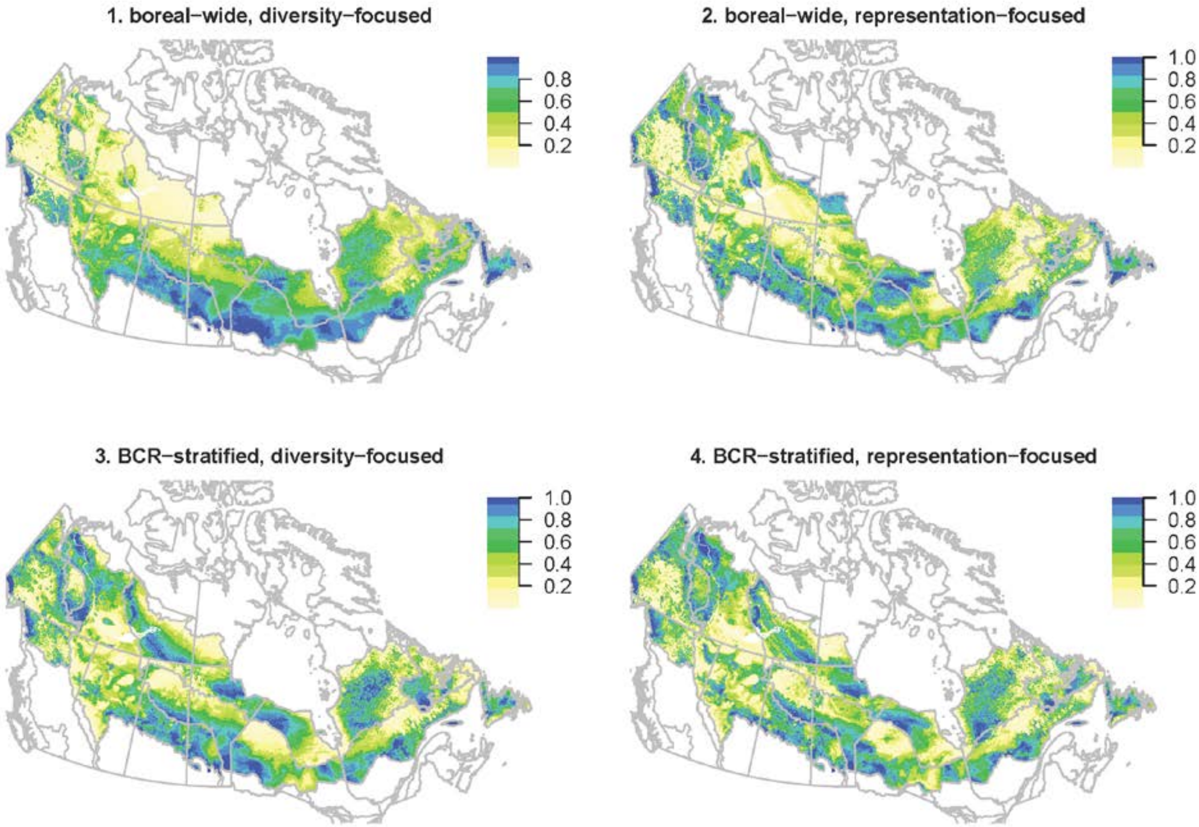

Figure 4. Conservation priorities based on four baseline scenarios: boreal-wide, diversity-focused (map 1, scenario 1a) and representation-focused (map 2, scenario 1) and BCR subregion-stratified diversity-focused (map 3, scenario 3a) and representation-focused (map 4, scenario 3a). Highest Zonation ranks are in dark blue; lowest ranks are in yellow.

For the BCR subregion-stratified, representation-focused algorithm, the difference due to disturbance was similar to that in the boreal-wide scenario (Figure 8), while the species weights difference was not discernable (Figure 8) and the uncertainty difference was also similar (Figure 8). The mid-century climate-change differences were generally greater than in the boreal-wide version, with more changes in the north, resulting in greater overall differences as well (Figure 8). Finally, for the BCR subregion-stratified, diversity-focused algorithm, the pattern of differences was fairly similar to that of the BCR subregion-stratified, representation-focused algorithm (Figure 9). We did not find a discernable influence of species list (forest-associated vs. all species) after the above constraints had been applied.

For all four major approaches, the incorporation of future climate change made a substantial difference in Zonation results. When considering species' projected mid-century climate-based distributions in addition to current modeled distributions, starting with disturbance- and uncertainty-discounted, priority species-weighted scenarios, we found major changes for both boreal-wide and BCR subregion-stratified scenarios (Figure 10, Figure 11). When comparing scenarios based on just future (mid-century) projections with those combining current and future distributions, the difference in Zonation ranking was of similar magnitude, but more consistent across scenarios (Figure 10, Figure 11).

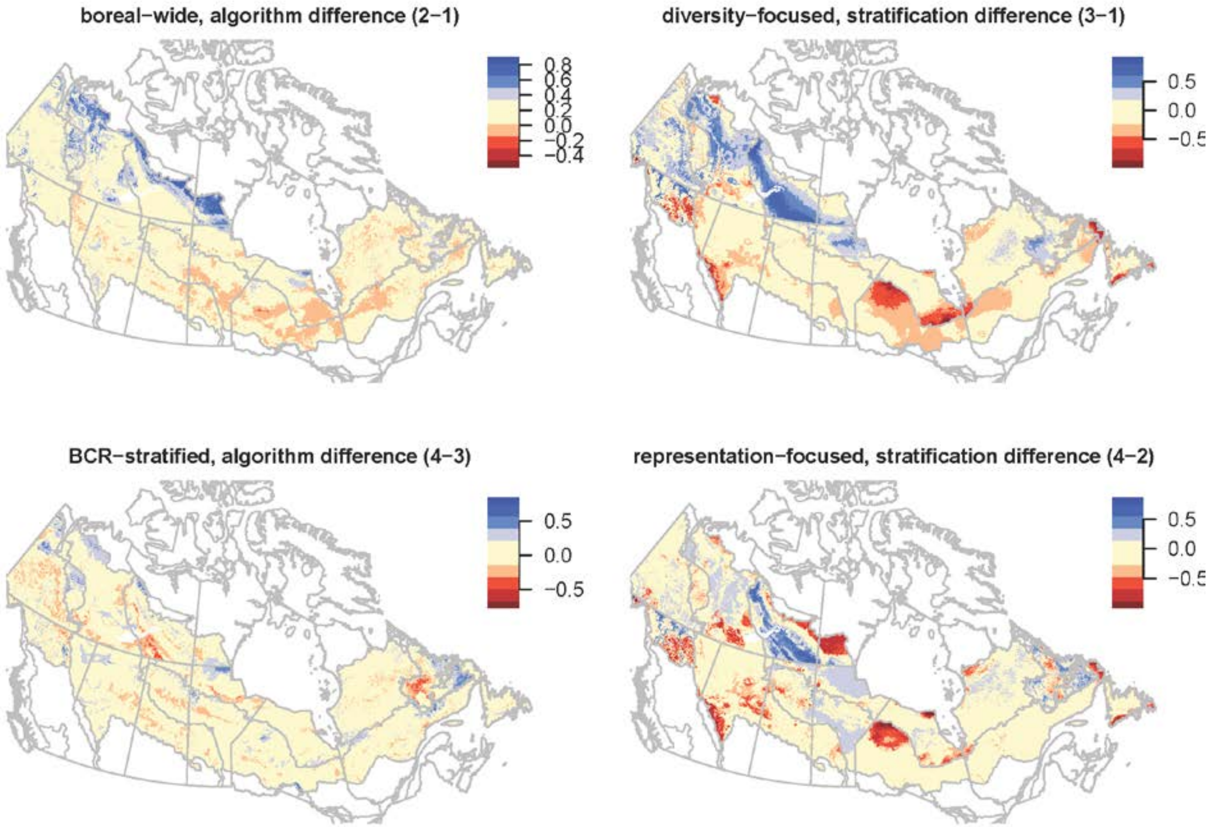

Figure 5. Differences among core scenarios based on all possible combinations of prioritization algorithm and stratification; see Figure 4 for map number references. Blue indicates higher rank than comparison scenario; red indicates lower rank.

Given our focus on identifying high-quality habitats for protection of threatened species currently and into the future, we focused further comparisons on disturbance- and uncertainty-discounted, priority species-weighted scenarios that included mid-century climate change, for all four combinations of prioritization algorithm and stratification (Figure 12, scenarios 42, 42a, 44, and 44a), although we recognize the validity of a range of assumptions.

Comparing the two boreal-wide scenarios, the representation-focused algorithm resulted in higher rankings at southwestern and northwestern margins and lower rankings in the eastern and far western boreal regions compared to the diversity-focused algorithm (Figure 13). With the BCR subregion-stratified scenarios, similar patterns were apparent within BCR subregions, with the greatest differences appearing near subregion boundaries. For both ABF and CAZ scenarios, stratification generally resulted in higher-ranked northern areas and lower-ranked southern areas (Figure 13).

When these four core scenarios were averaged to identify commonalities, additional patterns emerged (Figure 14). Consistent high value areas were found in western British Columbia, northern Saskatchewan, central Newfoundland, and undisturbed pockets in southern Saskatchewan, Manitoba, Ontario, and Québec. Areas with highest variation in Zonation ranking tended to have lower average value.

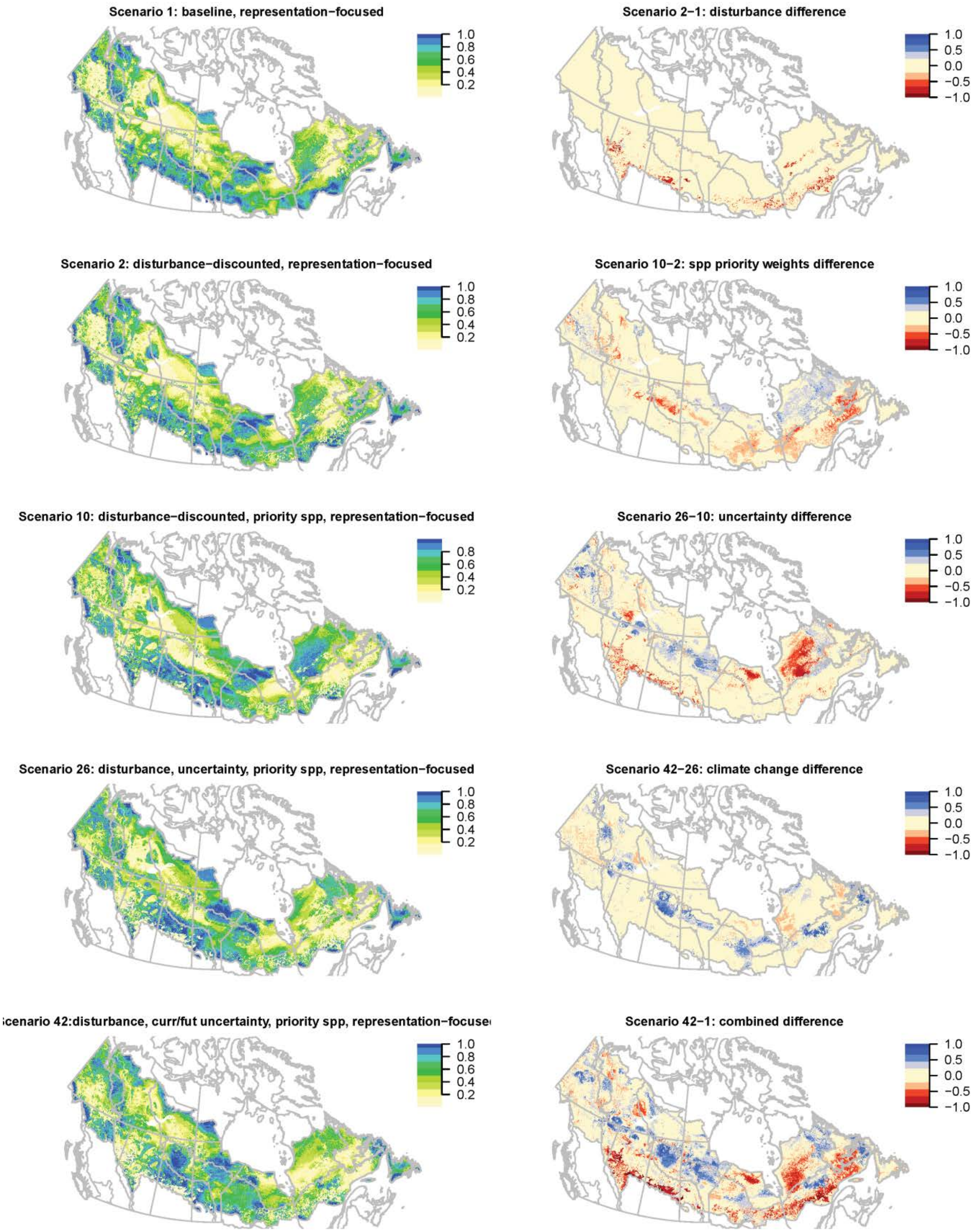

Figure 6. Comparison among baseline boreal-wide, species representation-focused rankings (scenario 1) and sequential influences of disturbance-discounting (scenario 2), species weighting (scenario 10), uncertainty discounting (scenario 26), and mid-century climate change (scenario 42), respectively. The left column shows Zonation rankings (Highest ranks in dark blue; lowest ranks in light yellow) and the right column shows the difference between sequential scenarios (blue indicates higher rank; red indicates lower), with the combined difference in the last row.

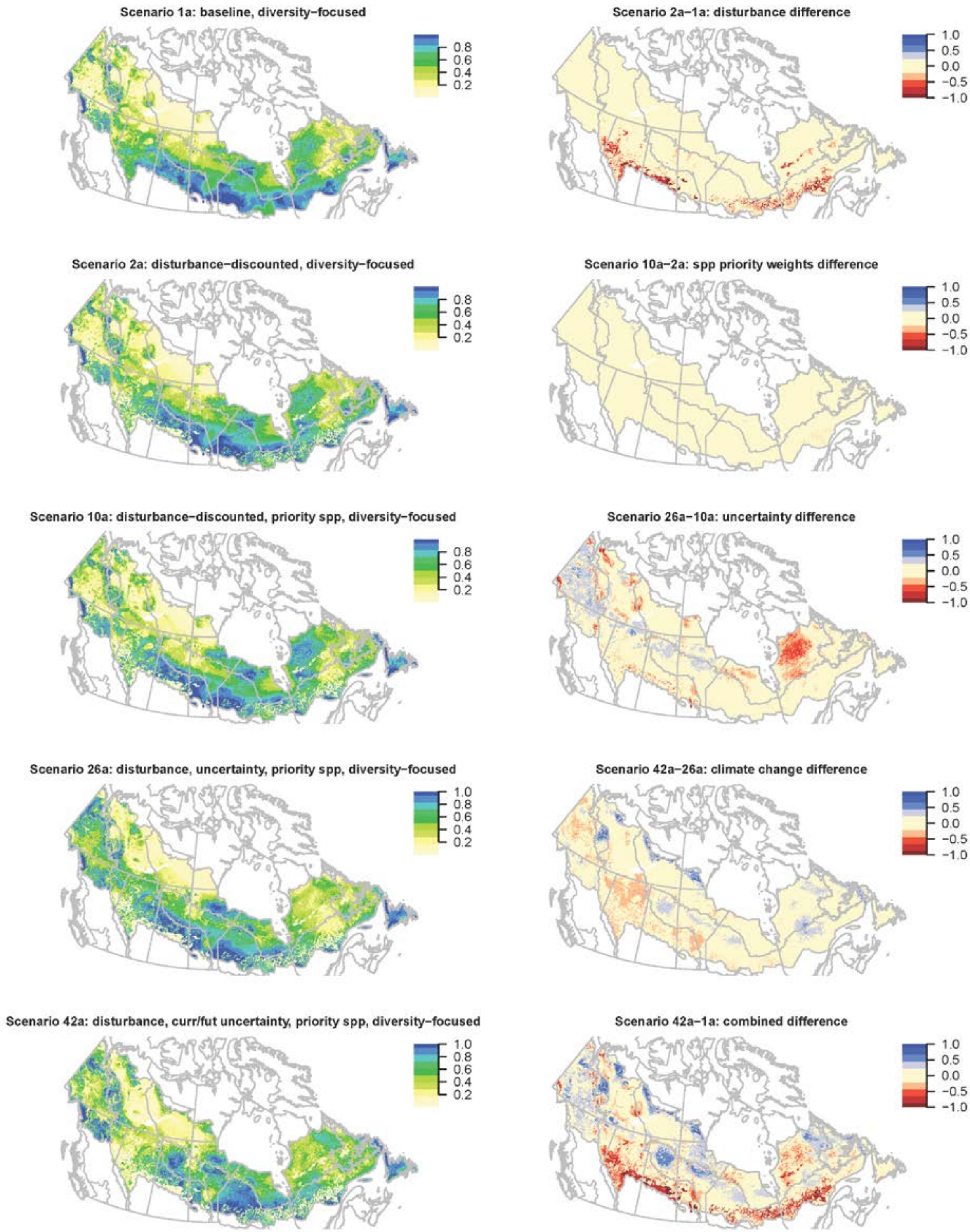

Figure 7. Comparison among baseline boreal-wide, species diversity-focused rankings (scenario 1a) and sequential influences of disturbance-discounting (scenario 2a), species weighting (scenario 10a), uncertainty discounting (scenario 26a), and mid-century climate change (scenario 42a), respectively. The left column shows Zonation rankings (Highest ranks in dark blue; lowest ranks in light yellow) and the right column shows the difference between sequential scenarios (blue indicates higher rank; red indicates lower), with the combined difference in the last row.

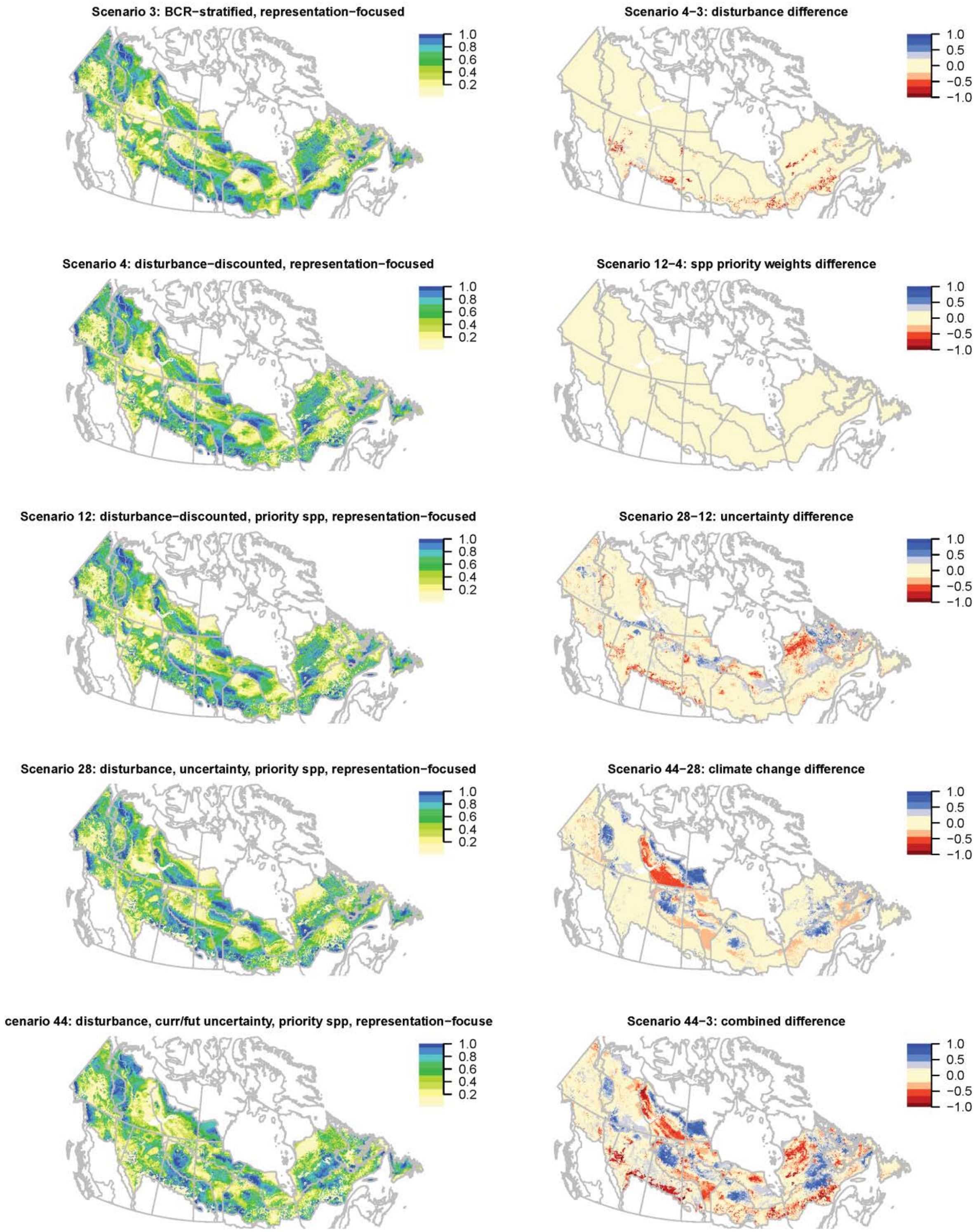

Figure 8. Comparison among baseline BCR-stratified, species representation-focused rankings (scenario 3) and sequential influences of disturbance-discounting (scenario 4), species weighting (scenario 12), uncertainty discounting (scenario 28), and mid-century climate change (scenario 44), respectively. The left column shows Zonation rankings (highest ranks in dark blue; lowest ranks in light yellow) and the right column shows the difference between sequential scenarios (blue indicates higher rank; red indicates lower), with the combined difference in the last row.

