

<p>You don't need a magnifying glass to see that the world is changing. Insects are already showing us. They appear only briefly in the Global Environment Outlook 7 (GEO-7), but together their stories reveal one of the clearest signals of a planet under strain.</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">Across rivers, forests, meadows, farms, and cities, insects are shifting their ranges, disappearing from familiar places, and rising in others. The GEO-7 report captures these changes like flashes of light scattered through its chapters: sometimes a chart, sometimes a paragraph, sometimes a single alarming number.</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">Put together, those flashes form a picture of profound transformation.</p> <p class="MsoNormal" style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt; margin-left:0cm;text-align:justify">Freshwater Insects: A Crisis Hidden Below the Surface</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">One of the starkest warnings comes from freshwater ecosystems. GEO-7 reports at least 89 documented freshwater species extinctions and 178 more suspected—a total of 267 losses across fish and invertebrates [p. 279].</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">But the report immediately notes something more troubling: the diversity, distribution, and abundance of many freshwater invertebrates—including aquatic insects—is "much less understood" than those of vertebrates [p. 279]. Even so, the data we do have show declines across major insect groups worldwide.</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">Among the invertebrates that have been assessed:</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l3 level1 lfo1; tab-stops:list 36.0pt">· Decapods (crabs, shrimp) have the highest proportion of threatened species—about 30% [p. 279].</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l3 level1 lfo1; tab-stops:list 36.0pt">· Odonates (dragonflies and damselflies) follow at 16% [p. 279].</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">These losses are unfolding fastest in tropical regions of South America, Africa, Southeast Asia, and the central United States—areas where biodiversity is richest, and monitoring is most limited [p. 279].</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">Meanwhile, the spread of aquatic invasive species, many of them invertebrates, has cost the global economy US\$345 billion since 1971. In North America alone, invasive invertebrates have caused the most damage to water infrastructure and resources [p. 281].</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify"><span

style="font-family:Helvetica">While infrastructure records are detailed down to the dollar, the lives of many native insects—much smaller, more numerous, and ecologically essential—remain largely unmapped.</p> <p class="MsoNormal" style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt; margin-left:0cm;text-align:justify">Pesticides Rising as Farmland Shrinks</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">Further on in the report, a troubling pattern emerges. Global agricultural land has been shrinking since 2000, yet pesticide use continues to rise [Figure 6.2, p. 266].</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">More chemicals on less land means greater runoff into streams, rivers, and wetlands. GEO-7 identifies pollution from fertilizers, pesticides, and herbicides as a significant source of freshwater degradation, often intensified by heavy rain, snowmelt, or poor irrigation systems [p. 266].</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">For the creatures living at the bottom of food chains—larval mayflies, caddisflies, beetles, midges—these chemical pressures can alter entire life cycles, long before humans notice the water has changed.</p> <p class="MsoNormal" style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt; margin-left:0cm;text-align:justify">Pollinators on the Move</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">The most vivid insect image in GEO-7 is tucked into a regional chapter. A full-page illustration shows bees and butterflies shifting their ranges across mountain slopes, forests, meadows, and agricultural land [Figure 8.29, p. 413].</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">The species include:</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l1 level1 lfo2; tab-stops:list 36.0pt">•Western bumble bee (Bombus occidentalis</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l1 level1 lfo2; tab-stops:list 36.0pt">•Hunt’s bumble bee (B. huntii</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l1 level1 lfo2; tab-stops:list 36.0pt">•Franklin’s bumble bee (B. franklini</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l1 level1 lfo2; tab-stops:list 36.0pt">•Rusty patched bumble bee (B. affinis</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l1 level1 lfo2; tab-stops:list 36.0pt">•Western honey bee (<span style="font-

