

## **A Sweet and Sour Celebration**

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# BioScience®

**A Forum for Integrating the Life Sciences**  
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## A Sweet and Sour Celebration

This month marks the 40th anniversary of President Richard Nixon's signing into law of the Endangered Species Act (ESA). This legislation—calling it *epochal* does not seem too much of a stretch—continues to provide federal impetus for vital protections now in place for thousands of species and has led to actions that have improved the prospects for many. But the (since modified) act is also undeniably flawed in numerous ways that have been much debated in the pages of *BioScience*.

Sometimes, technical analyses of how the act has succeeded and failed can make it easy to lose sight of the bigger picture. Readers may therefore welcome the Viewpoint article starting on page 924 of this issue, in which Jamie Rappaport Clark, president and chief executive officer of Defenders of Wildlife, provides her short-form summary of important changes she would like to see. It is notable that the changes she describes are, for pragmatic reasons, not in the act itself, but in how government agencies implement its mandated actions.

Unsurprisingly, perhaps, a lack of relevant information and essential funding, combined, in many cases, with stiff political opposition, hobbles many attempts to live up to the legislation's goals. This candid assessment—from a former head of the US Fish and Wildlife service who has been in the front lines outside government ever since—provides a valuable perspective on how a law inspired by heady ideals has, despite its victories, so often failed to provide needed protection or has provided too little too late.

A likely case in point is the proposal of the National Oceanic and Atmospheric Administration (NOAA) to list 66 coral species as *endangered* or *threatened* under the act. The proposal, made under the pressure of a lawsuit, was issued over a year ago, but a decision expected before the end of 2013 has been pushed back into 2014 while more data are assembled. Two coral species that were protected earlier under the ESA have reportedly shown some gains.

Yet, there is ample room to doubt that any action of NOAA, or similar efforts in other countries, will be adequate to slow the accelerating worldwide losses of corals, as Charles Birkeland and his colleagues argue persuasively in the article that begins on page 967. Their careful dissection of the interactions of many known density-dependent threats to corals with density-independent factors, such as warming and ocean acidification, provides plenty of reasons to fear that marine reserves and other protected areas, valuable though they are, are unlikely to prevent many coral extinctions. Standard concepts in conservation, such as the idea that small populations are most vulnerable, may be positively misleading when they are applied to corals. Being sessile when mature, corals cannot escape a pervasive change, and their mode of reproduction is peculiarly vulnerable to changes in ocean conditions and population structure. The standard measures of abundance used in population assessments fail to capture this vulnerability. As a result, population declines can be expected—indeed, have been observed—in some corals within protected areas.

International agencies are waking up to the ominous threats of ocean warming and acidification. But, as with the ESA in the United States, they will need to use biological assessments informed by the best science to impose measures that could slow the multiple coral extinctions that are likely in the offing.

TIMOTHY M. BEARDSLEY  
Editor in Chief

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