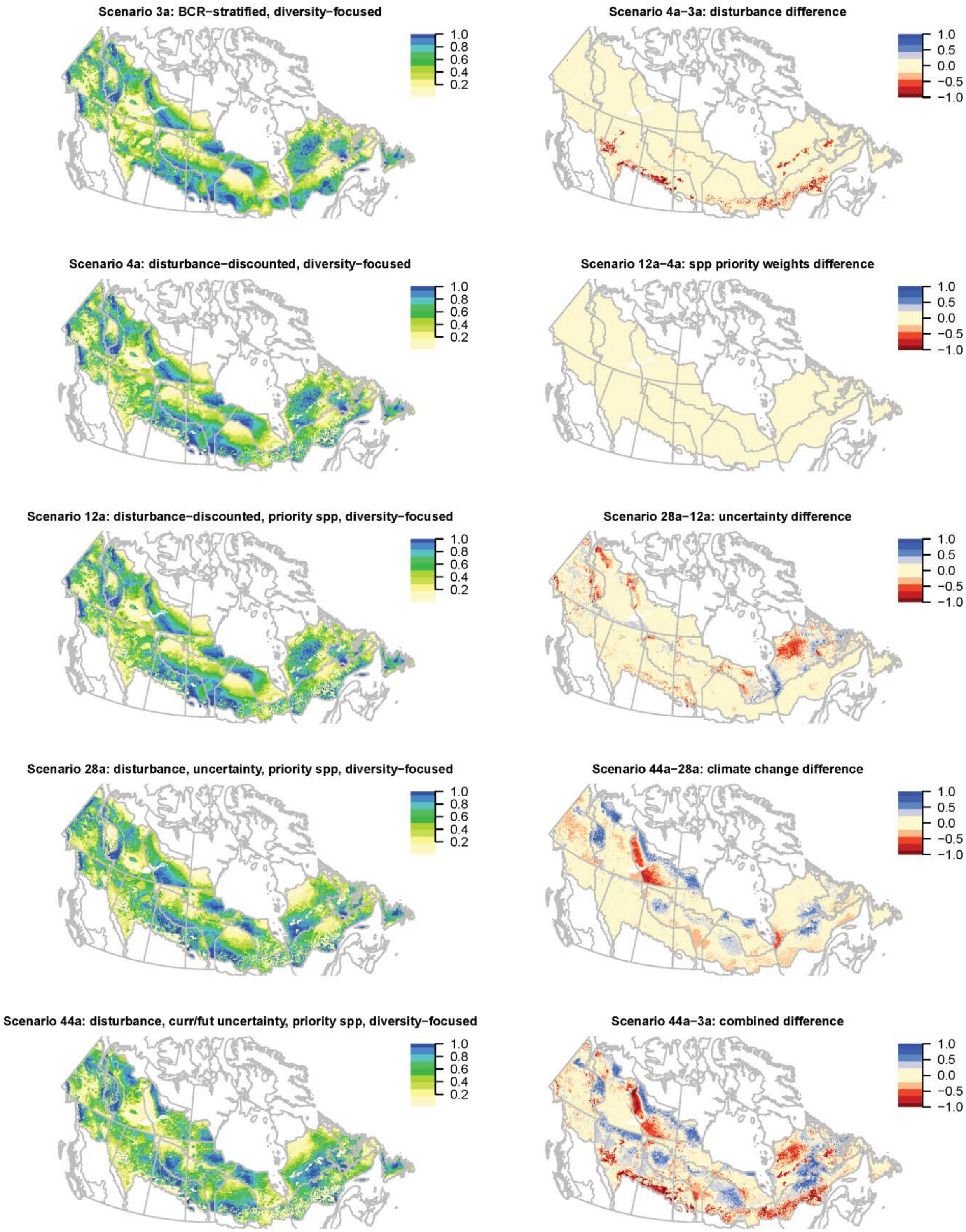

Figure 9. Comparison among baseline BCR-stratified, species diversity-focused rankings (scenario 3) and sequential influences of disturbance-discounting (scenario 4), species weighting (scenario 12), uncertainty discounting (scenario 28), and mid-century climate change (scenario 44), respectively. The left column shows Zonation rankings (highest ranks in dark blue; lowest ranks in light yellow) and the right column shows the difference between sequential scenarios (blue indicates higher rank; red indicates lower), with the combined difference in the last row.

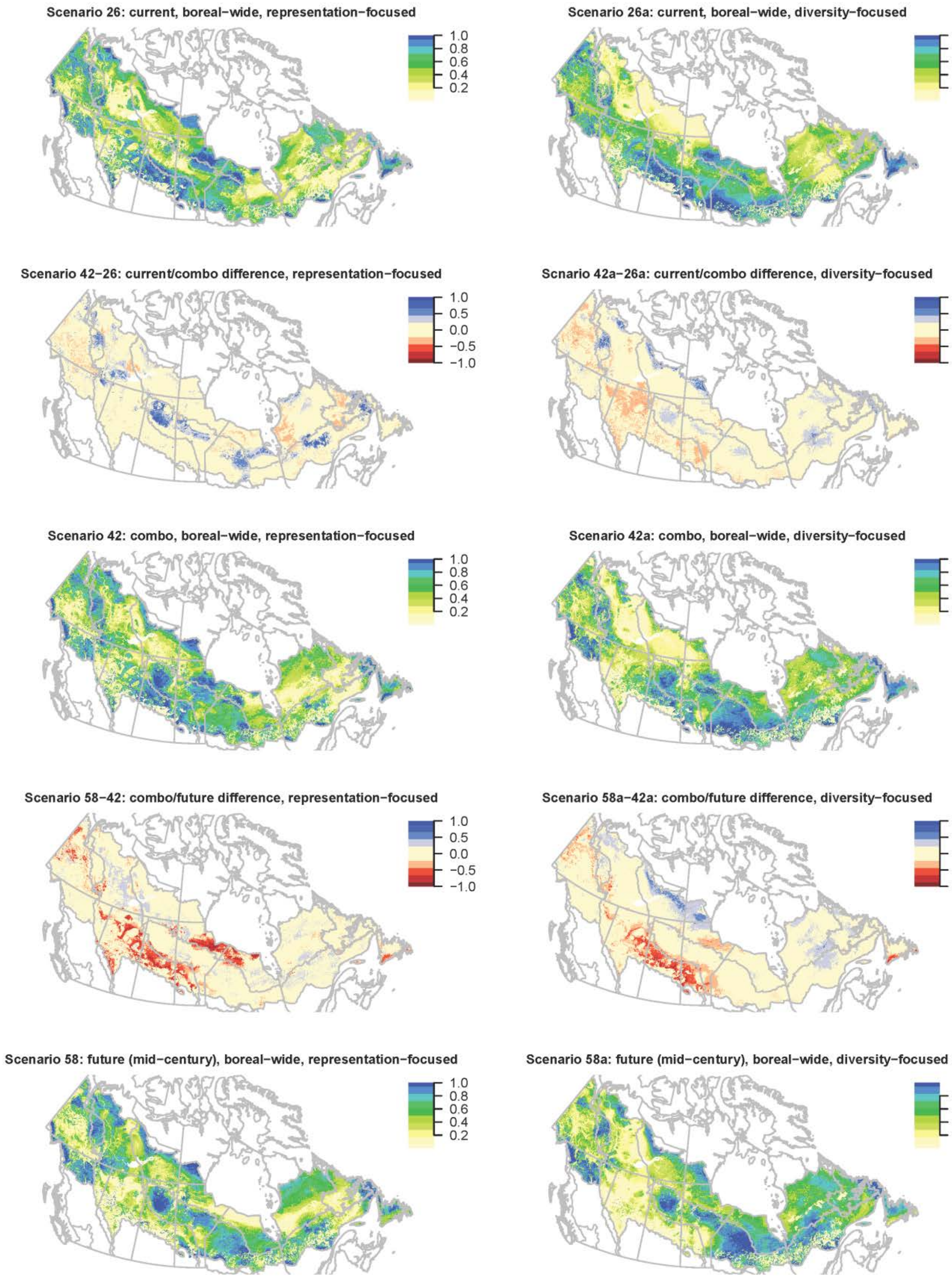

Figure 10. Comparison among scenarios based on current climate (scenario 26), current and mid-century climate change (scenario 42), and future climate only (scenario 58). All scenarios were disturbance- and uncertainty-discounted and incorporated species priority weights. The left column shows the boreal-wide, species representation-focused algorithm and the right column shows the boreal-wide, species diversity-focused algorithm. For Zonation rankings, highest ranks are in dark blue; lowest ranks are in yellow. For sequential difference maps, blue indicates higher rank; red indicates lower rank.

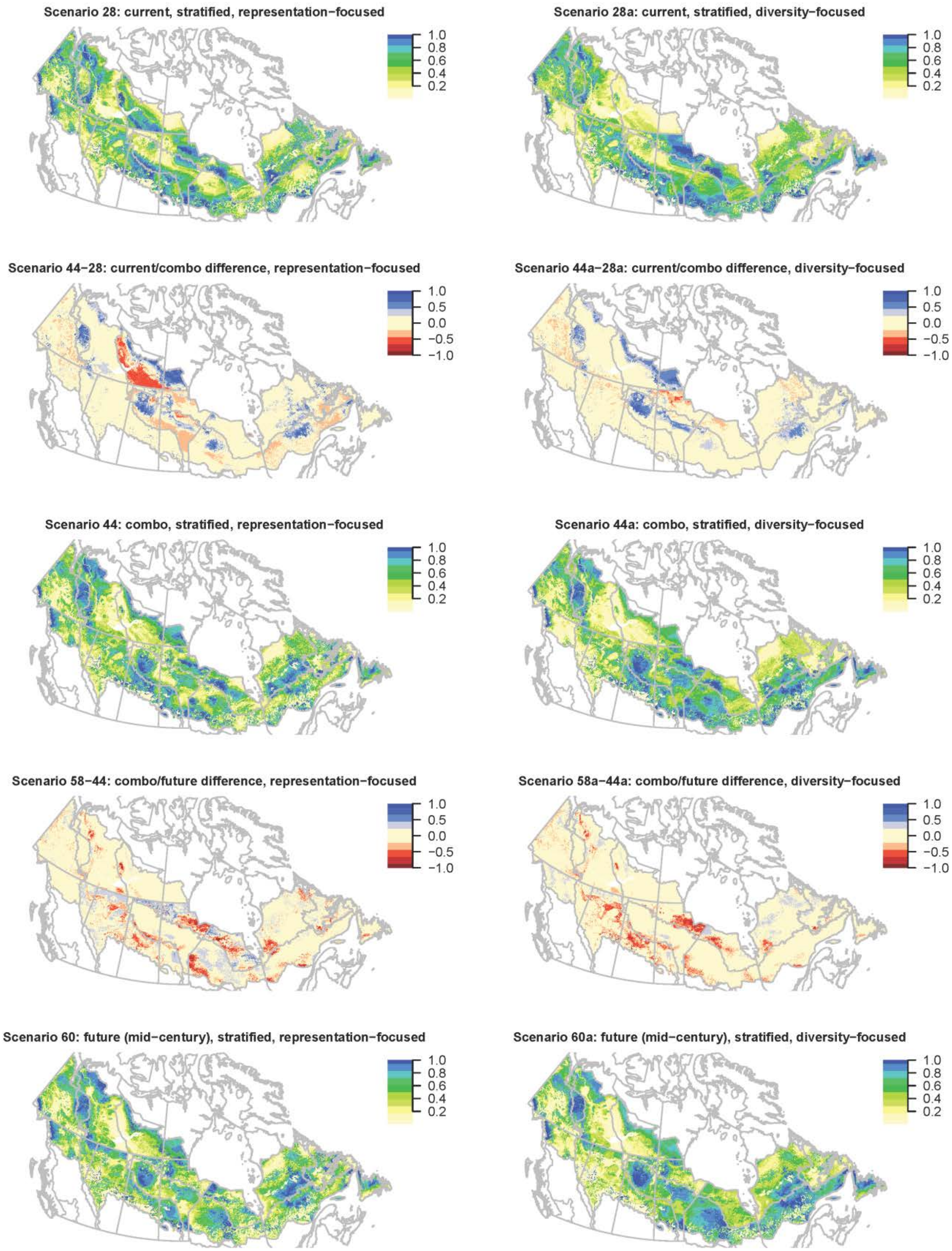

Figure 11. Comparison among scenarios based on current climate (scenario 28), current and mid-century climate change (scenario 44), and future climate only (scenario 60). All scenarios were disturbance- and uncertainty-discounted and incorporated species priority weights. The left column shows the BCR subregion-stratified, species representation-focused algorithm and the right column shows the BCR subregion-stratified, species diversity-focused algorithm. For Zonation rankings, highest ranks are in dark blue; lowest ranks are in yellow. For sequential difference maps, blue indicates higher rank; red indicates lower rank.

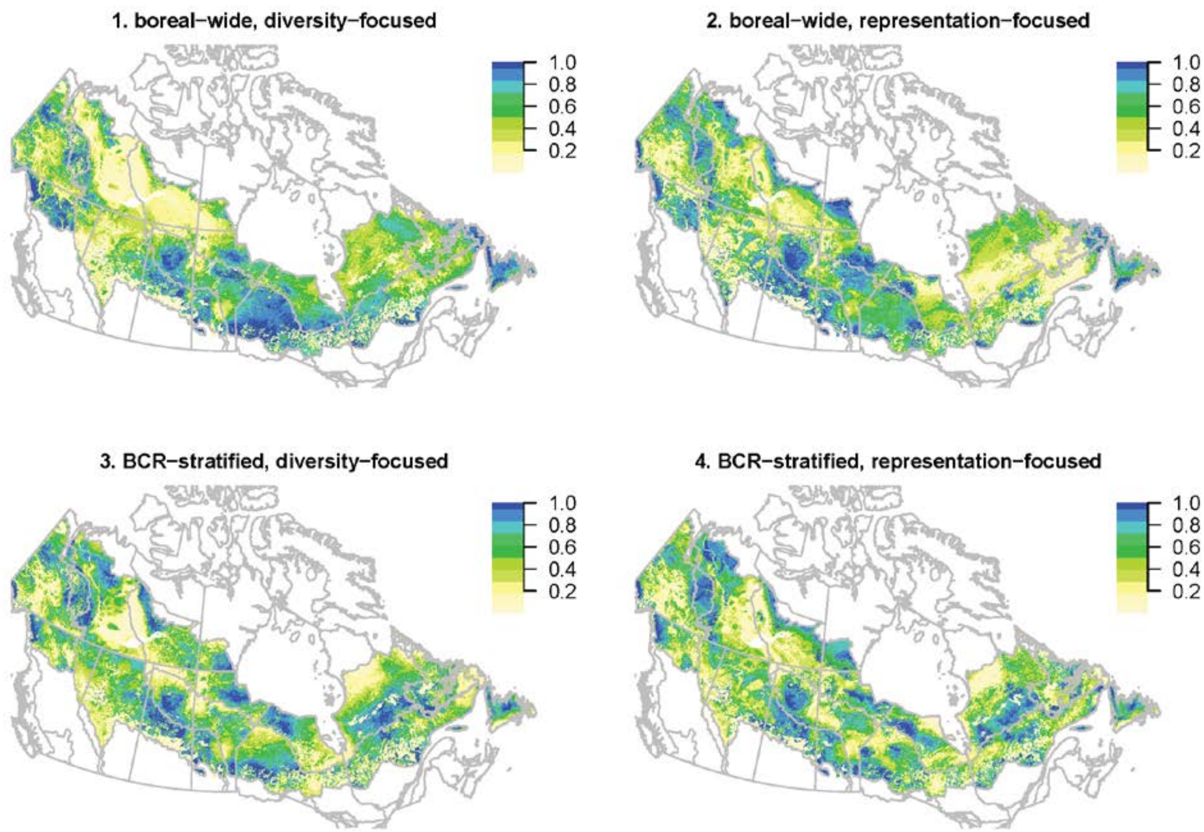

Figure 12. Conservation priorities based on four core scenarios: boreal-wide, diversity-focused (map 1, scenario 42a) and representation-focused (map 2, scenario 42) and BCR subregion-stratified diversity-focused (map 3, scenario 44a) and representation-focused (map 4, scenario 44). Highest Zonation ranks are in dark blue; lowest ranks are in yellow. For all scenarios, areas of higher disturbance and model uncertainty are down-weighted, and species' influence is weighted by conservation status.

With respect to efficiency, the average proportion of species' abundance protected per unit area (or "bang for the buck"), we did not find great differences across representation-focused scenarios, with 50% of the study area conserving between 56% and 69% of combined bird conservation value (Table 3), similar to previous work (Carlson 2015). Diversity-focused scenarios were more efficient, however, ranging from 56% to 72% of combined bird conservation value (Figure 15 and Table 3). The most efficient scenarios were those focused on forest species that included uncertainty and disturbance discounting (Table 3). The least efficient scenarios were those that were stratified by BCR subregion (Table 3). Scenario efficiency varied by species and was, by definition, more variable for the diversity-focused scenarios, which allow a high degree of species substitutability, than for the representation-focused scenarios, which balance all species' requirements (Table 4).

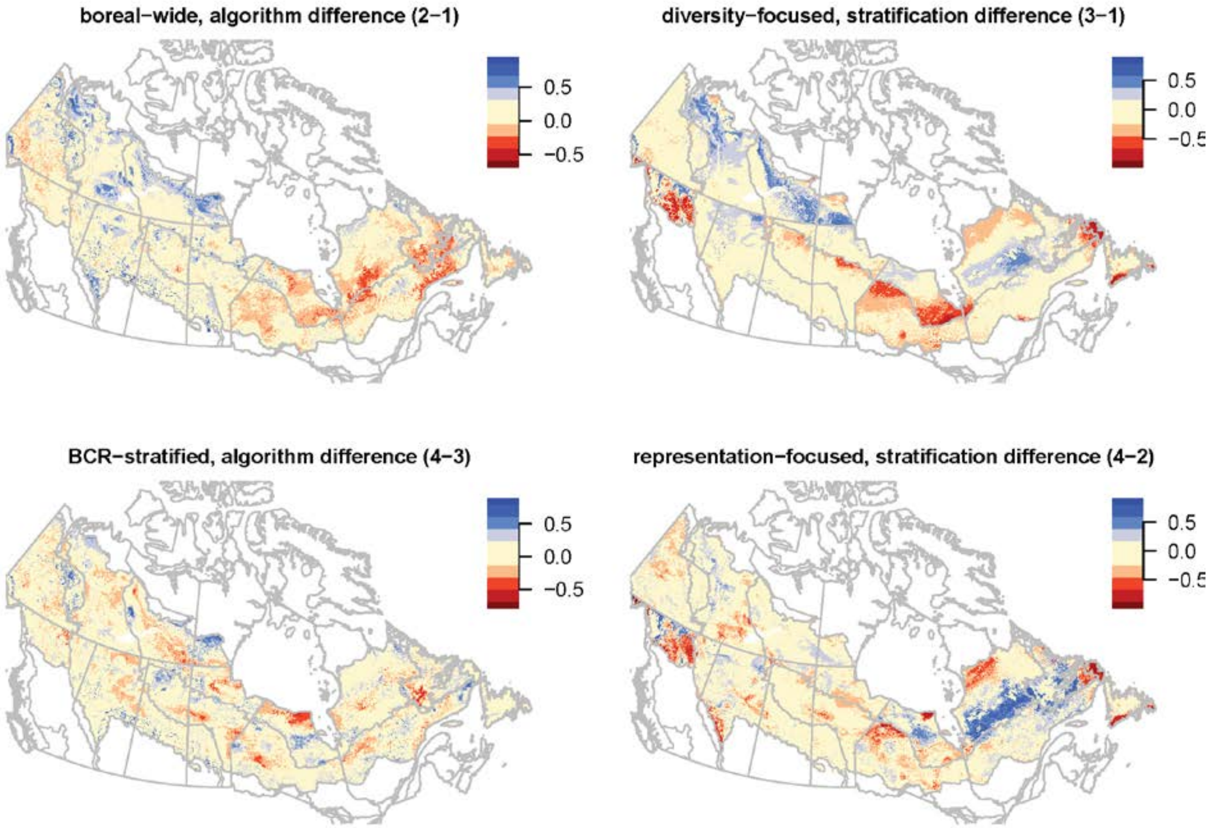

Figure 13. Differences among core scenarios based on all possible combinations of prioritization algorithm and stratification; see Figure 10 for map number references. Blue indicates higher rank than comparison scenario; red indicates lower rank.