family: Helvetica">Apis mellifera</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l1 level1 lfo2; tab-stops:list 36.0pt">· Karner blue (Lycaeides melissa samuelis)</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l1 level1 lfo2; tab-stops:list 36.0pt">· Edith's checkerspot (Euphydryas editha)</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l1 level1 lfo2; tab-stops:list 36.0pt">· Cabbage white (Pieris rapae)</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l1 level1 lfo2; tab-stops:list 36.0pt">· Gulf fritillary (Agraulis vanillae)</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">Some species are contracting into smaller ranges. Some are shifting into new territory. Others are expanding. GEO-7 describes these as complex shifts driven by changing climate conditions [p. 413].</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">Pollinators don't move alone. Their plants shift with them—or fail to. These changes ripple into farming communities, food systems, and rural economies. GEO-7 highlights that heat, altered rainfall, and pollinator decline are now deeply interconnected challenges for many regions [p. 414].</p> <p class="MsoNormal" style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt; margin-left:0cm;text-align:justify">Mosquitoes and Ticks Expanding Into New Regions</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">The report also documents the rise of mosquitoes and ticks, which are becoming more widespread as temperatures warm [p. 414].</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">Across parts of Europe and North America, GEO-7 describes increases in diseases linked to expanding insect vectors, including:</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l2 level1 lfo3; tab-stops:list 36.0pt">· West Nile fever</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l2 level1 lfo3; tab-stops:list 36.0pt">· Lyme disease</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l2 level1 lfo3; tab-stops:list 36.0pt">· Lyme disease</p>

style="mso-list:Ignore">·
Tick-borne encephalitis</p> <p
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indent:-18.0pt;mso-list:l2 level1 lfo3; tab-stops:list 36.0pt"><span style="font-size:10.0pt; mso-bidi-font-
size:12.0pt;font-family:Symbol;mso-fareast-font-family:Symbol; mso-bidi-font-family:Symbol"><span
style="mso-list:Ignore">·
Bluetongue</p> <p style="margin-
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18.0pt;mso-list:l2 level1 lfo3; tab-stops:list 36.0pt"><span style="font-size:10.0pt; mso-bidi-font-
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Leishmaniasis</p> <p style="margin-
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size:12.0pt;font-family:Symbol;mso-fareast-font-family:Symbol; mso-bidi-font-family:Symbol"><span
style="mso-list:Ignore">·
Malaria</p> <p style="margin-
top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify"><span style="font-
family:Helvetica">These trends, the report notes, are directly tied to <span style="font-
family:Helvetica; font-weight:normal">shifts in both vector populations and the pathogens they
carry, primarily driven by warming climates [p. 414].</p> <p style="margin-
top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify"><span style="font-
family:Helvetica">For many communities, this means encountering diseases that were once considered
“tropical” or limited to distant regions. The insects arrive first. The health risks follow.</p> <p
class="MsoNormal" style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt; margin-left:0cm;text-
align:justify"><span style="font-family:Helvetica; mso-bidi-font-family:" times="" new=""
roman";mso-bidi-theme-font:minor-bidi""="">Insects at the Intersection of Global
Change</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-
left: 0cm;text-align:justify">Once the pieces are assembled, a clear
through-line emerges in GEO-7:</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-
bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l0 level1 lfo4; tab-stops:list
36.0pt"><span style="font-size:10.0pt; mso-bidi-font-size:12.0pt;font-family:Symbol;mso-fareast-font-
family:Symbol; mso-bidi-font-family:Symbol">·
Freshwater
insects are declining, with significant knowledge gaps about their status [p. 279].</p> <p
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style="mso-list:Ignore">·
Pollinators are shifting or shrinking their
ranges as climate conditions change [p. 413].</p> <p style="margin-top:6.0pt;margin-
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family:Symbol;mso-fareast-font-family:Symbol; mso-bidi-font-family:Symbol"><span style="mso-
list:Ignore">· <span
style="font-family:Helvetica">Disease-carrying insects are expanding into new territories [p.
414].</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left:
36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l0 level1 lfo4; tab-stops:list 36.0pt"><span style="font-
size:10.0pt; mso-bidi-font-size:12.0pt;font-family:Symbol;mso-fareast-font-family:Symbol; mso-bidi-font-
family:Symbol">·<span style="font:7.0pt " times="" new=""
roman""=""> Invasive invertebrates are
spreading and costing billions [p. 281].</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-
bottom:6.0pt;margin-left: 36.0pt;text-align:justify;text-indent:-18.0pt;mso-list:l0 level1 lfo4; tab-stops:list
36.0pt"><span style="font-size:10.0pt; mso-bidi-font-size:12.0pt;font-family:Symbol;mso-fareast-font-

