

# MODELING WILDLIFE POPULATIONS AT THE WESTERN ECOLOGY DIVISION

## Program to Assist Tracking Critical Habitat (PATCH)

**Spatial models developed at the Western Ecology Division predict changes in wildlife populations from pesticide use, pollutants, and changing landscapes.**



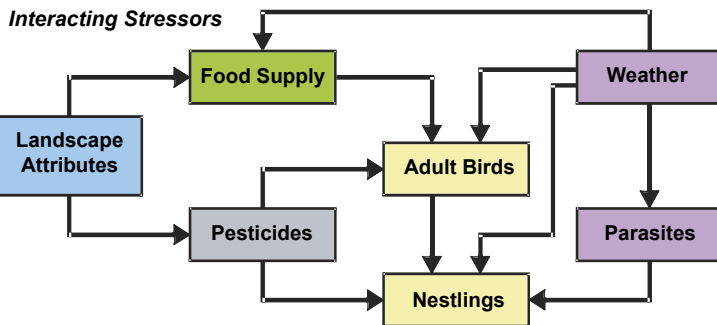
how pesticides affect animals in natural environments and changing landscapes. There are, unfortunately, no methods currently available that can do this well.

Our research is developing a computer model called PATCH that will make predictions about effects of pesticides on wild bird populations.

The PATCH model incorporates the range of disturbances found at watershed and larger landscape scales.

### Wildlife at Risk

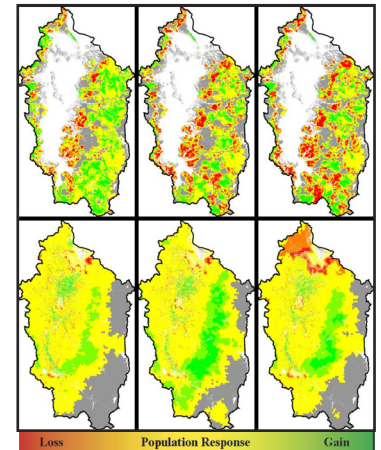
Hundreds of chemicals are used in agriculture every year to increase crop yields and enhance the look and flavor of produce. Over 2,000 new chemicals are registered annually for use in manufacturing. These and other toxins are discharged to the environment and can poison wildlife. When setting regulations for managing pesticide and chemical use, the EPA looks at potential harm to wildlife. But our ability to accurately predict effects from chemicals has been limited. Outside of the laboratory, other natural stress factors, such as weather extremes, parasites, and predators can quickly take on greater importance than simple exposure to the chemical(s) alone. And how the animals use increasingly fragmented habitats across a landscape certainly affects the frequency of their exposure to toxics. Our challenge is to bring all of this information together for use when regulating chemical production, use, or discharge.



### PATCH Model

The PATCH model balances realism with parsimony, and flexibility. *Realism* captures complex habitat patterns plus natural and human-induced stressors, all in an ever-changing landscape. *Parsimony* means the model includes only the minimal set of critical data. This ensures that results are responsibly and appropriately used. Finally, flexibility allows us to be responsive to new, unforeseen challenges as they occur. An equally significant principle is the need for these research products to be useful in a regulatory setting that is characterized by rapid deadlines and intense scrutiny. This research program will culminate in the delivery of a simulation model that meets all of these criteria.

### Changing Landscapes



### Pesticide Effects

Historically, chemical risk assessments have focused on impacts to individual animals, and have estimated only those effects caused by direct toxicity following exposure. However, EPA's Office of Pesticide Programs (OPP), through a cooperative effort with multiple stakeholders, has been challenged to develop risk assessment tools that address impacts to whole populations or communities of birds. Such methods need to include information about

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