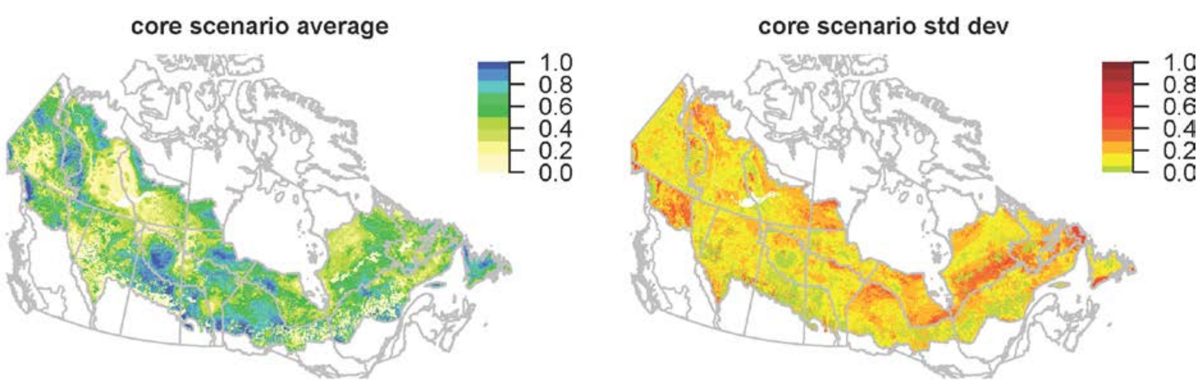

Figure 14. Mean and standard deviation of four scenarios based on all possible combinations of prioritization algorithm and stratification (see Figure 10). Highest Zonation ranks are in dark blue; lowest ranks are in yellow. Highest variation in Zonation ranks is in red; lowest variation is in green.

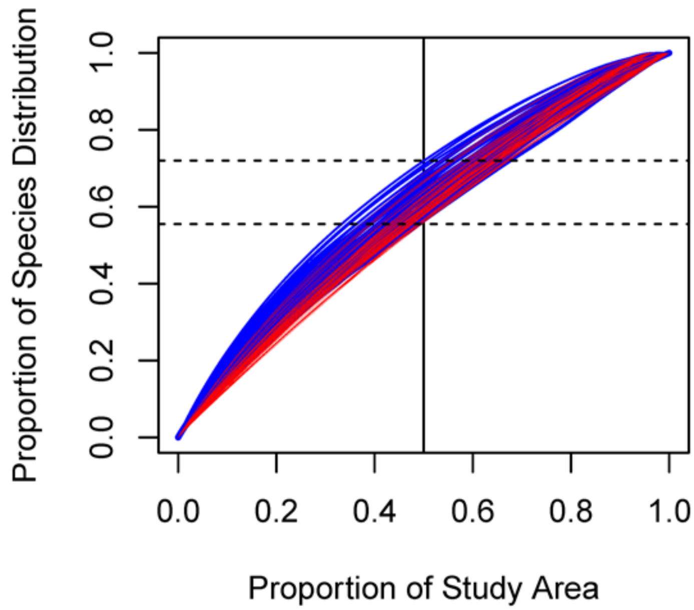

Figure 15. Efficiency curves for all 64 scenarios (blue = diversity-focused, red = representation-focused), representing the weighted average proportion of species conservation value (abundance) conserved by a given proportion of the study area. The vertical line indicates 50% of the study area. See Table 3 for further details.

Discussion

Given the dispersed distributional characteristics of largely territorial boreal passerines, as well as the predominantly undisturbed quality of boreal habitats, we did not expect to identify distinct and universal conservation hotspots. However, after constraining our study area and focal species to be more strictly boreal, we did find that solutions were more similar across species weightings and uncertainty assumptions, compared with previous work (Carlson 2015). Consistent high value areas were found in western British Columbia, northern Saskatchewan, central Newfoundland, and undisturbed portions of southern Saskatchewan, Manitoba, Ontario, and Québec.

Major differences in Zonation rankings were instead driven by external factors such as disturbance and climate change, as well as *a priori* choices regarding ranking algorithm and study area stratification. This highlights the importance of establishing *a priori* assumptions and criteria to guide the interpretation of results and identification of conservation priorities and management strategies. For example, areas to achieve optimal conservation of specific priority species within a given BCR differ from areas to maximize boreal bird species richness across the boreal region.

In terms of efficiency, the diversity-focused ABF algorithm produced higher efficiency solutions than the representation-focused CAZ algorithm, which is not surprising given the inherent efficiencies of species substitutability. That is, if the emphasis is on diversity (species richness), high priority areas are more easily distinguished from low priority areas. Given that species richness is partly driven by energy availability (Mönkkönen et al. 2006, Evans et al. 2008), which is associated with latitude via solar insolation, the diversity-focused scenarios necessarily identify more southerly areas as conservation priorities. Also, disturbance- and uncertainty-discounted scenarios were more efficient than their non-discounted counterparts, likely due to the coincidence of high uncertainty regions across multiple species, and, the fact that disturbance impacts were assumed equal across species. The same was true for species weighting considerations. In contrast, stratification of conservation priorities by BCR subregion resulted in less efficient solutions, as expected given additional geographic constraints. Thus these scenarios do involve trade-offs between efficiency and regional representation, whereas the more additional factors that are considered to define conservation value, the more efficient the solutions become.

We suggest that more constrained scenarios, in terms of disturbance, climate change, and priority species, are generally more informative and appropriate than simpler, unconstrained scenarios. However, we recognize that the identification of high-value, yet currently disturbed, habitats may be useful for identifying restoration and management priorities, and that areas of high prediction uncertainty may still have high value, and should be targeted for new surveys to fill data gaps. Furthermore, we did not consider the key constraint of existing land protection (e.g., parks), which clearly influences conservation decisions. Our intent was rather to allow Zonation results to be overlaid and compared with the existing protected areas network.

Stratifying priorities by BCR subregion resulted in a redistribution of priorities across the study area, which may correspond with regional management responsibilities and conservation opportunities. We present these as alternative solutions, recognizing that the original intent was to identify boreal-wide priorities without regard to administrative boundaries. We have no specific recommendation on this topic, but do note that this is a policy choice that has substantial conservation and management implications.

Disturbance discounting

Our approach to disturbance discounting conservatively ensured that highly disturbed areas were excluded from Zonation solutions, while allowing areas of intermediate disturbance to be considered, provided that species' densities are high enough after discounting. Given the localized effects of this approach, results are strongly tied to the accuracy and consistency of the various layers used. The discounting could be reduced by distinguishing relatively permanent (e.g., oil and gas infrastructure, agricultural conversion) from arguably more transitional disturbances, such as timber harvest. Data compiled by Pasher et al. (2013) would permit this discrimination for a portion of the region, although preliminary investigations did not suggest much difference in overall results. Consequently, our scenarios erred on the side of caution from a conservation standpoint, given the potentially long-lasting footprint of such disturbances on the landscape.

Climate change and uncertainty discounting

Not surprisingly, climate change had the biggest effect on results, with shifts in species distributions resulting in distinctive shifts in conservation value. Given uncertainties about how rapidly forest vegetation can track climate change, it is not appropriate to base conservation plans solely on predicted future distributions (Stralberg et al. 2015a). Nor can climate change be ignored, given the magnitude of future change expected, and the potential loss of forest throughout much of the study area (Price et al.

2013, Gauthier et al. 2015). However, considering future distributions (and associated uncertainty) in conjunction with current distributions provides a reasonable compromise that necessarily down-weights the less-certain future relative to more-certain current conditions. An alternative approach is to identify species-specific climate refugia and use those as inputs to Zonation (Stralberg et al. 2015a). The physical characteristics of areas with high refugia value (topographic complexity and coastal proximity) provides additional constraints that should lead to increased agreement across scenarios.

Incorporating model uncertainty in current predictions also had a noticeable effect on solutions, but primarily in certain northern regions where density models of species such as Rusty Blackbird have relatively high uncertainty. The relatively high efficiency of uncertainty-discounted scenarios was contrary to expectations, and suggests a clear investment advantage to incorporating uncertainty. With further experimentation it may be possible to identify an optimal uncertainty weighting based on maximization of efficiency. However, areas of high uncertainty may still have high species value and should be targeted for additional survey efforts.

Species weighting

Using a reduced subset of strictly forest-associated species did not have a large effect on solutions, although those scenarios were more efficient than their all-species counterparts, given the reduction in constraints when considering fewer species. Weighting by priority status had a larger impact on solutions, and also resulted in increased efficiency, suggesting that carefully considered species weights are useful to guide solutions toward particular species of interest.

Limitations

We recognize that density and distribution models rely on several assumptions, including environmental (vs. biotic) control of a species' distribution, and equilibrium between a species and its environment (Wiens et al. 2009). The ramifications of not meeting those assumptions are greatest in unsampled areas, especially where extrapolation is required. By discounting for model uncertainty, we underemphasized high-uncertainty areas, thereby decreasing their importance. Additional sampling is needed to reduce model uncertainty and provide equal treatment to all areas of the boreal region. Furthermore, models do not explicitly include habitat characteristics or natural disturbance histories, and should therefore be interpreted at spatial and temporal resolutions corresponding to the data used to build the model (4 km and 30 yr, respectively). Finer-scale habitat priorities cannot be discerned from the Zonation inputs.

Conclusion

Results from this study can cautiously be used to guide broad, continental-scale conservation priorities for boreal bird species. Although no single map can be viewed as prescriptive, our core constrained scenarios suggest four alternative options for meeting complementary conservation goals efficiently. With specific conservation objectives, other scenarios may be preferable, and can be selected using the roadmap provided herein (Figure 16). However, the opportunistic nature of conservation opportunities must also be considered, especially given the high replaceability that we found. Each conservation decision must address a full range of considerations and principles that are nearly impossible to include in a single comprehensive analysis. For example, opportunities for large-scale, regionally representative conservation may outweigh local diversity considerations (Schmiegelow et al. 2014). Likewise, local opportunities to conserve unique habitats for rare species must also be considered based on local knowledge and fine-scale habitat information. These results provide objective, data-driven insights to guide conservation planning activities and principles.

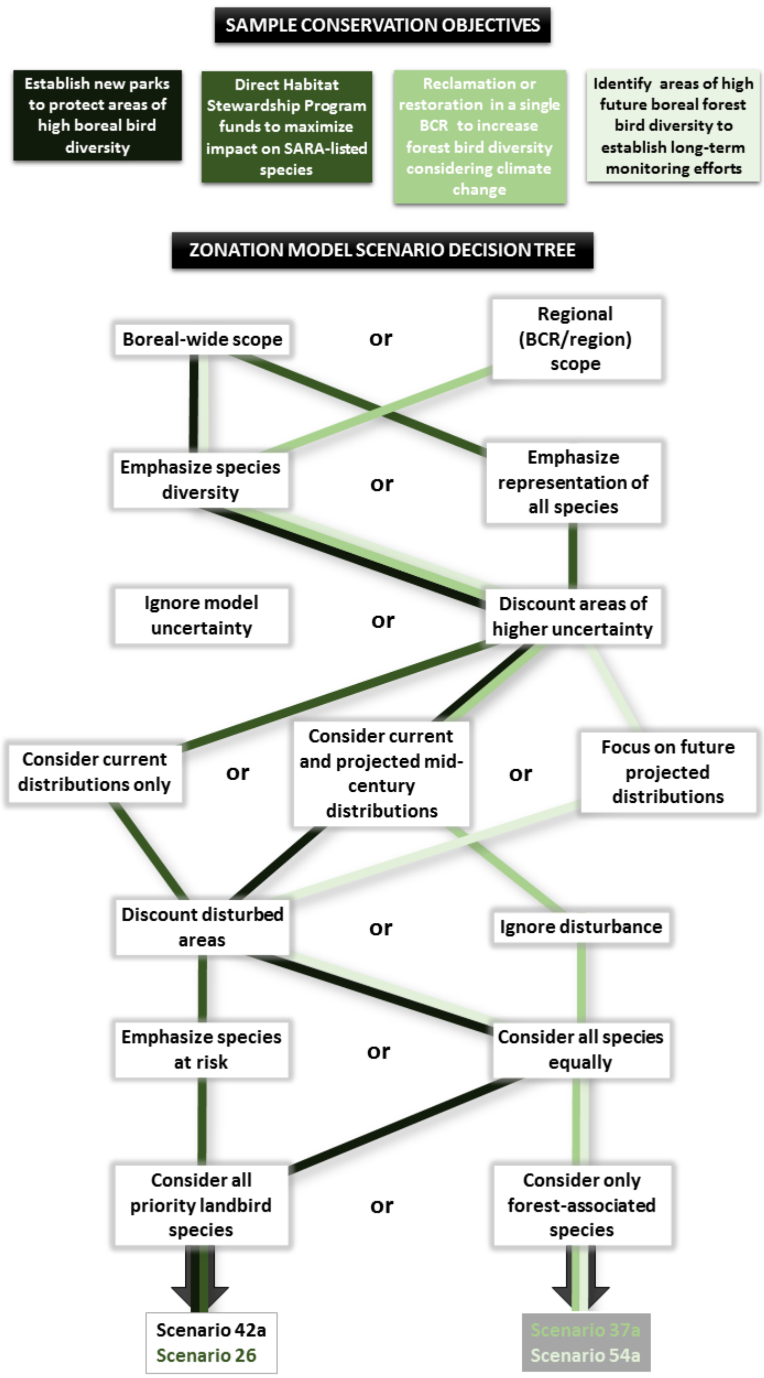

Figure 16. Scenario roadmap with example hypothetical conservation objectives. For a given objective, follow the lines corresponding to its color through the various choices.

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Tables

Table 1. Priority species considered in Zonation analysis. Forest species are according to Cornell Lab of Ornithology. Priority status assigned as follows: 1 = no status; 2 = PIF population trend score 4; 3 = PIF population trend score 5; 4 = listed species at risk. BCR subregion-specific priorities also indicated.

Code	Common Name	Forest spp	Priority Weight	BCR6-North	BCR7-North	BCR4-North	BCR7-QC	BCR8-QC	BCR7-NL	BCR8-NL	BCR4-Prairie	BCR6-Prairie	BCR7-Prairie	BCR8-West	BCR7-ON	BCR8-ON
ALFL	Alder Flycatcher	0	2	1	1	1	1	0	0	0	1	1	0	1	1	1
ATSP	American Tree Sparrow	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0
BAOR	Baltimore Oriole	0	2	0	0	0	0	0	0	0	1	1	0	0	0	0
BAWW	Black-and-white Warbler	1	2	0	0	0	0	1	0	0	0	0	0	1	0	1
BBWA	Bay-breasted Warbler	1	1	0	0	0	0	1	0	0	1	1	0	1	1	1
BHVI	Blue-headed Vireo	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
BLBW	Blackburnian Warbler	1	1	0	0	0	0	1	0	0	1	1	0	0	0	1
BLPW	Blackpoll Warbler	1	3	1	1	1	1	0	0	0	0	0	1	0	0	0
BOCH	Boreal Chickadee	1	2	1	1	1	1	1	1	0	1	1	1	0	1	0
BRCR	Brown Creeper	1	1	0	0	0	0	1	0	0	1	1	0	1	0	0
BTNW	Black-throated Green Warbler	1	1	0	0	0	0	1	0	1	1	1	0	0	0	1
CAWA	Canada Warbler	1	4	0	0	0	0	1	0	0	1	1	0	1	1	1
CCSP	Clay-colored Sparrow	0	2	0	0	0	0	0	0	0	1	1	0	0	0	0

Code	Common Name	Forest spp	Priority Weight	BCR6-North	BCR7-North	BCR4-North	BCR7-QC	BCR8-QC	BCR7-NL	BCR8-NL	BCR4-Prairie	BCR6-Prairie	BCR7-Prairie	BCR8-West	BCR7-ON	BCR8-ON
CMWA	Cape May Warbler	1	3	0	0	0	0	1	0	0	1	1	0	1	0	1
CONW	Connecticut Warbler	1	3	1	1	1	0	1	0	0	0	0	0	1	0	1
COYE	Common Yellowthroat	0	2	0	0	0	0	0	0	0	1	1	0	1	0	0
CSWA	Chestnut-sided Warbler	0	2	0	0	0	0	1	0	0	0	0	0	1	0	1
EAKI	Eastern Kingbird	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1
EAPH	Easter Phoebe	0	1	0	0	0	0	0	0	0	1	1	1	1	0	0
EAWP	Eastern Wood-pewee	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
EVGR	Evening Grosbeak	1	3	0	0	0	0	1	0	0	0	0	0	1	0	1
FOSP	Fox Sparrow	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0
GCKI	Golden-crowned Kinglet	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
GCTH	Gray-cheeked Thrush	1	1	0	0	0	1	0	1	1	0	0	0	0	0	0
GRAJ	Gray Jay	1	2	1	1	1	0	1	1	0	0	0	0	0	1	0
GRCA	Gray Catbird	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
HAFL	Hammond's Flycatcher	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
LCSP	LeConte's Sparrow	0	3	0	0	0	1	0	0	0	1	1	0	0	0	0
LEFL	Least Flycatcher	1	2	0	0	0	0	0	0	0	1	1	0	1	0	0
LISP	Lincoln's Sparrow	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0

Code	Common Name	Forest spp	Priority Weight	BCR6-North	BCR7-North	BCR4-North	BCR7-QC	BCR8-QC	BCR7-NL	BCR8-NL	BCR4-Prairie	BCR6-Prairie	BCR7-Prairie	BCR8-West	BCR7-ON	BCR8-ON
MAWA	Magnolia Warbler	1	1	0	0	0	0	1	0	1	0	0	0	0	0	1
MOWA	Mourning Warbler	1	2	0	0	0	0	1	0	1	1	1	0	1	0	1
NAWA	Nashville Warbler	1	1	0	0	0	0	1	0	0	0	0	0	1	0	1
OCWA	Orange-crowned Warbler	1	2	0	0	0	1	1	0	0	0	0	0	0	1	0
OSFL	Olive-sided Flycatcher	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1
OVEN	Ovenbird	1	1	0	0	0	0	1	0	0	0	0	0	1	0	1
PAWA	Palm Warbler	1	2	0	0	0	1	0	1	0	0	0	1	0	1	0
PHVI	Philadelphia Vireo	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1
PIGR	Pine Grosbeak	1	2	1	1	1	1	1	1	0	0	0	0	1	1	1
PISI	Pine Siskin	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0
PUFI	Purple Finch	1	2	0	0	0	0	1	0	1	0	0	0	1	0	1
RBGR	Rose-breasted Grosbeak	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
RCKI	Ruby-crowned Kinglet	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1
RUBL	Rusty Blackbird	1	4	1	1	1	1	1	1	1	1	1	1	1	1	1
SAVS	Savannah Sparrow	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
SEWR	Sedge Wren	0	1	0	0	0	0	1	0	0	1	1	0	1	0	0
SOSP	Song Sparrow	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
SWSP	Swamp Sparrow	0	1	0	0	0	1	1	1	1	0	0	1	1	1	1

Code	Common Name	Forest spp	Priority Weight	BCR6-North	BCR7-North	BCR4-North	BCR7-QC	BCR8-QC	BCR7-NL	BCR8-NL	BCR4-Prairie	BCR6-Prairie	BCR7-Prairie	BCR8-West	BCR7-ON	BCR8-ON
SWTH	Swainson's Thrush	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
TEWA	Tennessee Warbler	1	1	0	0	0	1	1	0	0	0	0	0	0	1	1
TOWA	Townsend's Warbler	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0
VATH	Varied Thrush	1	3	1	1	1	0	0	0	0	0	0	0	0	0	0
VEER	Veery	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0
WBNU	White-breasted Nuthatch	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
WCSP	White-crowned Sparrow	0	2	1	1	1	0	0	0	0	0	0	1	0	0	0
WETA	Western Tanager	1	1	0	0	0	0	0	0	0	1	1	0	0	0	0
WEWP	Western Wood-pewee	1	2	0	0	0	0	0	0	0	1	1	0	0	0	0
WIWA	Wilson's Warbler	1	3	1	1	1	0	0	0	0	0	0	0	0	0	0
WIWR	Winter Wren	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1
WTSP	White-throated Sparrow	1	2	0	0	0	1	1	0	1	1	1	1	0	0	1
WWCR	White-winged Crossbill	1	1	0	0	0	1	0	0	0	1	1	0	1	1	0
YBFL	Yellow-bellied Flycatcher	1	1	0	0	0	0	1	0	1	0	0	0	1	0	1
YEWA	Yellow Warbler	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2. Summary of scenarios evaluated. Uncertainty: 0 = current distribution only, no uncertainty; 1 = current distribution, with uncertainty; 2 = current and future (2050s) distributions, with uncertainty; 3 = future distribution (2050s), with uncertainty. Species Weights: 0 = all equal; 1 = priority ranking. Species List: 0 = all priority landbird species, 1 = forest-associated species. BCR Subregion: 0 = combined conservation priorities; 1 = separate conservation priorities by BCR subregion (based on separate priority species lists for each BCR subregion). Disturbance: 0 = none; 1 = discounted by footprint proportion. Scenarios 1-64 used the Core Area Zonation (CAZ) algorithm; scenarios 1a-64a used the Additive Benefit Function (ABF) algorithm.