family:Symbol; mso-bidi-font-family:Symbol">· Pesticide use is rising globally, with consequences for waterways and biodiversity [p. 266].</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">Insects are not minor characters in the global environmental narrative. They are early indicators—responding quickly to temperature, water quality, pollution, and land use.</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">When their movements become erratic, when their numbers dip or explode, they broadcast a signal that ecosystems are being rearranged.</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">The GEO-7 report, without ever dedicating a chapter solely to insects, ends up telling one of the most essential insect stories yet:</p> <p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">The smallest creatures on Earth are tracing the outlines of planetary change before our eyes.</p><p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify"> </p><p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">
</p><p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">Source:</p><p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify">United Nations Environment Programme (2025). Global Environment Outlook 7: A future we choose – Why investing in Earth now can lead to a trillion-dollar benefit for all. Nairobi. https://wedocs.unep.org/handle/20.500.11822/49014</p><p style="margin-top:6.0pt;margin-right:0cm;margin-bottom:6.0pt;margin-left: 0cm;text-align:justify"><style>@font-face {font-family:Helvetica; panose-1:0 0 0 0 0 0 0 0; mso-font-charset:0; mso-generic-font-family:auto; mso-font-pitch:variable; mso-font-signature:-536870145 1342208091 0 0 415 0;}@font-face {font-family:"Cambria Math"; panose-1:2 4 5 3 5 4 6 3 2 4; mso-font-charset:0; mso-generic-font-family:roman; mso-font-pitch:variable; mso-font-signature:-536870145 1107305727 0 0 415 0;}@font-face {font-family:Calibri; panose-1:2 15 5 2 2 2 4 3 2 4; mso-font-charset:0; mso-generic-font-family:swiss; mso-font-pitch:variable; mso-font-signature:-520082689 -1073697537 9 0 511 0;}p.MsoNormal, li.MsoNormal, div.MsoNormal {mso-style-unhide:no; mso-style-qformat:yes; mso-style-parent:""; margin:0cm; mso-pagination:widow-orphan; font-size:12.0pt; font-family:"Calibri",sans-serif; mso-ascii-font-family:Calibri; mso-ascii-theme-font:minor-latin; mso-fareast-font-family:Calibri; mso-fareast-theme-font:minor-latin; mso-hansi-font-family:Calibri; mso-hansi-theme-font:minor-latin; mso-bidi-font-family:"Times New Roman"; mso-bidi-theme-font:minor-bidi; mso-font-kerning:1.0pt; mso-ligatures:standardcontextual; mso-fareast-language:EN-US;}p {mso-style-priority:99; mso-margin-top-alt:auto; margin-right:0cm; mso-margin-bottom-alt:auto; margin-left:0cm; mso-pagination:widow-orphan; font-size:12.0pt; font-family:"Times New Roman",serif; mso-fareast-font-family:"Times New Roman";}.MsoChpDefault {mso-style-type:export-only; mso-default-props:yes; font-family:"Calibri",sans-serif; mso-ascii-font-family:Calibri; mso-ascii-theme-font:minor-latin; mso-fareast-font-family:Calibri; mso-fareast-theme-font:minor-latin; mso-hansi-font-family:Calibri; mso-hansi-theme-font:minor-latin; mso-bidi-font-family:"Times New Roman"; mso-bidi-theme-font:minor-bidi; mso-fareast-language:EN-US;}div.WordSection1 {page:WordSection1;}</style>
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