Sample Study 3: Honey Suckle in Happy Valley

Background Info: The Japenese honey suckle found its way to Happy Valley by human introduction and became prevalent in the 1990's. Honeysuckle is a fragrant, vining plant flowering from spring to summer. The woody plant with small trumpet-like flowers is attractive to pollinators such as bees, butterflies and hummingbirds. These climbing plants need support for vertical growth with profuse blooms.

Happy Valley Study: Happy Valley is a community in Pennsylvania that is home to Penn State. Tomás Carlo, an assistant professor of biology, and Jason Gleditsch, a graduate student, have studied how invasive fruiting plants affect ecosystems and how those effects, contrary to prevailing ideas, sometimes can be beneficial to an ecological community. The team's research, which will be published in the journal Diversity and Distributions, is expected to affect the way environmental resource managers respond to ecosystem maintenance. "Among conservation biologists, ecologists, and managers, the default approach is to try to eliminate and root out non-native, invasive shrubs -- anything that seems to change an ecosystem," Carlo said. "The fundamental goal is to return a natural area to its original, pristine state, with the native species occupying the dominant position in the community. But the problem is that most native communities

already have been changed beyond recognition by humans, and many native species are now rare." Carlo explained that his team wanted to test whether certain well-established, invasive fruiting species have negative or positive effects on bird and fruiting-plant communities. "We wondered: Are we sometimes doing more harm than good when we eradicate plants that, despite being introduced recently, have formed positive relationships with native animals?" To be considered invasive, a species of plant must have been introduced by humans, and it must be dominant numerically in the new environment.
To test the impact of an invasive fruiting-plant species on native bird communities, Carlo and Gleditsch sectioned off an area of central Pennsylvania known as the Happy Valley region, where honeysuckle -- a non-native fruiting plant that is considered invasive -- grows in abundance. They then assessed the abundance of bird species and fruiting plants -- including honeysuckle -- within the area. After comparing their data with similar data from urban, agricultural, and forested areas, they determined that the abundance of honeysuckle predicted the numbers and diversity of birds within the region and even beyond the region. That is, the honeysuckle and bird communities had formed a relationship known as mutualism -- a term that describes how two or more species interact by benefitting mutually from each other's existence.

What did the study find: They found that the invading honeysuckle and the local bird population had formed a mutually beneficial relationship: the honeysuckle provides food for the birds, and the birds disperse seeds for the honeysuckle, helping it spread.
Carlo explained that returning this particular ecosystem to its honeysuckle-free state could harm many species of native birds that now seem to rely on honeysuckle as a major food source.
In addition, the honeysuckle also provided benefits for a plant species native to Happy Valley American nightshade." The same birds that ate the honeysuckle also ate the American nightshade, dispersing the seeds of both plants. It's a win-win-win for all three: the birds, the honeysuckle and the nightshades," Carlo said. Carlo said that Pennsylvania's population of fruit-eating birds, such as robins and catbirds, is three or four times higher than just 30 years ago, especially in landscapes with high human populations. He said the change suggests that while some invasive, human-introduced plants are definitely problematic, others could serve to restore ecological balance by providing food to native migratory birds that live in areas affected by humans.

Additional Info: In addition, Carlo explained, while eliminating an invasive species could result in harm to the newly formed balance of an ecosystem, large-scale attempts to remove species also could be a waste of time and tax dollars. He explained that when managers and agencies attempt to eradicate an invasive plant from a particular ecosystem, the species often ends up growing back anyway. "Nature is in a constant state of flux, always shifting and readjusting as new relationships form between species, and not all of these relationships are bad just because they are novel or created by humans," Carlo said. "We need to be more careful about shooting first and asking questions later -- assuming that introduced species are inherently harmful. We should be asking: Are we responding to real threats to nature or to our cultural perception and scientific bias?"