#	Uncertainty	Disturbance	BCR Strata	Forest Species	Priority Weights	Name
1	0	0	0	0	0	Baseline
2	0	1	0	0	0	Disturbance
3	0	0	1	0	0	BCR Strata
4	0	1	1	0	0	Disturbance + BCR Strata
5	0	0	0	1	0	Forest Species
6	0	1	0	1	0	Disturbance + Forest Species
7	0	0	1	1	0	BCR Strata + Forest Species
8	0	1	1	1	0	Disturbance + BCR Strata + Forest Species
9	0	0	0	0	1	Priority Weights
10	0	1	0	0	1	Disturbance + Priority Weights
11	0	0	1	0	1	BCR Strata + Priority Weights
12	0	1	1	0	1	Disturbance + BCR Strata + Priority Weights
13	0	0	0	1	1	Forest Species + Priority Weights
14	0	1	0	1	1	Disturbance + Forest Species + Priority Weights
15	0	0	1	1	1	BCR Strata + Forest Species + Priority Weights
16	0	1	1	1	1	Disturbance + BCR Strata + Forest Species + Priority Weights
17	1	0	0	0	0	Current Uncertainty
18	1	1	0	0	0	Current Uncertainty + Disturbance
19	1	0	1	0	0	Current Uncertainty + BCR Strata
20	1	1	1	0	0	Current Uncertainty + Disturbance + BCR Strata
21	1	0	0	1	0	Current Uncertainty + Forest Species
22	1	1	0	1	0	Current Uncertainty + Disturbance + Forest Species
23	1	0	1	1	0	Current Uncertainty + BCR Strata + Forest Species
24	1	1	1	1	0	Current Uncertainty + Disturbance + BCR Strata + Forest Species
25	1	0	0	0	1	Current Uncertainty + Priority Weights
26	1	1	0	0	1	Current Uncertainty + Disturbance + Priority Weights
27	1	0	1	0	1	Current Uncertainty + BCR Strata + Priority Weights
28	1	1	1	0	1	Current Uncertainty + Disturbance + BCR Strata + Priority Weights
29	1	0	0	1	1	Current Uncertainty + Forest Species + Priority Weights
30	1	1	0	1	1	Current Uncertainty + Disturbance + Forest Species + Priority Weights
31	1	0	1	1	1	Current Uncertainty + BCR Strata + Forest Species + Priority Weights

#	Uncertainty	Disturbance	BCR Strata	Forest Species	Priority Weights	Name
32	1	1	1	1	1	Current Uncertainty + Disturbance + BCR Strata + Forest Species + Priority Weights
33	2	0	0	0	0	Current/Future Uncertainty
34	2	1	0	0	0	Current/Future Uncertainty + Disturbance
35	2	0	1	0	0	Current/Future Uncertainty + BCR Strata
36	2	1	1	0	0	Current/Future Uncertainty + Disturbance + BCR Strata
37	2	0	0	1	0	Current/Future Uncertainty + Forest Species
38	2	1	0	1	0	Current/Future Uncertainty + Disturbance + Forest Species
39	2	0	1	1	0	Current/Future Uncertainty + BCR Strata + Forest Species
40	2	1	1	1	0	Current/Future Uncertainty + Disturbance + BCR Strata + Forest Species
41	2	0	0	0	1	Current/Future Uncertainty + Priority Weights
42	2	1	0	0	1	Current/Future Uncertainty + Disturbance + Priority Weights
43	2	0	1	0	1	Current/Future Uncertainty + BCR Strata + Priority Weights
44	2	1	1	0	1	Current/Future Uncertainty + Disturbance + BCR Strata + Priority Weights
45	2	0	0	1	1	Current/Future Uncertainty + Forest Species + Priority Weights
46	2	1	0	1	1	Current/Future Uncertainty + Disturbance + Forest Species + Priority Weights
47	2	0	1	1	1	Current/Future Uncertainty + BCR Strata + Forest Species + Priority Weights
48	2	1	1	1	1	Current/Future Uncertainty + Disturbance + BCR Strata + Forest Species + Priority Weights
49	3	0	0	0	0	Future Uncertainty
50	3	1	0	0	0	Future Uncertainty + Disturbance
51	3	0	1	0	0	Future Uncertainty + BCR Strata
52	3	1	1	0	0	Future Uncertainty + Disturbance + BCR Strata
53	3	0	0	1	0	Future Uncertainty + Forest Species
54	3	1	0	1	0	Future Uncertainty + Disturbance + Forest Species
55	3	0	1	1	0	Future Uncertainty + BCR Strata + Forest Species
56	3	1	1	1	0	Future Uncertainty + Disturbance + BCR Strata + Forest Species
57	3	0	0	0	1	Future Uncertainty + Priority Weights
58	3	1	0	0	1	Future Uncertainty + Disturbance + Priority Weights
59	3	0	1	0	1	Future Uncertainty + BCR Strata + Priority Weights
60	3	1	1	0	1	Future Uncertainty + Disturbance + BCR Strata + Priority Weights
61	3	0	0	1	1	Future Uncertainty + Forest Species + Priority Weights

#	Uncertainty	Disturbance	BCR Strata	Forest Species	Priority Weights	Name
62	3	1	0	1	1	Future Uncertainty + Disturbance + Forest Species + Priority Weights
63	3	0	1	1	1	Future Uncertainty + BCR Strata + Forest Species + Priority Weights
64	3	1	1	1	1	Future Uncertainty + Disturbance + BCR Strata + Forest Species + Priority Weights

Table 3. Efficiency of scenarios for different percentages of the study area, in order of efficiency of the top-ranked 50% of the study area. The weighted average proportion of species conservation value (density) conserved by 50%, 30%, 10% and 5% of the study area is shown for each scenario. See Table 2 for scenario summaries.

#	Name	Algorithm	50%	30%	10%	5%
22a	Current Uncertainty + Disturbance + Forest Species	ABF	0.72	0.52	0.23	0.13
30a	Current Uncertainty + Disturbance + Forest Species + Priority Weights	ABF	0.71	0.51	0.22	0.13
21a	Current Uncertainty + Forest Species	ABF	0.70	0.50	0.22	0.12
24a	Current Uncertainty + Disturbance + BCR Strata + Forest Species	ABF	0.69	0.49	0.22	0.13
29a	Current Uncertainty + Forest Species + Priority Weights	ABF	0.69	0.49	0.21	0.12
22	Current Uncertainty + Disturbance + Forest Species	CAZ	0.69	0.47	0.18	0.10
32a	Current Uncertainty + Disturbance + BCR Strata + Forest Species + Priority Weights	ABF	0.68	0.48	0.20	0.12
6a	Disturbance + Forest Species	ABF	0.67	0.47	0.20	0.11
23a	Current Uncertainty + BCR Strata + Forest Species	ABF	0.67	0.48	0.21	0.12
24	Current Uncertainty + Disturbance + BCR Strata + Forest Species	CAZ	0.67	0.46	0.18	0.10
30	Current Uncertainty + Disturbance + Forest Species + Priority Weights	CAZ	0.67	0.45	0.18	0.10
5a	Forest Species	ABF	0.67	0.47	0.19	0.11
38a	Current/Future Uncertainty + Disturbance + Forest Species	ABF	0.67	0.45	0.17	0.10
32	Current Uncertainty + Disturbance + BCR Strata + Forest Species + Priority Weights	CAZ	0.66	0.45	0.18	0.10
21	Current Uncertainty + Forest Species	CAZ	0.66	0.45	0.17	0.09
18a	Current Uncertainty + Disturbance	ABF	0.66	0.46	0.20	0.11
31a	Current Uncertainty + BCR Strata + Forest Species + Priority Weights	ABF	0.66	0.46	0.19	0.11
14a	Disturbance + Forest Species + Priority Weights	ABF	0.66	0.46	0.19	0.11
26a	Current Uncertainty + Disturbance + Priority Weights	ABF	0.66	0.46	0.20	0.11
62a	Future Uncertainty + Disturbance + Forest Species + Priority Weights	ABF	0.65	0.44	0.18	0.10
13a	Forest Species + Priority Weights	ABF	0.65	0.44	0.18	0.10
23	Current Uncertainty + BCR Strata + Forest Species	CAZ	0.65	0.44	0.17	0.09
17a	Current Uncertainty	ABF	0.65	0.45	0.19	0.11
37a	Current/Future Uncertainty + Forest Species	ABF	0.64	0.43	0.16	0.09
25a	Current Uncertainty + Priority Weights	ABF	0.64	0.44	0.19	0.11
6	Disturbance + Forest Species	CAZ	0.64	0.42	0.16	0.09
31	Current Uncertainty + BCR Strata + Forest Species + Priority Weights	CAZ	0.64	0.43	0.17	0.09

#	Name	Algorithm	50%	30%	10%	5%
54a	Future Uncertainty + Disturbance + Forest Species	ABF	0.64	0.43	0.17	0.09
20a	Current Uncertainty + Disturbance + BCR Strata	ABF	0.64	0.44	0.19	0.11
8a	Disturbance + BCR Strata + Forest Species	ABF	0.64	0.44	0.18	0.11
29	Current Uncertainty + Forest Species + Priority Weights	CAZ	0.64	0.43	0.17	0.09
50a	Future Uncertainty + Disturbance	ABF	0.64	0.43	0.17	0.09
28a	Current Uncertainty + Disturbance + BCR Strata + Priority Weights	ABF	0.63	0.44	0.19	0.11
7a	BCR Strata + Forest Species	ABF	0.63	0.43	0.18	0.10
58a	Future Uncertainty + Disturbance + Priority Weights	ABF	0.63	0.42	0.17	0.09
38	Current/Future Uncertainty + Disturbance + Forest Species	CAZ	0.63	0.41	0.15	0.08
16	Disturbance + BCR Strata + Forest Species + Priority Weights	CAZ	0.63	0.42	0.16	0.09
5	Forest Species	CAZ	0.63	0.41	0.15	0.08
34a	Current/Future Uncertainty + Disturbance	ABF	0.63	0.42	0.16	0.09
2a	Disturbance	ABF	0.63	0.43	0.18	0.10
7	BCR Strata + Forest Species	CAZ	0.63	0.42	0.16	0.09
16a	Disturbance + BCR Strata + Forest Species + Priority Weights	ABF	0.62	0.42	0.17	0.10
61a	Future Uncertainty + Forest Species + Priority Weights	ABF	0.62	0.42	0.17	0.09
62	Future Uncertainty + Disturbance + Forest Species + Priority Weights	CAZ	0.62	0.41	0.16	0.09
40a	Current/Future Uncertainty + Disturbance + BCR Strata + Forest Species	ABF	0.62	0.43	0.17	0.09
46a	Current/Future Uncertainty + Disturbance + Forest Species + Priority Weights	ABF	0.62	0.41	0.16	0.09
1a	Baseline	ABF	0.62	0.42	0.17	0.10
42a	Current/Future Uncertainty + Disturbance + Priority Weights	ABF	0.62	0.41	0.16	0.09
19a	Current Uncertainty + BCR Strata	ABF	0.62	0.43	0.18	0.10
10a	Disturbance + Priority Weights	ABF	0.62	0.42	0.18	0.10
18	Current Uncertainty + Disturbance	CAZ	0.62	0.41	0.16	0.09
14	Disturbance + Forest Species + Priority Weights	CAZ	0.62	0.41	0.16	0.09
15a	BCR Strata + Forest Species + Priority Weights	ABF	0.62	0.41	0.16	0.09
9a	Priority Weights	ABF	0.62	0.42	0.17	0.10
27a	Current Uncertainty + BCR Strata + Priority Weights	ABF	0.62	0.43	0.18	0.10
20	Current Uncertainty + Disturbance + BCR Strata	CAZ	0.62	0.41	0.16	0.09
26	Current Uncertainty + Disturbance + Priority Weights	CAZ	0.61	0.41	0.16	0.09

#	Name	Algorithm	50%	30%	10%	5%
15	BCR Strata + Forest Species + Priority Weights	CAZ	0.61	0.40	0.15	0.08
28	Current Uncertainty + Disturbance + BCR Strata + Priority Weights	CAZ	0.61	0.41	0.16	0.08
58	Future Uncertainty + Disturbance + Priority Weights	CAZ	0.61	0.40	0.15	0.08
40	Current/Future Uncertainty + Disturbance + BCR Strata + Forest Species	CAZ	0.61	0.40	0.15	0.08
64	Future Uncertainty + Disturbance + BCR Strata + Forest Species + Priority Weights	CAZ	0.61	0.40	0.15	0.08
49a	Future Uncertainty	ABF	0.61	0.40	0.16	0.09
50	Future Uncertainty + Disturbance	CAZ	0.61	0.40	0.15	0.08
53a	Future Uncertainty + Forest Species	ABF	0.61	0.40	0.15	0.08
39a	Current/Future Uncertainty + BCR Strata + Forest Species	ABF	0.61	0.41	0.16	0.09
13	Forest Species + Priority Weights	CAZ	0.61	0.40	0.15	0.09
54	Future Uncertainty + Disturbance + Forest Species	CAZ	0.61	0.39	0.14	0.08
57a	Future Uncertainty + Priority Weights	ABF	0.60	0.40	0.15	0.09
33a	Current/Future Uncertainty	ABF	0.60	0.40	0.16	0.09
64a	Future Uncertainty + Disturbance + BCR Strata + Forest Species + Priority Weights	ABF	0.60	0.40	0.17	0.09
37	Current/Future Uncertainty + Forest Species	CAZ	0.60	0.38	0.14	0.07
41a	Current/Future Uncertainty + Priority Weights	ABF	0.60	0.40	0.16	0.09
17	Current Uncertainty	CAZ	0.60	0.39	0.15	0.08
45a	Current/Future Uncertainty + Forest Species + Priority Weights	ABF	0.60	0.39	0.15	0.08
19	Current Uncertainty + BCR Strata	CAZ	0.60	0.39	0.15	0.08
34	Current/Future Uncertainty + Disturbance	CAZ	0.60	0.38	0.14	0.07
25	Current Uncertainty + Priority Weights	CAZ	0.60	0.39	0.15	0.08
27	Current Uncertainty + BCR Strata + Priority Weights	CAZ	0.59	0.39	0.15	0.08
61	Future Uncertainty + Forest Species + Priority Weights	CAZ	0.59	0.39	0.15	0.08
2	Disturbance	CAZ	0.59	0.39	0.15	0.08
42	Current/Future Uncertainty + Disturbance + Priority Weights	CAZ	0.59	0.38	0.14	0.07
48a	Current/Future Uncertainty + Disturbance + BCR Strata + Forest Species + Priority Weights	ABF	0.59	0.39	0.15	0.09
3a	BCR Strata	ABF	0.59	0.40	0.17	0.09
46	Current/Future Uncertainty + Disturbance + Forest Species + Priority Weights	CAZ	0.59	0.38	0.13	0.07
4a	Disturbance + BCR Strata	ABF	0.59	0.40	0.17	0.10
36a	Current/Future Uncertainty + Disturbance + BCR Strata	ABF	0.59	0.39	0.16	0.09

#	Name	Algorithm	50%	30%	10%	5%
56	Future Uncertainty + Disturbance + BCR Strata + Forest Species	CAZ	0.59	0.38	0.14	0.08
11a	BCR Strata + Priority Weights	ABF	0.59	0.40	0.16	0.09
1	Baseline	CAZ	0.59	0.38	0.14	0.08
8	Disturbance + BCR Strata + Forest Species	CAZ	0.59	0.39	0.15	0.08
56a	Future Uncertainty + Disturbance + BCR Strata + Forest Species	ABF	0.59	0.40	0.16	0.09
12a	Disturbance + BCR Strata + Priority Weights	ABF	0.59	0.40	0.17	0.09
44a	Current/Future Uncertainty + Disturbance + BCR Strata + Priority Weights	ABF	0.59	0.39	0.16	0.09
39	Current/Future Uncertainty + BCR Strata + Forest Species	CAZ	0.59	0.38	0.14	0.08
52	Future Uncertainty + Disturbance + BCR Strata	CAZ	0.59	0.38	0.14	0.08
10	Disturbance + Priority Weights	CAZ	0.59	0.39	0.15	0.08
60	Future Uncertainty + Disturbance + BCR Strata + Priority Weights	CAZ	0.59	0.38	0.14	0.08
9	Priority Weights	CAZ	0.59	0.39	0.15	0.08
52a	Future Uncertainty + Disturbance + BCR Strata	ABF	0.58	0.39	0.16	0.09
60a	Future Uncertainty + Disturbance + BCR Strata + Priority Weights	ABF	0.58	0.39	0.15	0.08
57	Future Uncertainty + Priority Weights	CAZ	0.58	0.37	0.14	0.08
63	Future Uncertainty + BCR Strata + Forest Species + Priority Weights	CAZ	0.58	0.38	0.14	0.08
3	BCR Strata	CAZ	0.58	0.38	0.14	0.08
4	Disturbance + BCR Strata	CAZ	0.58	0.38	0.15	0.08
36	Current/Future Uncertainty + Disturbance + BCR Strata	CAZ	0.58	0.38	0.14	0.07
49	Future Uncertainty	CAZ	0.58	0.37	0.14	0.08
11	BCR Strata + Priority Weights	CAZ	0.58	0.38	0.14	0.08
48	Current/Future Uncertainty + Disturbance + BCR Strata + Forest Species + Priority Weights	CAZ	0.58	0.37	0.14	0.07
12	Disturbance + BCR Strata + Priority Weights	CAZ	0.58	0.38	0.15	0.08
63a	Future Uncertainty + BCR Strata + Forest Species + Priority Weights	ABF	0.58	0.39	0.16	0.09
44	Current/Future Uncertainty + Disturbance + BCR Strata + Priority Weights	CAZ	0.58	0.37	0.14	0.07
53	Future Uncertainty + Forest Species	CAZ	0.58	0.37	0.14	0.07
47a	Current/Future Uncertainty + BCR Strata + Forest Species + Priority Weights	ABF	0.58	0.38	0.15	0.08
35a	Current/Future Uncertainty + BCR Strata	ABF	0.57	0.39	0.15	0.08
43a	Current/Future Uncertainty + BCR Strata + Priority Weights	ABF	0.57	0.38	0.15	0.08
33	Current/Future Uncertainty	CAZ	0.57	0.36	0.13	0.07

#	Name	Algorithm	50%	30%	10%	5%
55a	Future Uncertainty + BCR Strata + Forest Species	ABF	0.57	0.38	0.15	0.08
41	Current/Future Uncertainty + Priority Weights	CAZ	0.57	0.36	0.13	0.07
55	Future Uncertainty + BCR Strata + Forest Species	CAZ	0.57	0.36	0.13	0.07
51	Future Uncertainty + BCR Strata	CAZ	0.56	0.36	0.13	0.07
45	Current/Future Uncertainty + Forest Species + Priority Weights	CAZ	0.56	0.35	0.13	0.07
59	Future Uncertainty + BCR Strata + Priority Weights	CAZ	0.56	0.36	0.13	0.07
51a	Future Uncertainty + BCR Strata	ABF	0.56	0.38	0.15	0.08
59a	Future Uncertainty + BCR Strata + Priority Weights	ABF	0.56	0.37	0.14	0.08
35	Current/Future Uncertainty + BCR Strata	CAZ	0.56	0.36	0.13	0.07
47	Current/Future Uncertainty + BCR Strata + Forest Species + Priority Weights	CAZ	0.56	0.36	0.13	0.07
43	Current/Future Uncertainty + BCR Strata + Priority Weights	CAZ	0.56	0.36	0.13	0.07

Table 4. Weighted average proportion of species conservation value (density) conserved by 50% of the study area, by species (see Table 1). See Table 2 for scenario summaries.

