

Environment The Insects Are Moving, and the Planet Is Sending a Warning

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.

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.

Put together, those flashes form a picture of profound transformation.

Freshwater Insects: A Crisis Hidden Below the Surface

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].

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.

Among the invertebrates that have been assessed:

- Decapods** (crabs, shrimp) have the highest proportion of threatened species—about 30% [p. 279].
- Odonates** (dragonflies and damselflies) follow at 16% [p. 279].

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].

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].

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>

Tick-borne encephalitis

Bluetongue

Leishmaniasis

Malaria

These trends, the report notes, are directly tied to shifts in both vector populations and the pathogens they carry, primarily driven by warming climates [p. 414].

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.

Insects at the Intersection of Global Change

Once the pieces are assembled, a clear through-line emerges in GEO-7:

Freshwater insects are declining, with significant knowledge gaps about their status [p. 279].

Pollinators are shifting or shrinking their ranges as climate conditions change [p. 413].

Disease-carrying insects are expanding into new territories [p. 414].

Invasive invertebrates are spreading and costing billions [p. 281].

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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