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[Home](#) > [News](#) > [Daily News Archive](#) > [2009](#) > [January](#) > [7 January \(Berardelli\)](#)

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Outshone. Glossy automotive paints can lure some insects, such as this water beetle, into mistakenly laying their eggs.

CREDIT: G. HORVATH *ET AL.*, *FRONTIERS IN ECOLOGY AND THE ENVIRONMENT* (2009).

When a Building Is Like a Pond

By Phil Berardelli
ScienceNOW Daily News
 7 January 2009

Talk about a mirage. If the light is right, what we see as a black plastic bag can look like an inviting pool of water to a dragonfly. According to a new study, many dark, shiny surfaces, including buildings, asphalt roads, and even gravestones, can confuse--and ultimately harm--insects and other animals because of the way they reflect light. The findings could spur an effort to reduce the phenomenon researchers call polarized light pollution.

The sun emits light in a chaotic pattern, with light waves traveling in all directions. But once they pierce Earth's atmosphere, or reflect off bodies of water, the waves become more organized, traveling in one direction only. This polarized light creates very little glare and offers a clear path to its origins, where habitat and food may await waterborne creatures. "It turns out that the most reliable way [for some animals] to find water is to orient toward strong sources of polarized light," says ecologist Bruce Robertson of Michigan State University in East Lansing.

The problem, as Robertson and colleagues report online today in *Frontiers in Ecology and the Environment*, is that as people and their structures have taken over more and more of the planet's land area, they have created "ecological traps" by generating artificial sources of polarized light. In a series of optical studies, the researchers compared the light polarization caused by artificial surfaces with the same effect caused naturally by water. They found that any smooth, dark surface returns an even stronger polarized light signature than water does, and the effect is particularly pronounced with shiny dark surfaces. Humans are building "structures that look more like water to animals than water," says Robertson.

That's bad news for animals that rely on polarized light to guide them to food or good nesting locales. Indeed, Robertson and colleagues found cases of waterborne insects such as stoneflies and water beetles laying eggs on asphalt and the roof of a red car, respectively. Polarized light pollution might even be the reason dead sea turtles have been found to have ingested plastic bags, Robertson says, because the turtles could have mistaken the bags' polarized light signature for that of one of their favorite prey: the jellyfish.

This is important research that shows how human activity "can create a whole lot of problems for ecosystems that are inadvertent," says visual neuroscientist Barrie Frost of Queen's University in Kingston, Canada. Although there's not

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much quantitative work in the paper on the direct effects of polarized light pollution, Frost says it effectively points out how the phenomenon is much more widespread than anyone could have expected. "They've made a very strong case, and if this information becomes more widely known, then hopefully our engineers and architects can redress the problem," he says.

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