Scenario	ALFL	ATSP	BAOR	BAWW	BBWA	BHVI	BLBW	BLPW	BOCH	BRCR	BTNW	CAWA	CCSP	CMWA	CONW	COYE
1	0.48	0.54	0.64	0.75	0.64	0.55	0.53	0.56	0.68	0.71	0.66	0.77	0.61	0.77	0.52	0.54
2	0.49	0.53	0.65	0.77	0.65	0.57	0.54	0.56	0.68	0.71	0.69	0.77	0.61	0.75	0.52	0.54
3	0.50	0.54	0.64	0.77	0.65	0.55	0.55	0.58	0.68	0.72	0.70	0.75	0.63	0.77	0.52	0.54
4	0.50	0.52	0.65	0.79	0.65	0.57	0.56	0.57	0.68	0.72	0.72	0.76	0.62	0.75	0.51	0.53
5	0.50	0.52	0.67	0.81	0.69	0.59	0.56	0.58	0.71	0.74	0.71	0.79	0.62	0.79	0.51	0.53
6	0.51	0.52	0.68	0.83	0.70	0.61	0.58	0.59	0.72	0.74	0.74	0.80	0.63	0.77	0.52	0.54
7	0.49	0.52	0.68	0.84	0.70	0.57	0.60	0.61	0.73	0.75	0.75	0.78	0.64	0.79	0.50	0.53
8	0.50	0.52	0.65	0.79	0.65	0.57	0.56	0.57	0.68	0.72	0.72	0.76	0.62	0.75	0.51	0.53
9	0.44	0.54	0.61	0.67	0.57	0.68	0.55	0.54	0.67	0.69	0.61	0.75	0.59	0.77	0.52	0.54
10	0.45	0.53	0.61	0.70	0.58	0.69	0.56	0.55	0.67	0.69	0.63	0.75	0.59	0.76	0.52	0.54
11	0.50	0.54	0.64	0.77	0.65	0.55	0.55	0.58	0.68	0.72	0.70	0.75	0.63	0.77	0.52	0.54
12	0.50	0.52	0.65	0.79	0.65	0.57	0.56	0.57	0.68	0.72	0.72	0.76	0.62	0.75	0.51	0.53
13	0.46	0.53	0.63	0.71	0.60	0.71	0.57	0.56	0.69	0.70	0.63	0.76	0.59	0.78	0.51	0.53
14	0.47	0.53	0.64	0.74	0.61	0.72	0.59	0.57	0.69	0.70	0.67	0.76	0.59	0.77	0.52	0.54
15	0.49	0.52	0.68	0.84	0.70	0.57	0.60	0.61	0.73	0.75	0.75	0.78	0.64	0.79	0.50	0.53
16	0.50	0.52	0.69	0.85	0.71	0.60	0.61	0.61	0.73	0.75	0.77	0.79	0.64	0.79	0.51	0.53
17	0.50	0.51	0.68	0.81	0.67	0.54	0.52	0.55	0.72	0.85	0.72	0.80	0.61	0.76	0.51	0.52
18	0.52	0.53	0.69	0.85	0.69	0.57	0.56	0.58	0.75	0.89	0.76	0.83	0.62	0.75	0.52	0.55
19	0.53	0.51	0.69	0.82	0.67	0.52	0.55	0.56	0.72	0.88	0.76	0.79	0.62	0.76	0.51	0.54
20	0.55	0.53	0.71	0.85	0.70	0.56	0.57	0.59	0.74	0.91	0.79	0.83	0.62	0.76	0.53	0.56
21	0.53	0.52	0.72	0.88	0.73	0.57	0.55	0.57	0.77	0.90	0.78	0.84	0.63	0.78	0.50	0.53
22	0.55	0.54	0.74	0.90	0.74	0.60	0.59	0.59	0.78	0.93	0.81	0.87	0.64	0.78	0.53	0.55
23	0.53	0.52	0.72	0.86	0.71	0.53	0.56	0.58	0.75	0.90	0.80	0.82	0.62	0.77	0.51	0.55
24	0.55	0.54	0.74	0.89	0.73	0.57	0.59	0.60	0.77	0.93	0.82	0.86	0.63	0.78	0.53	0.56
25	0.45	0.51	0.65	0.75	0.62	0.55	0.51	0.52	0.69	0.84	0.66	0.80	0.58	0.77	0.51	0.53
26	0.47	0.53	0.67	0.80	0.64	0.58	0.54	0.55	0.71	0.87	0.72	0.82	0.58	0.76	0.53	0.55
27	0.53	0.51	0.69	0.82	0.67	0.52	0.55	0.56	0.72	0.88	0.76	0.79	0.62	0.76	0.51	0.54

Scenario	ALFL	ATSP	BAOR	BAWW	BBWA	BHVI	BLBW	BLPW	BOCH	BRCR	BTNW	CAWA	CCSP	CMWA	CONW	COYE
28	0.55	0.53	0.71	0.85	0.70	0.56	0.57	0.59	0.74	0.91	0.79	0.83	0.62	0.76	0.53	0.56
29	0.48	0.52	0.68	0.80	0.65	0.59	0.54	0.54	0.72	0.86	0.70	0.81	0.58	0.78	0.50	0.53
30	0.50	0.54	0.70	0.84	0.67	0.62	0.57	0.57	0.73	0.89	0.76	0.84	0.59	0.77	0.53	0.55
31	0.53	0.52	0.72	0.86	0.71	0.53	0.56	0.58	0.75	0.90	0.80	0.82	0.62	0.77	0.51	0.55
32	0.55	0.54	0.74	0.89	0.73	0.57	0.59	0.60	0.77	0.93	0.82	0.86	0.63	0.78	0.53	0.56
33	0.51	0.51	0.64	0.74	0.64	0.52	0.51	0.53	0.68	0.77	0.65	0.74	0.59	0.73	0.51	0.52
34	0.53	0.53	0.67	0.79	0.67	0.55	0.55	0.57	0.72	0.82	0.70	0.77	0.61	0.74	0.53	0.55
35	0.52	0.50	0.64	0.76	0.65	0.46	0.52	0.54	0.67	0.79	0.70	0.69	0.59	0.72	0.51	0.53
36	0.54	0.52	0.66	0.80	0.67	0.50	0.55	0.56	0.69	0.83	0.74	0.74	0.60	0.72	0.53	0.55
37	0.53	0.52	0.67	0.79	0.68	0.56	0.53	0.55	0.70	0.80	0.70	0.76	0.60	0.74	0.50	0.53
38	0.56	0.54	0.69	0.84	0.70	0.58	0.57	0.58	0.74	0.85	0.74	0.80	0.61	0.74	0.53	0.55
39	0.54	0.51	0.66	0.81	0.68	0.51	0.54	0.55	0.68	0.80	0.74	0.69	0.59	0.71	0.50	0.54
40	0.55	0.53	0.68	0.84	0.70	0.53	0.56	0.57	0.71	0.86	0.78	0.77	0.60	0.73	0.53	0.56
41	0.48	0.51	0.64	0.72	0.63	0.52	0.50	0.53	0.66	0.79	0.63	0.76	0.58	0.74	0.51	0.52
42	0.51	0.53	0.66	0.78	0.67	0.54	0.54	0.57	0.70	0.83	0.69	0.79	0.60	0.73	0.53	0.55
43	0.52	0.50	0.64	0.76	0.65	0.46	0.52	0.54	0.67	0.79	0.70	0.69	0.59	0.72	0.51	0.53
44	0.54	0.52	0.66	0.80	0.67	0.50	0.55	0.56	0.69	0.83	0.74	0.74	0.60	0.72	0.53	0.55
45	0.48	0.51	0.63	0.72	0.63	0.52	0.50	0.53	0.66	0.79	0.63	0.76	0.58	0.73	0.51	0.52
46	0.51	0.53	0.66	0.78	0.67	0.55	0.54	0.57	0.69	0.83	0.70	0.79	0.59	0.73	0.53	0.55
47	0.52	0.50	0.64	0.76	0.65	0.46	0.52	0.54	0.67	0.79	0.70	0.69	0.59	0.72	0.51	0.53
48	0.54	0.52	0.66	0.80	0.67	0.50	0.55	0.56	0.69	0.83	0.74	0.74	0.60	0.72	0.53	0.55
49	0.51	0.53	0.64	0.66	0.60	0.53	0.52	0.48	0.65	0.62	0.56	0.70	0.61	0.72	0.59	0.62
50	0.54	0.55	0.67	0.70	0.63	0.56	0.55	0.52	0.68	0.66	0.60	0.74	0.63	0.75	0.58	0.63
51	0.53	0.52	0.62	0.68	0.61	0.51	0.52	0.50	0.63	0.63	0.54	0.70	0.60	0.70	0.57	0.58
52	0.56	0.54	0.64	0.70	0.64	0.55	0.55	0.54	0.66	0.67	0.57	0.73	0.61	0.71	0.57	0.60
53	0.52	0.53	0.64	0.67	0.60	0.54	0.52	0.49	0.65	0.62	0.56	0.71	0.60	0.73	0.58	0.61
54	0.55	0.55	0.67	0.71	0.63	0.57	0.56	0.52	0.68	0.66	0.60	0.75	0.62	0.75	0.58	0.62
55	0.54	0.52	0.62	0.68	0.62	0.52	0.52	0.50	0.63	0.62	0.54	0.70	0.59	0.70	0.57	0.58
56	0.56	0.54	0.65	0.70	0.64	0.55	0.55	0.54	0.66	0.66	0.57	0.73	0.61	0.71	0.57	0.60
57	0.48	0.53	0.65	0.62	0.58	0.57	0.49	0.50	0.59	0.66	0.52	0.70	0.60	0.76	0.59	0.61

Scenario	ALFL	ATSP	BAOR	BAWW	BBWA	BHVI	BLBW	BLPW	BOCH	BRCR	BTNW	CAWA	CCSP	CMWA	CONW	COYE
58	0.52	0.55	0.69	0.66	0.61	0.61	0.53	0.54	0.62	0.70	0.55	0.74	0.62	0.78	0.59	0.62
59	0.53	0.52	0.62	0.68	0.61	0.51	0.52	0.50	0.63	0.63	0.54	0.70	0.60	0.70	0.57	0.58
60	0.56	0.54	0.64	0.70	0.64	0.55	0.55	0.54	0.66	0.67	0.57	0.73	0.61	0.71	0.57	0.60
61	0.52	0.53	0.68	0.67	0.62	0.60	0.52	0.52	0.64	0.68	0.53	0.72	0.59	0.78	0.50	0.55
62	0.55	0.56	0.70	0.70	0.64	0.62	0.55	0.55	0.66	0.72	0.56	0.75	0.61	0.78	0.55	0.56
63	0.57	0.52	0.64	0.72	0.65	0.55	0.56	0.52	0.66	0.63	0.56	0.73	0.56	0.70	0.49	0.47
64	0.59	0.56	0.67	0.74	0.67	0.58	0.58	0.55	0.68	0.66	0.59	0.76	0.60	0.71	0.54	0.49
1a	0.51	0.54	0.72	0.88	0.75	0.58	0.59	0.62	0.77	0.79	0.76	0.86	0.68	0.83	0.52	0.54
2a	0.53	0.53	0.72	0.88	0.75	0.63	0.61	0.63	0.75	0.77	0.79	0.84	0.66	0.79	0.52	0.54
3a	0.51	0.55	0.69	0.86	0.73	0.44	0.58	0.62	0.71	0.79	0.78	0.87	0.65	0.80	0.52	0.54
4a	0.52	0.52	0.68	0.85	0.73	0.47	0.58	0.62	0.70	0.77	0.79	0.85	0.63	0.78	0.51	0.53
5a	0.54	0.51	0.73	0.91	0.79	0.55	0.62	0.63	0.80	0.79	0.79	0.85	0.68	0.82	0.50	0.52
6a	0.55	0.52	0.73	0.91	0.78	0.59	0.64	0.64	0.78	0.78	0.80	0.84	0.67	0.79	0.51	0.53
7a	0.51	0.53	0.69	0.86	0.74	0.50	0.60	0.63	0.74	0.78	0.78	0.86	0.65	0.80	0.51	0.53
8a	0.52	0.52	0.69	0.86	0.74	0.52	0.60	0.63	0.73	0.76	0.79	0.83	0.64	0.78	0.50	0.53
9a	0.49	0.55	0.72	0.87	0.74	0.62	0.58	0.61	0.76	0.79	0.76	0.86	0.68	0.83	0.52	0.54
10a	0.51	0.53	0.71	0.87	0.73	0.67	0.60	0.62	0.75	0.77	0.78	0.84	0.65	0.79	0.52	0.54
11a	0.51	0.55	0.69	0.86	0.73	0.44	0.58	0.62	0.71	0.79	0.78	0.87	0.65	0.80	0.52	0.54
12a	0.52	0.52	0.68	0.85	0.73	0.47	0.58	0.62	0.70	0.77	0.79	0.85	0.63	0.78	0.51	0.53
13a	0.51	0.52	0.72	0.90	0.76	0.61	0.61	0.62	0.79	0.79	0.77	0.85	0.67	0.82	0.50	0.52
14a	0.53	0.52	0.72	0.89	0.76	0.65	0.63	0.63	0.78	0.77	0.79	0.83	0.66	0.79	0.51	0.53
15a	0.51	0.53	0.69	0.86	0.74	0.50	0.60	0.63	0.74	0.78	0.78	0.86	0.65	0.80	0.51	0.53
16a	0.52	0.52	0.69	0.86	0.74	0.52	0.60	0.63	0.73	0.76	0.79	0.83	0.64	0.78	0.50	0.53
17a	0.56	0.52	0.77	0.93	0.79	0.53	0.60	0.62	0.84	0.96	0.85	0.90	0.68	0.80	0.51	0.55
18a	0.59	0.54	0.77	0.93	0.78	0.59	0.64	0.63	0.83	0.96	0.86	0.90	0.67	0.78	0.54	0.57
19a	0.57	0.51	0.75	0.90	0.77	0.42	0.59	0.60	0.80	0.95	0.84	0.91	0.66	0.79	0.52	0.55
20a	0.59	0.53	0.76	0.91	0.78	0.48	0.61	0.61	0.81	0.95	0.85	0.90	0.65	0.77	0.53	0.57
21a	0.58	0.52	0.77	0.94	0.80	0.53	0.62	0.61	0.85	0.95	0.86	0.89	0.67	0.79	0.51	0.55
22a	0.60	0.54	0.78	0.95	0.80	0.57	0.65	0.63	0.86	0.96	0.87	0.90	0.68	0.78	0.54	0.57
23a	0.56	0.52	0.75	0.90	0.77	0.45	0.59	0.59	0.81	0.94	0.85	0.90	0.65	0.79	0.51	0.55

Scenario	ALFL	ATSP	BAOR	BAWW	BBWA	BHVI	BLBW	BLPW	BOCH	BRCR	BTNW	CAWA	CCSP	CMWA	CONW	COYE
24a	0.58	0.53	0.76	0.91	0.78	0.50	0.61	0.61	0.81	0.95	0.86	0.90	0.65	0.77	0.53	0.57
25a	0.53	0.52	0.77	0.93	0.77	0.54	0.59	0.60	0.83	0.96	0.84	0.91	0.67	0.80	0.52	0.55
26a	0.56	0.54	0.77	0.93	0.77	0.59	0.63	0.62	0.82	0.96	0.86	0.90	0.66	0.78	0.54	0.57
27a	0.57	0.51	0.75	0.90	0.77	0.42	0.59	0.60	0.80	0.95	0.84	0.91	0.66	0.79	0.52	0.55
28a	0.59	0.53	0.76	0.91	0.78	0.48	0.61	0.61	0.81	0.95	0.85	0.90	0.65	0.77	0.53	0.57
29a	0.55	0.52	0.77	0.94	0.79	0.54	0.61	0.60	0.85	0.95	0.85	0.90	0.66	0.79	0.51	0.55
30a	0.57	0.54	0.77	0.94	0.79	0.59	0.65	0.62	0.85	0.96	0.86	0.90	0.66	0.78	0.54	0.57
31a	0.56	0.52	0.75	0.90	0.77	0.45	0.59	0.59	0.81	0.94	0.85	0.90	0.65	0.79	0.51	0.55
32a	0.58	0.53	0.76	0.91	0.78	0.50	0.61	0.61	0.81	0.95	0.86	0.90	0.65	0.77	0.53	0.57
33a	0.56	0.52	0.72	0.84	0.73	0.55	0.58	0.60	0.77	0.83	0.69	0.75	0.64	0.77	0.51	0.54
34a	0.58	0.54	0.72	0.86	0.73	0.60	0.61	0.62	0.77	0.84	0.74	0.78	0.63	0.75	0.54	0.56
35a	0.55	0.52	0.72	0.88	0.74	0.37	0.56	0.59	0.73	0.91	0.83	0.89	0.62	0.78	0.51	0.55
36a	0.56	0.54	0.72	0.87	0.74	0.42	0.58	0.60	0.75	0.90	0.83	0.87	0.61	0.76	0.53	0.57
37a	0.58	0.52	0.71	0.88	0.75	0.56	0.60	0.60	0.78	0.81	0.73	0.74	0.62	0.73	0.50	0.53
38a	0.60	0.54	0.73	0.89	0.75	0.61	0.63	0.62	0.79	0.84	0.78	0.80	0.63	0.73	0.54	0.56
39a	0.55	0.52	0.71	0.88	0.75	0.40	0.57	0.59	0.76	0.87	0.82	0.83	0.61	0.75	0.51	0.55
40a	0.56	0.54	0.72	0.87	0.75	0.44	0.59	0.60	0.76	0.89	0.83	0.86	0.61	0.75	0.53	0.57
41a	0.54	0.52	0.72	0.85	0.73	0.53	0.58	0.60	0.79	0.86	0.70	0.79	0.65	0.78	0.51	0.54
42a	0.56	0.54	0.72	0.86	0.73	0.58	0.62	0.62	0.78	0.85	0.75	0.80	0.64	0.75	0.54	0.56
43a	0.55	0.52	0.72	0.88	0.74	0.37	0.56	0.59	0.73	0.91	0.83	0.89	0.62	0.78	0.51	0.55
44a	0.56	0.54	0.72	0.87	0.74	0.42	0.58	0.60	0.75	0.90	0.83	0.87	0.61	0.76	0.53	0.57
45a	0.54	0.52	0.72	0.86	0.73	0.52	0.58	0.60	0.78	0.86	0.71	0.79	0.64	0.78	0.51	0.54
46a	0.56	0.54	0.72	0.87	0.73	0.58	0.62	0.62	0.77	0.85	0.76	0.81	0.63	0.75	0.54	0.57
47a	0.55	0.52	0.72	0.87	0.74	0.38	0.56	0.59	0.73	0.90	0.82	0.88	0.62	0.78	0.51	0.55
48a	0.56	0.53	0.72	0.87	0.74	0.43	0.58	0.60	0.75	0.90	0.83	0.87	0.61	0.76	0.53	0.57
49a	0.58	0.56	0.70	0.75	0.68	0.58	0.56	0.53	0.73	0.67	0.53	0.66	0.63	0.79	0.60	0.61
50a	0.61	0.60	0.70	0.78	0.69	0.64	0.61	0.57	0.75	0.67	0.57	0.71	0.63	0.76	0.61	0.59
51a	0.53	0.50	0.64	0.71	0.63	0.47	0.49	0.54	0.66	0.72	0.56	0.71	0.62	0.77	0.52	0.63
52a	0.56	0.53	0.64	0.73	0.66	0.52	0.53	0.57	0.68	0.73	0.58	0.73	0.62	0.74	0.53	0.61
53a	0.59	0.56	0.69	0.76	0.68	0.60	0.57	0.54	0.73	0.66	0.54	0.68	0.61	0.78	0.58	0.58

Scenario	ALFL	ATSP	BAOR	BAWW	BBWA	BHVI	BLBW	BLPW	BOCH	BRCR	BTNW	CAWA	CCSP	CMWA	CONW	COYE
54a	0.62	0.59	0.70	0.79	0.70	0.65	0.62	0.58	0.75	0.67	0.59	0.73	0.61	0.74	0.59	0.55
55a	0.54	0.50	0.64	0.72	0.64	0.48	0.50	0.55	0.67	0.72	0.56	0.71	0.62	0.77	0.51	0.63
56a	0.56	0.52	0.65	0.73	0.66	0.52	0.53	0.58	0.68	0.73	0.58	0.74	0.63	0.74	0.53	0.61
57a	0.55	0.56	0.70	0.73	0.66	0.60	0.55	0.52	0.71	0.68	0.51	0.68	0.63	0.81	0.59	0.62
58a	0.59	0.59	0.70	0.77	0.68	0.66	0.60	0.56	0.73	0.68	0.56	0.73	0.63	0.77	0.61	0.59
59a	0.53	0.50	0.64	0.71	0.63	0.47	0.49	0.54	0.66	0.72	0.56	0.71	0.62	0.77	0.52	0.63
60a	0.56	0.53	0.64	0.73	0.66	0.52	0.53	0.57	0.68	0.73	0.58	0.73	0.62	0.74	0.53	0.61
61a	0.60	0.54	0.68	0.80	0.69	0.60	0.59	0.54	0.75	0.67	0.56	0.74	0.58	0.74	0.49	0.45
62a	0.62	0.59	0.69	0.82	0.70	0.63	0.63	0.57	0.76	0.69	0.60	0.77	0.60	0.72	0.56	0.48
63a	0.55	0.51	0.66	0.73	0.66	0.50	0.52	0.55	0.70	0.72	0.57	0.73	0.61	0.77	0.47	0.59
64a	0.57	0.54	0.66	0.74	0.67	0.54	0.55	0.58	0.70	0.72	0.59	0.75	0.62	0.73	0.52	0.57

Scenario	CSWA	EAKI	EAPH	EAWP	EVGR	FOSP	GCKI	GCTH	GRAJ	GRCA	HAFL	LCSP	LEFL	LISP	MAWA	MOWA
1	0.53	0.61	0.49	0.61	0.58	0.44	0.55	0.67	0.56	0.61	0.47	0.65	0.76	0.77	0.41	0.47
2	0.53	0.62	0.51	0.62	0.59	0.46	0.54	0.68	0.54	0.61	0.49	0.65	0.75	0.76	0.43	0.49
3	0.53	0.61	0.52	0.62	0.60	0.47	0.55	0.47	0.56	0.62	0.47	0.69	0.76	0.80	0.38	0.47
4	0.53	0.61	0.54	0.61	0.61	0.48	0.53	0.48	0.54	0.61	0.48	0.68	0.74	0.77	0.39	0.48
5	0.53	0.63	0.53	0.65	0.54	0.49	0.52	0.66	0.51	0.63	0.50	0.71	0.80	0.82	0.42	0.49
6	0.54	0.65	0.55	0.66	0.56	0.52	0.54	0.68	0.52	0.64	0.52	0.71	0.79	0.80	0.44	0.51
7	0.53	0.63	0.55	0.67	0.39	0.51	0.53	0.50	0.50	0.65	0.49	0.74	0.80	0.84	0.35	0.48
8	0.53	0.61	0.54	0.61	0.61	0.48	0.53	0.48	0.54	0.61	0.48	0.68	0.74	0.77	0.39	0.48
9	0.53	0.60	0.56	0.57	0.52	0.44	0.55	0.67	0.53	0.57	0.47	0.57	0.73	0.68	0.43	0.49
10	0.53	0.61	0.58	0.57	0.53	0.46	0.54	0.68	0.50	0.56	0.48	0.58	0.72	0.67	0.45	0.50
11	0.53	0.61	0.52	0.62	0.60	0.47	0.55	0.47	0.56	0.62	0.47	0.69	0.76	0.80	0.38	0.47
12	0.53	0.61	0.54	0.61	0.61	0.48	0.53	0.48	0.54	0.61	0.48	0.68	0.74	0.77	0.39	0.48
13	0.53	0.62	0.60	0.60	0.50	0.48	0.53	0.67	0.49	0.58	0.50	0.61	0.76	0.72	0.45	0.51
14	0.54	0.63	0.63	0.60	0.53	0.51	0.54	0.69	0.49	0.58	0.52	0.62	0.74	0.71	0.48	0.53
15	0.53	0.63	0.55	0.67	0.39	0.51	0.53	0.50	0.50	0.65	0.49	0.74	0.80	0.84	0.35	0.48
16	0.54	0.65	0.58	0.67	0.41	0.54	0.53	0.53	0.50	0.65	0.50	0.74	0.79	0.83	0.37	0.50

Scenario	CSWA	EAKI	EAPH	EAWP	EVGR	FOSP	GCKI	GCTH	GRAJ	GRCA	HAFL	LCSP	LEFL	LISP	MAWA	MOWA
17	0.52	0.62	0.49	0.61	0.80	0.46	0.51	0.63	0.52	0.62	0.47	0.69	0.77	0.79	0.43	0.49
18	0.54	0.64	0.53	0.64	0.82	0.50	0.53	0.65	0.53	0.63	0.51	0.71	0.77	0.78	0.46	0.52
19	0.52	0.63	0.49	0.61	0.78	0.49	0.51	0.47	0.53	0.62	0.50	0.72	0.76	0.82	0.43	0.49
20	0.53	0.65	0.53	0.62	0.80	0.53	0.53	0.49	0.54	0.64	0.53	0.73	0.76	0.80	0.45	0.52
21	0.51	0.66	0.54	0.67	0.78	0.52	0.52	0.63	0.50	0.65	0.51	0.76	0.81	0.84	0.45	0.52
22	0.53	0.68	0.58	0.68	0.80	0.55	0.54	0.65	0.52	0.67	0.54	0.77	0.81	0.83	0.48	0.54
23	0.51	0.66	0.53	0.64	0.56	0.54	0.52	0.48	0.50	0.64	0.52	0.76	0.79	0.85	0.43	0.52
24	0.53	0.68	0.56	0.65	0.62	0.58	0.54	0.50	0.53	0.66	0.54	0.76	0.79	0.84	0.46	0.55
25	0.52	0.62	0.50	0.56	0.73	0.45	0.52	0.63	0.51	0.58	0.44	0.61	0.76	0.71	0.48	0.52
26	0.54	0.64	0.54	0.57	0.76	0.50	0.54	0.66	0.53	0.59	0.47	0.63	0.74	0.70	0.51	0.55
27	0.52	0.63	0.49	0.61	0.78	0.49	0.51	0.47	0.53	0.62	0.50	0.72	0.76	0.82	0.43	0.49
28	0.53	0.65	0.53	0.62	0.80	0.53	0.53	0.49	0.54	0.64	0.53	0.73	0.76	0.80	0.45	0.52
29	0.52	0.64	0.55	0.59	0.74	0.50	0.52	0.64	0.50	0.60	0.48	0.65	0.78	0.75	0.50	0.55
30	0.54	0.67	0.59	0.61	0.76	0.55	0.55	0.66	0.52	0.62	0.52	0.67	0.76	0.73	0.53	0.58
31	0.51	0.66	0.53	0.64	0.56	0.54	0.52	0.48	0.50	0.64	0.52	0.76	0.79	0.85	0.43	0.52
32	0.53	0.68	0.56	0.65	0.62	0.58	0.54	0.50	0.53	0.66	0.54	0.76	0.79	0.84	0.46	0.55
33	0.51	0.61	0.51	0.61	0.76	0.47	0.51	0.63	0.50	0.59	0.48	0.67	0.72	0.75	0.42	0.49
34	0.54	0.63	0.55	0.64	0.78	0.51	0.53	0.65	0.51	0.61	0.51	0.70	0.72	0.75	0.45	0.52
35	0.51	0.58	0.46	0.59	0.73	0.48	0.50	0.47	0.52	0.59	0.48	0.71	0.70	0.78	0.40	0.47
36	0.53	0.60	0.50	0.60	0.76	0.52	0.52	0.49	0.54	0.61	0.51	0.71	0.70	0.75	0.43	0.50
37	0.51	0.63	0.55	0.65	0.75	0.52	0.52	0.63	0.48	0.60	0.51	0.72	0.74	0.79	0.44	0.51
38	0.54	0.66	0.58	0.67	0.77	0.55	0.54	0.65	0.52	0.63	0.54	0.73	0.75	0.78	0.46	0.54
39	0.51	0.61	0.51	0.62	0.62	0.52	0.51	0.48	0.49	0.58	0.50	0.75	0.70	0.81	0.42	0.50
40	0.54	0.63	0.53	0.62	0.65	0.54	0.53	0.50	0.53	0.62	0.52	0.74	0.72	0.78	0.44	0.52
41	0.52	0.60	0.44	0.58	0.68	0.45	0.51	0.63	0.51	0.60	0.45	0.63	0.73	0.70	0.44	0.50
42	0.54	0.62	0.48	0.61	0.71	0.50	0.53	0.66	0.53	0.61	0.48	0.66	0.71	0.69	0.47	0.53
43	0.51	0.58	0.46	0.59	0.73	0.48	0.50	0.47	0.52	0.59	0.48	0.71	0.70	0.78	0.40	0.47
44	0.53	0.60	0.50	0.60	0.76	0.52	0.52	0.49	0.54	0.61	0.51	0.71	0.70	0.75	0.43	0.50
45	0.52	0.60	0.44	0.58	0.68	0.45	0.51	0.63	0.51	0.59	0.45	0.62	0.72	0.69	0.45	0.50
46	0.54	0.62	0.48	0.61	0.71	0.50	0.54	0.66	0.53	0.61	0.48	0.66	0.71	0.68	0.48	0.53

Scenario	CSWA	EAKI	EAPH	EAWP	EVGR	FOSP	GCKI	GCTH	GRAJ	GRCA	HAFL	LCSP	LEFL	LISP	MAWA	MOWA
47	0.51	0.58	0.46	0.59	0.73	0.48	0.50	0.47	0.52	0.59	0.48	0.71	0.70	0.78	0.40	0.47
48	0.53	0.60	0.50	0.60	0.76	0.52	0.52	0.49	0.54	0.61	0.51	0.71	0.70	0.75	0.43	0.50
49	0.68	0.53	0.63	0.55	0.66	0.41	0.63	0.65	0.42	0.50	0.44	0.68	0.64	0.72	0.45	0.49
50	0.67	0.56	0.67	0.59	0.68	0.45	0.64	0.68	0.48	0.54	0.48	0.71	0.70	0.75	0.48	0.52
51	0.61	0.53	0.54	0.53	0.64	0.46	0.60	0.51	0.45	0.50	0.47	0.68	0.62	0.71	0.48	0.49
52	0.59	0.57	0.57	0.56	0.66	0.50	0.61	0.55	0.49	0.55	0.50	0.69	0.66	0.73	0.52	0.52
53	0.67	0.52	0.64	0.55	0.65	0.42	0.62	0.62	0.43	0.50	0.45	0.68	0.65	0.73	0.46	0.49
54	0.67	0.56	0.67	0.58	0.68	0.46	0.62	0.66	0.49	0.54	0.48	0.72	0.71	0.76	0.49	0.52
55	0.61	0.52	0.55	0.53	0.64	0.46	0.60	0.51	0.45	0.50	0.47	0.68	0.62	0.71	0.48	0.49
56	0.59	0.56	0.58	0.57	0.66	0.51	0.61	0.55	0.49	0.54	0.51	0.70	0.67	0.74	0.52	0.52
57	0.67	0.54	0.64	0.52	0.65	0.45	0.63	0.63	0.43	0.50	0.44	0.55	0.69	0.72	0.49	0.51
58	0.66	0.58	0.67	0.56	0.68	0.49	0.63	0.66	0.47	0.54	0.47	0.58	0.75	0.75	0.53	0.54
59	0.61	0.53	0.54	0.53	0.64	0.46	0.60	0.51	0.45	0.50	0.47	0.68	0.62	0.71	0.48	0.49
60	0.59	0.57	0.57	0.56	0.66	0.50	0.61	0.55	0.49	0.55	0.50	0.69	0.66	0.73	0.52	0.52
61	0.62	0.56	0.67	0.56	0.65	0.50	0.51	0.63	0.44	0.52	0.48	0.61	0.74	0.76	0.51	0.52
62	0.62	0.60	0.69	0.59	0.68	0.52	0.56	0.66	0.48	0.56	0.51	0.62	0.78	0.77	0.53	0.55
63	0.54	0.55	0.58	0.59	0.63	0.53	0.46	0.53	0.48	0.51	0.53	0.71	0.66	0.74	0.51	0.52
64	0.55	0.59	0.60	0.61	0.66	0.55	0.52	0.56	0.51	0.55	0.55	0.73	0.72	0.77	0.54	0.54
1a	0.53	0.67	0.49	0.72	0.42	0.48	0.55	0.65	0.54	0.69	0.49	0.78	0.86	0.89	0.34	0.47
2a	0.54	0.67	0.56	0.71	0.46	0.53	0.54	0.67	0.52	0.68	0.53	0.76	0.81	0.82	0.39	0.50
3a	0.53	0.64	0.48	0.64	0.37	0.52	0.55	0.39	0.58	0.70	0.49	0.74	0.83	0.82	0.32	0.46
4a	0.53	0.64	0.51	0.64	0.39	0.55	0.54	0.42	0.55	0.68	0.51	0.74	0.80	0.78	0.35	0.48
5a	0.53	0.67	0.50	0.75	0.33	0.53	0.51	0.63	0.49	0.69	0.51	0.82	0.86	0.89	0.33	0.48
6a	0.54	0.68	0.55	0.74	0.36	0.56	0.53	0.65	0.49	0.70	0.53	0.81	0.83	0.85	0.37	0.51
7a	0.53	0.65	0.53	0.66	0.26	0.53	0.53	0.44	0.53	0.69	0.50	0.76	0.83	0.82	0.31	0.46
8a	0.53	0.65	0.55	0.66	0.29	0.56	0.53	0.47	0.51	0.68	0.52	0.76	0.80	0.80	0.35	0.49
9a	0.53	0.67	0.51	0.71	0.41	0.48	0.56	0.66	0.53	0.68	0.48	0.76	0.86	0.88	0.34	0.47
10a	0.54	0.67	0.58	0.70	0.46	0.52	0.55	0.68	0.52	0.66	0.51	0.74	0.81	0.81	0.39	0.51
11a	0.53	0.64	0.48	0.64	0.37	0.52	0.55	0.39	0.58	0.70	0.49	0.74	0.83	0.82	0.32	0.46
12a	0.53	0.64	0.51	0.64	0.39	0.55	0.54	0.42	0.55	0.68	0.51	0.74	0.80	0.78	0.35	0.48

Scenario	CSWA	EAKI	EAPH	EAWP	EVGR	FOSP	GCKI	GCTH	GRAJ	GRCA	HAFL	LCSP	LEFL	LISP	MAWA	MOWA
13a	0.53	0.67	0.53	0.74	0.32	0.51	0.51	0.66	0.48	0.68	0.50	0.79	0.86	0.89	0.34	0.48
14a	0.54	0.67	0.58	0.73	0.35	0.55	0.53	0.68	0.48	0.68	0.53	0.77	0.82	0.83	0.38	0.51
15a	0.53	0.65	0.53	0.66	0.26	0.53	0.53	0.44	0.53	0.69	0.50	0.76	0.83	0.82	0.31	0.46
16a	0.53	0.65	0.55	0.66	0.29	0.56	0.53	0.47	0.51	0.68	0.52	0.76	0.80	0.80	0.35	0.49
17a	0.52	0.70	0.45	0.72	0.69	0.53	0.52	0.62	0.53	0.72	0.53	0.83	0.87	0.89	0.40	0.52
18a	0.54	0.71	0.52	0.72	0.73	0.60	0.54	0.65	0.56	0.71	0.58	0.81	0.82	0.83	0.46	0.57
19a	0.52	0.67	0.41	0.65	0.60	0.55	0.51	0.44	0.56	0.72	0.53	0.79	0.84	0.84	0.40	0.51
20a	0.53	0.69	0.47	0.67	0.64	0.60	0.53	0.50	0.56	0.72	0.57	0.80	0.82	0.83	0.45	0.55
21a	0.51	0.70	0.44	0.74	0.61	0.56	0.52	0.61	0.52	0.72	0.55	0.85	0.86	0.89	0.41	0.53
22a	0.54	0.72	0.50	0.74	0.65	0.61	0.54	0.64	0.55	0.73	0.58	0.83	0.84	0.85	0.46	0.57
23a	0.52	0.68	0.45	0.67	0.46	0.56	0.52	0.47	0.54	0.71	0.54	0.80	0.84	0.85	0.40	0.53
24a	0.53	0.70	0.50	0.67	0.50	0.61	0.53	0.51	0.55	0.71	0.57	0.81	0.82	0.84	0.45	0.56
25a	0.52	0.70	0.42	0.70	0.67	0.52	0.52	0.64	0.53	0.71	0.50	0.80	0.86	0.88	0.42	0.53
26a	0.54	0.71	0.49	0.70	0.70	0.58	0.54	0.66	0.56	0.70	0.55	0.78	0.81	0.81	0.48	0.59
27a	0.52	0.67	0.41	0.65	0.60	0.55	0.51	0.44	0.56	0.72	0.53	0.79	0.84	0.84	0.40	0.51
28a	0.53	0.69	0.47	0.67	0.64	0.60	0.53	0.50	0.56	0.72	0.57	0.80	0.82	0.83	0.45	0.55
29a	0.52	0.70	0.42	0.73	0.58	0.55	0.52	0.64	0.52	0.71	0.52	0.83	0.86	0.88	0.44	0.54
30a	0.54	0.72	0.48	0.73	0.61	0.60	0.54	0.66	0.55	0.71	0.55	0.81	0.83	0.83	0.49	0.58
31a	0.52	0.68	0.45	0.67	0.46	0.56	0.52	0.47	0.54	0.71	0.54	0.80	0.84	0.85	0.40	0.53
32a	0.53	0.70	0.50	0.67	0.50	0.61	0.53	0.51	0.55	0.71	0.57	0.81	0.82	0.84	0.45	0.56
33a	0.51	0.66	0.56	0.72	0.65	0.54	0.52	0.61	0.47	0.64	0.54	0.79	0.80	0.89	0.38	0.53
34a	0.54	0.68	0.64	0.72	0.69	0.59	0.55	0.65	0.50	0.65	0.58	0.76	0.75	0.80	0.43	0.58
35a	0.52	0.65	0.45	0.62	0.62	0.55	0.52	0.42	0.55	0.70	0.52	0.76	0.81	0.82	0.37	0.50
36a	0.54	0.67	0.51	0.63	0.67	0.59	0.54	0.49	0.55	0.68	0.56	0.76	0.77	0.77	0.43	0.55
37a	0.51	0.67	0.59	0.75	0.57	0.58	0.52	0.60	0.45	0.63	0.58	0.81	0.78	0.89	0.40	0.54
38a	0.54	0.70	0.64	0.74	0.61	0.62	0.55	0.64	0.50	0.66	0.61	0.79	0.76	0.81	0.44	0.58
39a	0.51	0.66	0.50	0.65	0.55	0.57	0.52	0.47	0.50	0.66	0.53	0.78	0.78	0.82	0.40	0.53
40a	0.53	0.68	0.54	0.64	0.60	0.60	0.54	0.51	0.53	0.67	0.56	0.77	0.77	0.78	0.44	0.57
41a	0.51	0.67	0.50	0.71	0.63	0.51	0.52	0.63	0.47	0.65	0.50	0.79	0.81	0.88	0.40	0.53
42a	0.54	0.68	0.59	0.71	0.68	0.58	0.55	0.65	0.50	0.65	0.55	0.76	0.76	0.79	0.45	0.58

Scenario	CSWA	EAKI	EAPH	EAWP	EVGR	FOSP	GCKI	GCTH	GRAJ	GRCA	HAFL	LCSP	LEFL	LISP	MAWA	MOWA
43a	0.52	0.65	0.45	0.62	0.62	0.55	0.52	0.42	0.55	0.70	0.52	0.76	0.81	0.82	0.37	0.50
44a	0.54	0.67	0.51	0.63	0.67	0.59	0.54	0.49	0.55	0.68	0.56	0.76	0.77	0.77	0.43	0.55
45a	0.51	0.67	0.50	0.71	0.63	0.52	0.52	0.61	0.47	0.65	0.51	0.78	0.81	0.88	0.40	0.53
46a	0.54	0.68	0.58	0.70	0.68	0.58	0.55	0.64	0.51	0.65	0.56	0.76	0.75	0.78	0.45	0.58
47a	0.52	0.65	0.47	0.62	0.62	0.54	0.52	0.42	0.54	0.69	0.52	0.76	0.80	0.82	0.36	0.50
48a	0.54	0.67	0.53	0.62	0.66	0.59	0.54	0.47	0.55	0.68	0.56	0.76	0.77	0.78	0.42	0.55
49a	0.70	0.57	0.65	0.66	0.67	0.46	0.62	0.64	0.38	0.53	0.52	0.77	0.76	0.83	0.43	0.51
50a	0.67	0.60	0.70	0.71	0.70	0.52	0.62	0.68	0.43	0.55	0.58	0.78	0.78	0.82	0.50	0.56
51a	0.64	0.58	0.44	0.56	0.65	0.43	0.58	0.44	0.41	0.59	0.45	0.67	0.70	0.75	0.40	0.46
52a	0.60	0.62	0.47	0.61	0.68	0.47	0.56	0.54	0.44	0.61	0.49	0.68	0.70	0.74	0.46	0.51
53a	0.66	0.56	0.66	0.67	0.67	0.48	0.57	0.60	0.39	0.54	0.53	0.77	0.76	0.83	0.44	0.52
54a	0.64	0.60	0.71	0.71	0.71	0.53	0.58	0.65	0.44	0.56	0.58	0.78	0.78	0.82	0.50	0.56
55a	0.64	0.57	0.45	0.57	0.65	0.43	0.58	0.42	0.41	0.59	0.45	0.67	0.70	0.75	0.40	0.47
56a	0.60	0.61	0.48	0.60	0.68	0.47	0.57	0.50	0.44	0.61	0.49	0.68	0.70	0.74	0.46	0.51
57a	0.70	0.57	0.64	0.64	0.65	0.44	0.63	0.63	0.38	0.53	0.49	0.72	0.77	0.83	0.46	0.52
58a	0.67	0.60	0.70	0.68	0.68	0.51	0.62	0.67	0.43	0.55	0.55	0.75	0.78	0.82	0.53	0.56
59a	0.64	0.58	0.44	0.56	0.65	0.43	0.58	0.44	0.41	0.59	0.45	0.67	0.70	0.75	0.40	0.46
60a	0.60	0.62	0.47	0.61	0.68	0.47	0.56	0.54	0.44	0.61	0.49	0.68	0.70	0.74	0.46	0.51
61a	0.52	0.59	0.66	0.70	0.65	0.50	0.47	0.62	0.38	0.54	0.56	0.78	0.77	0.82	0.48	0.53
62a	0.55	0.63	0.69	0.73	0.69	0.54	0.53	0.66	0.41	0.58	0.60	0.78	0.79	0.82	0.52	0.57
63a	0.64	0.60	0.47	0.60	0.52	0.48	0.50	0.49	0.41	0.58	0.49	0.69	0.71	0.76	0.44	0.49
64a	0.60	0.63	0.50	0.62	0.55	0.51	0.53	0.54	0.44	0.60	0.52	0.70	0.70	0.75	0.48	0.53

Scenario	NAWA	OCWA	OSFL	OVEN	PAWA	PHVI	PIGR	PISI	PUFI	RBGR	RCKI	RUBL	SAVS	SEWR	SOSP	SWSP
1	0.71	0.56	0.68	0.46	0.65	0.59	0.72	0.52	0.45	0.53	0.54	0.63	0.56	0.47	0.54	0.74
2	0.72	0.59	0.66	0.48	0.66	0.59	0.70	0.54	0.46	0.53	0.53	0.61	0.59	0.48	0.57	0.75
3	0.71	0.50	0.71	0.49	0.49	0.59	0.71	0.54	0.52	0.50	0.54	0.62	0.59	0.48	0.53	0.42
4	0.73	0.53	0.68	0.50	0.50	0.59	0.70	0.56	0.53	0.50	0.53	0.60	0.60	0.48	0.54	0.43
5	0.76	0.61	0.72	0.48	0.68	0.61	0.73	0.57	0.48	0.42	0.51	0.60	0.57	0.51	0.61	0.73

Scenario	NAWA	OCWA	OSFL	OVEN	PAWA	PHVI	PIGR	PISI	PUFI	RBGR	RCKI	RUBL	SAVS	SEWR	SOSP	SWSP
6	0.77	0.63	0.71	0.51	0.69	0.62	0.71	0.59	0.50	0.43	0.51	0.61	0.60	0.53	0.64	0.75
7	0.77	0.54	0.74	0.50	0.55	0.62	0.72	0.61	0.53	0.47	0.50	0.60	0.60	0.50	0.60	0.45
8	0.73	0.53	0.68	0.50	0.50	0.59	0.70	0.56	0.53	0.50	0.53	0.60	0.60	0.48	0.54	0.43
9	0.66	0.49	0.60	0.52	0.64	0.57	0.72	0.49	0.55	0.61	0.52	0.63	0.56	0.44	0.46	0.75
10	0.66	0.51	0.58	0.54	0.65	0.58	0.70	0.50	0.57	0.61	0.51	0.61	0.57	0.46	0.48	0.76
11	0.71	0.50	0.71	0.49	0.49	0.59	0.71	0.54	0.52	0.50	0.54	0.62	0.59	0.48	0.53	0.42
12	0.73	0.53	0.68	0.50	0.50	0.59	0.70	0.56	0.53	0.50	0.53	0.60	0.60	0.48	0.54	0.43
13	0.68	0.52	0.63	0.54	0.66	0.59	0.72	0.52	0.58	0.51	0.50	0.61	0.58	0.48	0.49	0.75
14	0.70	0.54	0.61	0.57	0.67	0.60	0.70	0.54	0.60	0.52	0.50	0.61	0.60	0.50	0.52	0.77
15	0.77	0.54	0.74	0.50	0.55	0.62	0.72	0.61	0.53	0.47	0.50	0.60	0.60	0.50	0.60	0.45
16	0.79	0.58	0.73	0.52	0.57	0.62	0.70	0.64	0.55	0.48	0.50	0.60	0.63	0.52	0.62	0.48
17	0.73	0.61	0.70	0.47	0.64	0.61	0.71	0.52	0.49	0.49	0.50	0.60	0.59	0.48	0.58	0.65
18	0.76	0.65	0.69	0.49	0.66	0.62	0.71	0.55	0.53	0.51	0.52	0.60	0.62	0.50	0.63	0.67
19	0.74	0.57	0.73	0.51	0.49	0.61	0.71	0.56	0.58	0.45	0.51	0.59	0.63	0.49	0.57	0.47
20	0.77	0.62	0.71	0.54	0.52	0.62	0.73	0.60	0.62	0.47	0.53	0.59	0.67	0.52	0.61	0.50
21	0.80	0.67	0.74	0.49	0.68	0.64	0.73	0.58	0.57	0.39	0.50	0.59	0.57	0.53	0.67	0.64
22	0.82	0.71	0.74	0.51	0.70	0.65	0.74	0.61	0.61	0.41	0.51	0.61	0.60	0.55	0.71	0.67
23	0.78	0.62	0.74	0.50	0.53	0.62	0.72	0.62	0.62	0.43	0.52	0.57	0.61	0.53	0.64	0.48
24	0.81	0.66	0.73	0.53	0.55	0.64	0.74	0.65	0.67	0.45	0.54	0.59	0.64	0.55	0.66	0.51
25	0.70	0.52	0.64	0.45	0.63	0.59	0.72	0.45	0.65	0.54	0.50	0.61	0.50	0.46	0.51	0.65
26	0.73	0.57	0.63	0.48	0.65	0.60	0.72	0.49	0.70	0.57	0.52	0.61	0.53	0.49	0.56	0.68
27	0.74	0.57	0.73	0.51	0.49	0.61	0.71	0.56	0.58	0.45	0.51	0.59	0.63	0.49	0.57	0.47
28	0.77	0.62	0.71	0.54	0.52	0.62	0.73	0.60	0.62	0.47	0.53	0.59	0.67	0.52	0.61	0.50
29	0.74	0.58	0.66	0.49	0.66	0.61	0.72	0.50	0.70	0.47	0.50	0.59	0.53	0.50	0.56	0.66
30	0.76	0.63	0.65	0.52	0.68	0.62	0.73	0.53	0.74	0.49	0.52	0.61	0.57	0.53	0.61	0.68
31	0.78	0.62	0.74	0.50	0.53	0.62	0.72	0.62	0.62	0.43	0.52	0.57	0.61	0.53	0.64	0.48
32	0.81	0.66	0.73	0.53	0.55	0.64	0.74	0.65	0.67	0.45	0.54	0.59	0.64	0.55	0.66	0.51
33	0.66	0.60	0.67	0.44	0.63	0.60	0.67	0.56	0.49	0.47	0.50	0.60	0.54	0.47	0.57	0.65
34	0.70	0.65	0.66	0.46	0.65	0.62	0.67	0.61	0.52	0.49	0.52	0.60	0.59	0.50	0.61	0.67
35	0.66	0.60	0.70	0.45	0.46	0.58	0.65	0.59	0.52	0.47	0.52	0.57	0.57	0.47	0.59	0.45

Scenario	NAWA	OCWA	OSFL	OVEN	PAWA	PHVI	PIGR	PISI	PUFI	RBGR	RCKI	RUBL	SAVS	SEWR	SOSP	SWSP
36	0.70	0.67	0.68	0.48	0.50	0.60	0.67	0.62	0.56	0.48	0.54	0.57	0.60	0.49	0.64	0.48
37	0.70	0.66	0.69	0.46	0.65	0.62	0.66	0.62	0.54	0.40	0.51	0.56	0.54	0.52	0.64	0.63
38	0.74	0.70	0.69	0.49	0.68	0.64	0.69	0.66	0.57	0.43	0.53	0.59	0.58	0.54	0.67	0.65
39	0.70	0.66	0.71	0.47	0.49	0.60	0.60	0.63	0.58	0.43	0.52	0.53	0.55	0.51	0.66	0.47
40	0.74	0.70	0.70	0.50	0.52	0.62	0.67	0.64	0.61	0.46	0.54	0.57	0.57	0.52	0.69	0.50
41	0.67	0.55	0.64	0.45	0.63	0.58	0.69	0.49	0.60	0.51	0.50	0.59	0.49	0.45	0.55	0.62
42	0.71	0.62	0.62	0.48	0.65	0.61	0.69	0.54	0.64	0.54	0.53	0.60	0.54	0.49	0.60	0.66
43	0.66	0.60	0.70	0.45	0.46	0.58	0.65	0.59	0.52	0.47	0.52	0.57	0.57	0.47	0.59	0.45
44	0.70	0.67	0.68	0.48	0.50	0.60	0.67	0.62	0.56	0.48	0.54	0.57	0.60	0.49	0.64	0.48
45	0.67	0.55	0.63	0.45	0.62	0.58	0.69	0.49	0.60	0.51	0.50	0.59	0.49	0.46	0.55	0.61
46	0.71	0.62	0.62	0.48	0.65	0.61	0.69	0.54	0.64	0.54	0.53	0.60	0.54	0.49	0.60	0.65
47	0.66	0.60	0.70	0.45	0.46	0.58	0.65	0.59	0.52	0.47	0.52	0.57	0.57	0.47	0.59	0.45
48	0.70	0.67	0.68	0.48	0.50	0.60	0.67	0.62	0.56	0.48	0.54	0.57	0.60	0.49	0.64	0.48
49	0.61	0.51	0.62	0.46	0.58	0.65	0.58	0.52	0.51	0.62	0.49	0.60	0.56	0.45	0.54	0.72
50	0.66	0.54	0.64	0.49	0.61	0.66	0.62	0.55	0.55	0.59	0.51	0.61	0.59	0.49	0.58	0.74
51	0.60	0.52	0.62	0.51	0.44	0.63	0.56	0.52	0.56	0.63	0.52	0.56	0.56	0.46	0.49	0.47
52	0.65	0.55	0.64	0.55	0.47	0.63	0.59	0.55	0.60	0.60	0.54	0.59	0.59	0.49	0.52	0.51
53	0.62	0.52	0.63	0.46	0.57	0.63	0.59	0.52	0.52	0.62	0.49	0.58	0.56	0.46	0.55	0.63
54	0.67	0.55	0.65	0.50	0.61	0.64	0.62	0.56	0.55	0.59	0.51	0.59	0.59	0.50	0.59	0.67
55	0.60	0.52	0.62	0.51	0.44	0.63	0.56	0.52	0.56	0.63	0.51	0.56	0.56	0.46	0.49	0.47
56	0.65	0.56	0.64	0.55	0.47	0.63	0.58	0.56	0.60	0.60	0.53	0.59	0.59	0.50	0.53	0.51
57	0.65	0.47	0.50	0.51	0.55	0.61	0.60	0.44	0.58	0.65	0.51	0.58	0.56	0.44	0.39	0.66
58	0.70	0.50	0.53	0.55	0.58	0.62	0.64	0.48	0.62	0.63	0.52	0.60	0.59	0.48	0.43	0.70
59	0.60	0.52	0.62	0.51	0.44	0.63	0.56	0.52	0.56	0.63	0.52	0.56	0.56	0.46	0.49	0.47
60	0.65	0.55	0.64	0.55	0.47	0.63	0.59	0.55	0.60	0.60	0.54	0.59	0.59	0.49	0.52	0.51
61	0.69	0.50	0.54	0.51	0.57	0.62	0.61	0.49	0.60	0.49	0.49	0.51	0.57	0.48	0.44	0.63
62	0.73	0.53	0.56	0.55	0.60	0.63	0.65	0.52	0.63	0.60	0.54	0.57	0.60	0.51	0.47	0.67
63	0.64	0.56	0.64	0.53	0.48	0.64	0.51	0.59	0.58	0.47	0.50	0.47	0.57	0.52	0.55	0.50
64	0.68	0.59	0.66	0.56	0.50	0.65	0.56	0.60	0.61	0.57	0.55	0.53	0.60	0.54	0.57	0.53
1a	0.84	0.59	0.77	0.46	0.68	0.64	0.77	0.62	0.45	0.45	0.52	0.65	0.66	0.50	0.61	0.73

Scenario	NAWA	OCWA	OSFL	OVEN	PAWA	PHVI	PIGR	PISI	PUFI	RBGR	RCKI	RUBL	SAVS	SEWR	SOSP	SWSP
2a	0.83	0.66	0.72	0.51	0.68	0.63	0.73	0.65	0.50	0.47	0.52	0.62	0.69	0.52	0.66	0.75
3a	0.84	0.59	0.74	0.45	0.52	0.59	0.79	0.63	0.52	0.46	0.55	0.62	0.62	0.50	0.68	0.32
4a	0.83	0.64	0.71	0.47	0.53	0.60	0.75	0.64	0.55	0.45	0.54	0.59	0.64	0.51	0.72	0.35
5a	0.86	0.66	0.80	0.46	0.71	0.65	0.75	0.68	0.42	0.34	0.49	0.60	0.63	0.53	0.71	0.70
6a	0.85	0.69	0.76	0.49	0.71	0.65	0.72	0.70	0.47	0.37	0.50	0.60	0.66	0.55	0.75	0.73
7a	0.84	0.60	0.74	0.46	0.56	0.62	0.78	0.65	0.52	0.46	0.52	0.61	0.62	0.50	0.68	0.37
8a	0.83	0.65	0.71	0.48	0.57	0.62	0.73	0.67	0.55	0.45	0.52	0.59	0.63	0.51	0.73	0.40
9a	0.83	0.54	0.75	0.48	0.69	0.64	0.78	0.59	0.49	0.50	0.52	0.65	0.63	0.48	0.58	0.74
10a	0.82	0.61	0.69	0.53	0.68	0.63	0.73	0.62	0.54	0.51	0.51	0.62	0.67	0.51	0.62	0.75
11a	0.84	0.59	0.74	0.45	0.52	0.59	0.79	0.63	0.52	0.46	0.55	0.62	0.62	0.50	0.68	0.32
12a	0.83	0.64	0.71	0.47	0.53	0.60	0.75	0.64	0.55	0.45	0.54	0.59	0.64	0.51	0.72	0.35
13a	0.85	0.61	0.78	0.48	0.71	0.65	0.75	0.64	0.47	0.40	0.49	0.61	0.63	0.52	0.65	0.74
14a	0.84	0.66	0.73	0.52	0.71	0.64	0.72	0.67	0.51	0.42	0.49	0.61	0.66	0.54	0.70	0.75
15a	0.84	0.60	0.74	0.46	0.56	0.62	0.78	0.65	0.52	0.46	0.52	0.61	0.62	0.50	0.68	0.37
16a	0.83	0.65	0.71	0.48	0.57	0.62	0.73	0.67	0.55	0.45	0.52	0.59	0.63	0.51	0.73	0.40
17a	0.88	0.71	0.79	0.52	0.71	0.67	0.79	0.64	0.53	0.38	0.52	0.62	0.70	0.54	0.74	0.64
18a	0.86	0.79	0.76	0.58	0.72	0.67	0.77	0.67	0.61	0.40	0.54	0.62	0.74	0.58	0.80	0.67
19a	0.87	0.71	0.79	0.53	0.57	0.63	0.80	0.64	0.56	0.36	0.53	0.60	0.67	0.55	0.78	0.42
20a	0.86	0.76	0.76	0.57	0.61	0.64	0.78	0.68	0.61	0.37	0.54	0.60	0.71	0.58	0.81	0.47
21a	0.88	0.77	0.81	0.51	0.73	0.67	0.77	0.67	0.53	0.31	0.51	0.59	0.66	0.58	0.82	0.61
22a	0.88	0.81	0.80	0.56	0.74	0.68	0.77	0.70	0.58	0.33	0.52	0.61	0.71	0.61	0.84	0.64
23a	0.86	0.71	0.78	0.51	0.59	0.64	0.79	0.67	0.57	0.35	0.53	0.59	0.62	0.56	0.78	0.46
24a	0.86	0.75	0.76	0.55	0.62	0.64	0.77	0.69	0.63	0.37	0.55	0.59	0.67	0.59	0.80	0.49
25a	0.87	0.65	0.79	0.52	0.71	0.66	0.79	0.58	0.61	0.41	0.51	0.63	0.62	0.54	0.71	0.65
26a	0.86	0.73	0.74	0.57	0.72	0.67	0.77	0.62	0.68	0.44	0.54	0.62	0.68	0.58	0.76	0.67
27a	0.87	0.71	0.79	0.53	0.57	0.63	0.80	0.64	0.56	0.36	0.53	0.60	0.67	0.55	0.78	0.42
28a	0.86	0.76	0.76	0.57	0.61	0.64	0.78	0.68	0.61	0.37	0.54	0.60	0.71	0.58	0.81	0.47
29a	0.88	0.72	0.81	0.52	0.74	0.67	0.77	0.62	0.59	0.32	0.51	0.60	0.59	0.58	0.79	0.64
30a	0.87	0.77	0.78	0.57	0.76	0.68	0.77	0.65	0.65	0.35	0.52	0.62	0.64	0.61	0.81	0.67
31a	0.86	0.71	0.78	0.51	0.59	0.64	0.79	0.67	0.57	0.35	0.53	0.59	0.62	0.56	0.78	0.46

Scenario	NAWA	OCWA	OSFL	OVEN	PAWA	PHVI	PIGR	PISI	PUFI	RBGR	RCKI	RUBL	SAVS	SEWR	SOSP	SWSP
32a	0.86	0.75	0.76	0.55	0.62	0.64	0.77	0.69	0.63	0.37	0.55	0.59	0.67	0.59	0.80	0.49
33a	0.73	0.68	0.76	0.49	0.62	0.66	0.67	0.69	0.53	0.43	0.52	0.58	0.68	0.52	0.61	0.64
34a	0.74	0.73	0.71	0.53	0.66	0.67	0.67	0.71	0.60	0.48	0.55	0.59	0.73	0.55	0.66	0.68
35a	0.83	0.69	0.77	0.48	0.50	0.60	0.78	0.65	0.54	0.41	0.55	0.58	0.64	0.51	0.78	0.38
36a	0.82	0.72	0.72	0.52	0.57	0.62	0.75	0.67	0.60	0.45	0.57	0.58	0.67	0.54	0.79	0.44
37a	0.75	0.73	0.77	0.50	0.67	0.66	0.61	0.74	0.53	0.36	0.52	0.53	0.68	0.56	0.71	0.60
38a	0.76	0.77	0.74	0.54	0.70	0.68	0.67	0.75	0.58	0.41	0.54	0.58	0.72	0.58	0.74	0.65
39a	0.81	0.70	0.75	0.48	0.55	0.63	0.70	0.67	0.57	0.42	0.55	0.54	0.63	0.54	0.78	0.44
40a	0.81	0.72	0.72	0.51	0.58	0.63	0.73	0.68	0.62	0.47	0.56	0.57	0.65	0.55	0.79	0.48
41a	0.75	0.64	0.76	0.49	0.64	0.66	0.70	0.64	0.58	0.45	0.51	0.60	0.64	0.51	0.61	0.64
42a	0.75	0.71	0.70	0.53	0.67	0.67	0.69	0.67	0.64	0.50	0.54	0.60	0.70	0.55	0.66	0.67
43a	0.83	0.69	0.77	0.48	0.50	0.60	0.78	0.65	0.54	0.41	0.55	0.58	0.64	0.51	0.78	0.38
44a	0.82	0.72	0.72	0.52	0.57	0.62	0.75	0.67	0.60	0.45	0.57	0.58	0.67	0.54	0.79	0.44
45a	0.75	0.65	0.77	0.49	0.62	0.65	0.70	0.64	0.59	0.45	0.52	0.59	0.63	0.51	0.63	0.60
46a	0.75	0.72	0.70	0.53	0.66	0.66	0.69	0.67	0.65	0.50	0.54	0.59	0.70	0.55	0.67	0.65
47a	0.82	0.70	0.76	0.47	0.50	0.60	0.77	0.65	0.55	0.43	0.54	0.58	0.65	0.51	0.75	0.39
48a	0.82	0.73	0.72	0.50	0.55	0.62	0.75	0.67	0.60	0.47	0.57	0.58	0.68	0.53	0.78	0.44
49a	0.69	0.52	0.70	0.50	0.60	0.69	0.58	0.61	0.51	0.57	0.50	0.55	0.61	0.50	0.57	0.67
50a	0.70	0.58	0.71	0.55	0.65	0.69	0.59	0.66	0.55	0.63	0.54	0.56	0.63	0.55	0.63	0.71
51a	0.70	0.49	0.64	0.52	0.42	0.60	0.68	0.51	0.50	0.58	0.51	0.57	0.58	0.44	0.47	0.36
52a	0.70	0.51	0.65	0.57	0.52	0.61	0.68	0.54	0.53	0.58	0.52	0.58	0.59	0.49	0.50	0.42
53a	0.69	0.54	0.71	0.51	0.59	0.66	0.57	0.62	0.51	0.57	0.49	0.52	0.61	0.51	0.59	0.60
54a	0.71	0.59	0.72	0.56	0.64	0.67	0.58	0.67	0.55	0.63	0.53	0.53	0.63	0.56	0.64	0.65
55a	0.69	0.49	0.64	0.52	0.41	0.61	0.68	0.51	0.50	0.59	0.48	0.57	0.59	0.44	0.47	0.36
56a	0.70	0.52	0.65	0.56	0.46	0.62	0.68	0.54	0.53	0.59	0.51	0.58	0.60	0.49	0.50	0.40
57a	0.69	0.49	0.67	0.51	0.59	0.67	0.60	0.55	0.54	0.60	0.50	0.57	0.60	0.48	0.49	0.65
58a	0.71	0.54	0.69	0.55	0.64	0.67	0.61	0.62	0.59	0.64	0.53	0.57	0.62	0.54	0.55	0.70
59a	0.70	0.49	0.64	0.52	0.42	0.60	0.68	0.51	0.50	0.58	0.51	0.57	0.58	0.44	0.47	0.36
60a	0.70	0.51	0.65	0.57	0.52	0.61	0.68	0.54	0.53	0.58	0.52	0.58	0.59	0.49	0.50	0.42
61a	0.70	0.54	0.72	0.49	0.64	0.66	0.55	0.64	0.53	0.46	0.47	0.46	0.58	0.55	0.58	0.61

Scenario	NAWA	OCWA	OSFL	OVEN	PAWA	PHVI	PIGR	PISI	PUFI	RBGR	RCKI	RUBL	SAVS	SEWR	SOSP	SWSP
62a	0.72	0.58	0.73	0.53	0.68	0.66	0.59	0.67	0.56	0.57	0.52	0.51	0.61	0.58	0.62	0.65
63a	0.71	0.51	0.65	0.53	0.46	0.64	0.66	0.54	0.51	0.46	0.47	0.52	0.59	0.49	0.50	0.41
64a	0.70	0.54	0.66	0.57	0.51	0.64	0.67	0.57	0.55	0.56	0.52	0.55	0.60	0.52	0.52	0.45

Scenario	SWTH	TEWA	TOWA	VATH	VEER	WBNU	WCSP	WETA	WEWP	WIWA	WIWR	WTSP	WWCR	YBFL	YWAR
1	0.60	0.70	0.52	0.49	0.51	0.47	0.48	0.64	0.58	0.46	0.64	0.53	0.48	0.51	0.54
2	0.62	0.68	0.52	0.50	0.52	0.48	0.50	0.65	0.58	0.48	0.65	0.54	0.49	0.53	0.53
3	0.42	0.69	0.50	0.54	0.50	0.45	0.46	0.69	0.61	0.48	0.66	0.54	0.50	0.44	0.54
4	0.43	0.67	0.50	0.55	0.51	0.45	0.48	0.69	0.61	0.50	0.67	0.53	0.50	0.44	0.52
5	0.60	0.70	0.50	0.39	0.53	0.47	0.51	0.69	0.63	0.50	0.69	0.51	0.50	0.30	0.52
6	0.61	0.69	0.51	0.41	0.54	0.48	0.54	0.70	0.64	0.52	0.71	0.52	0.51	0.32	0.52
7	0.43	0.70	0.50	0.32	0.51	0.43	0.51	0.75	0.66	0.52	0.72	0.52	0.49	0.28	0.52
8	0.43	0.67	0.50	0.55	0.51	0.45	0.48	0.69	0.61	0.50	0.67	0.53	0.50	0.44	0.52
9	0.63	0.70	0.52	0.45	0.47	0.46	0.57	0.53	0.53	0.46	0.57	0.55	0.44	0.55	0.54
10	0.64	0.68	0.52	0.46	0.48	0.46	0.59	0.54	0.54	0.47	0.59	0.55	0.45	0.56	0.53
11	0.42	0.69	0.50	0.54	0.50	0.45	0.46	0.69	0.61	0.48	0.66	0.54	0.50	0.44	0.54
12	0.43	0.67	0.50	0.55	0.51	0.45	0.48	0.69	0.61	0.50	0.67	0.53	0.50	0.44	0.52
13	0.63	0.70	0.50	0.40	0.47	0.46	0.61	0.57	0.57	0.49	0.61	0.54	0.46	0.36	0.53
14	0.65	0.68	0.51	0.42	0.49	0.47	0.63	0.58	0.57	0.51	0.63	0.55	0.47	0.38	0.53
15	0.43	0.70	0.50	0.32	0.51	0.43	0.51	0.75	0.66	0.52	0.72	0.52	0.49	0.28	0.52
16	0.45	0.70	0.51	0.34	0.52	0.44	0.54	0.75	0.67	0.55	0.73	0.53	0.50	0.29	0.52
17	0.59	0.68	0.50	0.52	0.51	0.48	0.45	0.68	0.60	0.47	0.69	0.54	0.50	0.53	0.51
18	0.61	0.67	0.52	0.55	0.54	0.50	0.48	0.71	0.62	0.50	0.72	0.56	0.52	0.56	0.53
19	0.40	0.67	0.51	0.56	0.52	0.48	0.44	0.71	0.64	0.51	0.70	0.55	0.53	0.40	0.51
20	0.43	0.67	0.53	0.58	0.55	0.51	0.47	0.72	0.65	0.55	0.73	0.58	0.55	0.42	0.53
21	0.58	0.68	0.51	0.42	0.54	0.49	0.49	0.73	0.66	0.51	0.74	0.54	0.53	0.27	0.52
22	0.60	0.67	0.53	0.44	0.58	0.52	0.53	0.75	0.68	0.55	0.76	0.57	0.55	0.29	0.54
23	0.41	0.68	0.51	0.40	0.54	0.49	0.48	0.74	0.68	0.55	0.73	0.56	0.53	0.27	0.52
24	0.43	0.67	0.53	0.44	0.57	0.52	0.51	0.74	0.69	0.58	0.75	0.59	0.55	0.29	0.54

Scenario	SWTH	TEWA	TOWA	VATH	VEER	WBNU	WCSP	WETA	WEWP	WIWA	WIWR	WTSP	WWCR	YBFL	YWAR
25	0.61	0.68	0.50	0.51	0.50	0.49	0.52	0.52	0.53	0.46	0.60	0.53	0.45	0.56	0.51
26	0.63	0.67	0.53	0.54	0.53	0.52	0.56	0.54	0.54	0.50	0.63	0.54	0.47	0.59	0.53
27	0.40	0.67	0.51	0.56	0.52	0.48	0.44	0.71	0.64	0.51	0.70	0.55	0.53	0.40	0.51
28	0.43	0.67	0.53	0.58	0.55	0.51	0.47	0.72	0.65	0.55	0.73	0.58	0.55	0.42	0.53
29	0.61	0.68	0.51	0.47	0.51	0.51	0.57	0.56	0.57	0.50	0.64	0.54	0.48	0.35	0.52
30	0.63	0.67	0.53	0.49	0.55	0.54	0.61	0.58	0.58	0.54	0.67	0.58	0.50	0.36	0.54
31	0.41	0.68	0.51	0.40	0.54	0.49	0.48	0.74	0.68	0.55	0.73	0.56	0.53	0.27	0.52
32	0.43	0.67	0.53	0.44	0.57	0.52	0.51	0.74	0.69	0.58	0.75	0.59	0.55	0.29	0.54
33	0.60	0.67	0.50	0.47	0.49	0.47	0.46	0.64	0.61	0.50	0.67	0.52	0.51	0.49	0.51
34	0.62	0.66	0.53	0.50	0.51	0.49	0.49	0.70	0.64	0.53	0.71	0.54	0.53	0.52	0.53
35	0.41	0.65	0.50	0.51	0.49	0.46	0.40	0.69	0.64	0.52	0.69	0.50	0.52	0.54	0.50
36	0.44	0.64	0.52	0.55	0.52	0.49	0.43	0.70	0.66	0.55	0.71	0.52	0.54	0.58	0.52
37	0.59	0.66	0.51	0.42	0.50	0.48	0.49	0.70	0.66	0.53	0.71	0.51	0.53	0.33	0.52
38	0.61	0.65	0.53	0.45	0.54	0.51	0.52	0.73	0.68	0.56	0.75	0.55	0.56	0.36	0.54
39	0.42	0.64	0.51	0.45	0.51	0.48	0.45	0.72	0.67	0.55	0.72	0.49	0.54	0.42	0.51
40	0.44	0.65	0.53	0.48	0.55	0.50	0.47	0.70	0.68	0.57	0.73	0.53	0.55	0.44	0.53
41	0.60	0.67	0.51	0.49	0.50	0.48	0.47	0.59	0.56	0.48	0.61	0.50	0.48	0.55	0.51
42	0.63	0.66	0.53	0.52	0.52	0.51	0.50	0.64	0.59	0.52	0.67	0.53	0.51	0.58	0.53
43	0.41	0.65	0.50	0.51	0.49	0.46	0.40	0.69	0.64	0.52	0.69	0.50	0.52	0.54	0.50
44	0.44	0.64	0.52	0.55	0.52	0.49	0.43	0.70	0.66	0.55	0.71	0.52	0.54	0.58	0.52
45	0.60	0.66	0.50	0.49	0.50	0.48	0.47	0.59	0.56	0.48	0.61	0.50	0.48	0.55	0.51
46	0.63	0.65	0.53	0.53	0.53	0.52	0.50	0.63	0.59	0.52	0.67	0.53	0.51	0.59	0.53
47	0.41	0.65	0.50	0.51	0.49	0.46	0.40	0.69	0.64	0.52	0.69	0.50	0.52	0.54	0.50
48	0.44	0.64	0.52	0.55	0.52	0.49	0.43	0.70	0.66	0.55	0.71	0.52	0.54	0.58	0.52
49	0.67	0.74	0.58	0.69	0.46	0.46	0.52	0.66	0.59	0.46	0.64	0.48	0.51	0.71	0.53
50	0.70	0.75	0.59	0.71	0.49	0.50	0.56	0.69	0.63	0.49	0.68	0.51	0.54	0.74	0.55
51	0.46	0.69	0.55	0.73	0.46	0.46	0.47	0.66	0.60	0.49	0.64	0.47	0.53	0.69	0.52
52	0.48	0.69	0.57	0.75	0.50	0.49	0.51	0.68	0.63	0.52	0.67	0.51	0.56	0.72	0.54
53	0.66	0.74	0.58	0.69	0.46	0.46	0.53	0.67	0.60	0.47	0.64	0.47	0.52	0.72	0.53
54	0.69	0.74	0.59	0.72	0.49	0.50	0.57	0.70	0.64	0.50	0.68	0.50	0.55	0.75	0.55

Scenario	SWTH	TEWA	TOWA	VATH	VEER	WBNU	WCSP	WETA	WEWP	WIWA	WIWR	WTSP	WWCR	YBFL	YWAR
55	0.46	0.69	0.55	0.73	0.46	0.46	0.47	0.66	0.60	0.49	0.64	0.47	0.54	0.69	0.52
56	0.49	0.69	0.57	0.75	0.49	0.49	0.51	0.68	0.63	0.53	0.67	0.51	0.56	0.72	0.54
57	0.68	0.76	0.58	0.74	0.46	0.47	0.62	0.57	0.51	0.47	0.53	0.49	0.48	0.82	0.53
58	0.71	0.76	0.59	0.76	0.49	0.51	0.66	0.60	0.55	0.51	0.58	0.53	0.52	0.85	0.55
59	0.46	0.69	0.55	0.73	0.46	0.46	0.47	0.66	0.60	0.49	0.64	0.47	0.53	0.69	0.52
60	0.48	0.69	0.57	0.75	0.50	0.49	0.51	0.68	0.63	0.52	0.67	0.51	0.56	0.72	0.54
61	0.69	0.75	0.51	0.67	0.47	0.48	0.67	0.62	0.56	0.51	0.58	0.47	0.52	0.69	0.53
62	0.71	0.74	0.55	0.70	0.50	0.51	0.69	0.63	0.59	0.53	0.62	0.52	0.55	0.71	0.56
63	0.48	0.66	0.47	0.65	0.48	0.47	0.54	0.70	0.64	0.54	0.68	0.46	0.57	0.56	0.52
64	0.50	0.66	0.51	0.67	0.51	0.50	0.56	0.72	0.67	0.56	0.70	0.51	0.59	0.59	0.56
1a	0.56	0.73	0.51	0.31	0.50	0.43	0.48	0.82	0.70	0.50	0.76	0.54	0.51	0.27	0.54
2a	0.59	0.71	0.53	0.36	0.54	0.44	0.52	0.79	0.69	0.54	0.77	0.56	0.53	0.31	0.53
3a	0.34	0.71	0.50	0.30	0.54	0.42	0.44	0.75	0.69	0.54	0.67	0.53	0.51	0.23	0.55
4a	0.37	0.68	0.50	0.31	0.55	0.42	0.46	0.74	0.69	0.56	0.69	0.52	0.52	0.24	0.52
5a	0.55	0.72	0.50	0.22	0.52	0.42	0.46	0.85	0.75	0.55	0.81	0.50	0.54	0.14	0.51
6a	0.58	0.70	0.51	0.25	0.55	0.44	0.51	0.83	0.74	0.57	0.82	0.52	0.55	0.17	0.52
7a	0.37	0.70	0.50	0.21	0.54	0.42	0.45	0.75	0.70	0.55	0.71	0.53	0.51	0.18	0.53
8a	0.39	0.69	0.51	0.23	0.55	0.42	0.48	0.75	0.71	0.58	0.73	0.52	0.52	0.19	0.52
9a	0.58	0.74	0.51	0.31	0.51	0.43	0.51	0.77	0.67	0.49	0.73	0.54	0.49	0.30	0.55
10a	0.60	0.71	0.53	0.36	0.54	0.45	0.56	0.76	0.66	0.53	0.74	0.55	0.51	0.34	0.53
11a	0.34	0.71	0.50	0.30	0.54	0.42	0.44	0.75	0.69	0.54	0.67	0.53	0.51	0.23	0.55
12a	0.37	0.68	0.50	0.31	0.55	0.42	0.46	0.74	0.69	0.56	0.69	0.52	0.52	0.24	0.52
13a	0.58	0.72	0.50	0.24	0.51	0.42	0.50	0.81	0.71	0.53	0.78	0.51	0.51	0.17	0.52
14a	0.60	0.70	0.52	0.27	0.54	0.44	0.55	0.79	0.71	0.56	0.79	0.53	0.53	0.20	0.52
15a	0.37	0.70	0.50	0.21	0.54	0.42	0.45	0.75	0.70	0.55	0.71	0.53	0.51	0.18	0.53
16a	0.39	0.69	0.51	0.23	0.55	0.42	0.48	0.75	0.71	0.58	0.73	0.52	0.52	0.19	0.52
17a	0.50	0.70	0.51	0.35	0.57	0.49	0.41	0.84	0.74	0.54	0.83	0.59	0.56	0.23	0.52
18a	0.54	0.68	0.53	0.39	0.62	0.53	0.48	0.82	0.74	0.59	0.84	0.63	0.59	0.26	0.54
19a	0.35	0.68	0.51	0.36	0.60	0.49	0.37	0.78	0.73	0.56	0.74	0.57	0.57	0.21	0.51
20a	0.40	0.66	0.53	0.39	0.61	0.52	0.42	0.79	0.75	0.60	0.78	0.60	0.59	0.23	0.53

Scenario	SWTH	TEWA	TOWA	VATH	VEER	WBNU	WCSP	WETA	WEWP	WIWA	WIWR	WTSP	WWCR	YBFL	YWAR
21a	0.51	0.69	0.51	0.26	0.60	0.50	0.40	0.85	0.77	0.56	0.84	0.56	0.58	0.13	0.52
22a	0.55	0.68	0.53	0.30	0.63	0.53	0.46	0.84	0.77	0.60	0.85	0.61	0.60	0.15	0.54
23a	0.38	0.68	0.51	0.30	0.59	0.49	0.41	0.77	0.74	0.58	0.76	0.56	0.56	0.15	0.52
24a	0.42	0.67	0.53	0.33	0.61	0.52	0.45	0.78	0.75	0.61	0.79	0.59	0.58	0.18	0.53
25a	0.53	0.70	0.51	0.37	0.58	0.50	0.44	0.78	0.69	0.53	0.79	0.57	0.53	0.27	0.52
26a	0.57	0.68	0.53	0.40	0.63	0.55	0.51	0.77	0.69	0.58	0.80	0.61	0.56	0.30	0.54
27a	0.35	0.68	0.51	0.36	0.60	0.49	0.37	0.78	0.73	0.56	0.74	0.57	0.57	0.21	0.51
28a	0.40	0.66	0.53	0.39	0.61	0.52	0.42	0.79	0.75	0.60	0.78	0.60	0.59	0.23	0.53
29a	0.54	0.69	0.51	0.29	0.60	0.52	0.43	0.80	0.73	0.55	0.81	0.54	0.55	0.16	0.52
30a	0.58	0.68	0.53	0.33	0.63	0.55	0.49	0.79	0.72	0.59	0.82	0.59	0.57	0.19	0.54
31a	0.38	0.68	0.51	0.30	0.59	0.49	0.41	0.77	0.74	0.58	0.76	0.56	0.56	0.15	0.52
32a	0.42	0.67	0.53	0.33	0.61	0.52	0.45	0.78	0.75	0.61	0.79	0.59	0.58	0.18	0.53
33a	0.55	0.68	0.51	0.36	0.46	0.45	0.49	0.85	0.73	0.56	0.83	0.57	0.56	0.31	0.52
34a	0.59	0.66	0.53	0.42	0.51	0.49	0.56	0.81	0.72	0.61	0.82	0.61	0.58	0.36	0.54
35a	0.35	0.67	0.51	0.34	0.57	0.46	0.41	0.75	0.72	0.58	0.70	0.55	0.55	0.25	0.52
36a	0.42	0.66	0.53	0.40	0.60	0.50	0.47	0.72	0.71	0.62	0.71	0.58	0.56	0.30	0.54
37a	0.55	0.65	0.51	0.30	0.49	0.46	0.50	0.86	0.76	0.60	0.84	0.54	0.58	0.19	0.52
38a	0.59	0.64	0.53	0.34	0.54	0.50	0.55	0.82	0.76	0.63	0.83	0.61	0.60	0.22	0.54
39a	0.39	0.66	0.51	0.33	0.56	0.48	0.46	0.75	0.72	0.60	0.74	0.54	0.55	0.23	0.52
40a	0.43	0.65	0.53	0.38	0.60	0.51	0.51	0.72	0.71	0.63	0.74	0.58	0.56	0.26	0.54
41a	0.56	0.69	0.51	0.37	0.48	0.47	0.50	0.83	0.70	0.54	0.81	0.55	0.54	0.34	0.52
42a	0.60	0.66	0.54	0.43	0.53	0.51	0.57	0.79	0.70	0.59	0.81	0.60	0.56	0.40	0.54
43a	0.35	0.67	0.51	0.34	0.57	0.46	0.41	0.75	0.72	0.58	0.70	0.55	0.55	0.25	0.52
44a	0.42	0.66	0.53	0.40	0.60	0.50	0.47	0.72	0.71	0.62	0.71	0.58	0.56	0.30	0.54
45a	0.55	0.69	0.51	0.38	0.48	0.46	0.50	0.82	0.70	0.55	0.80	0.55	0.54	0.35	0.52
46a	0.59	0.65	0.54	0.43	0.53	0.51	0.57	0.79	0.70	0.60	0.80	0.60	0.56	0.40	0.54
47a	0.36	0.67	0.51	0.35	0.56	0.46	0.42	0.75	0.72	0.58	0.71	0.56	0.55	0.26	0.52
48a	0.40	0.66	0.53	0.40	0.59	0.50	0.48	0.73	0.71	0.62	0.72	0.59	0.56	0.31	0.53
49a	0.64	0.78	0.59	0.62	0.43	0.43	0.55	0.82	0.71	0.52	0.75	0.49	0.58	0.64	0.56
50a	0.69	0.72	0.60	0.68	0.48	0.47	0.61	0.82	0.74	0.58	0.79	0.53	0.61	0.72	0.60

Scenario	SWTH	TEWA	TOWA	VATH	VEER	WBNU	WCSP	WETA	WEWP	WIWA	WIWR	WTSP	WWCR	YBFL	YWAR
51a	0.39	0.74	0.55	0.64	0.44	0.43	0.48	0.68	0.62	0.47	0.60	0.49	0.53	0.59	0.50
52a	0.49	0.69	0.56	0.69	0.49	0.48	0.55	0.69	0.63	0.51	0.63	0.52	0.56	0.66	0.53
53a	0.63	0.75	0.56	0.63	0.43	0.43	0.57	0.82	0.72	0.54	0.75	0.48	0.59	0.67	0.56
54a	0.68	0.70	0.58	0.69	0.48	0.47	0.63	0.83	0.74	0.59	0.79	0.53	0.62	0.74	0.59
55a	0.39	0.74	0.55	0.65	0.43	0.43	0.50	0.69	0.62	0.47	0.61	0.49	0.54	0.61	0.50
56a	0.44	0.70	0.56	0.70	0.48	0.47	0.55	0.69	0.64	0.51	0.63	0.53	0.56	0.69	0.52
57a	0.67	0.80	0.58	0.66	0.43	0.45	0.59	0.77	0.66	0.50	0.69	0.48	0.55	0.72	0.56
58a	0.71	0.74	0.60	0.71	0.48	0.49	0.66	0.79	0.70	0.56	0.75	0.52	0.59	0.78	0.59
59a	0.39	0.74	0.55	0.64	0.44	0.43	0.48	0.68	0.62	0.47	0.60	0.49	0.53	0.59	0.50
60a	0.49	0.69	0.56	0.69	0.49	0.48	0.55	0.69	0.63	0.51	0.63	0.52	0.56	0.66	0.53
61a	0.68	0.69	0.46	0.47	0.46	0.45	0.60	0.82	0.73	0.55	0.77	0.47	0.60	0.39	0.54
62a	0.71	0.67	0.53	0.50	0.50	0.48	0.65	0.82	0.75	0.59	0.79	0.53	0.62	0.43	0.59
63a	0.43	0.73	0.52	0.53	0.45	0.44	0.54	0.70	0.64	0.51	0.64	0.48	0.55	0.52	0.51
64a	0.48	0.69	0.54	0.57	0.50	0.48	0.58	0.70	0.64	0.54	0.66	0.52	0.57	0.57	0.54