



SYSTEM DIMENSIONS	CHEMICAL AND PHYSICAL	BIOLOGICAL COMPONENTS	HUMAN USES
Extent Pattern	Nutrients, Carbon, Oxygen Contaminants Physical	Plants and Animals Communities Ecological Productivity	Food, Fiber, and Water Recreation and Other Services

② Non-native Species

Non-native Species

Indicator Development Needed

What Is This Indicator, and Why Is It Important? This indicator will report the percentage of major estuaries with high, medium, or low influence by non-native species. Ratings of the degree of influence should incorporate both the number of different species present and the degree to which they occupy available habitat.

Non-native species often spread aggressively and crowd out species native to a region; they may act as predators or parasites of native species, cause diseases, compete for food or habitat, and alter habitat. These species—whose spread has been promoted by increased travel and trade—may also pose threats to human health

(e.g., exotic diseases and harmful algae) and economic well-being (e.g., loss of shellfish production). Non-native species are also called nonindigenous, exotic, alien, or introduced species; particularly aggressive species are termed “invasive.”

U.S. estuaries are now home to many non-native species. These include the Asian clam and the veined, or Asian, rapa whelk, which cause economic and ecological damage as they displace native clams and mussels, and the European green crab, which is blamed for the collapse of the soft-shelled clam industry in Maine. The problem is both worldwide and apparently growing: an introduced North American jellyfish has devastated the anchovy fishery in the Black Sea, and in San Francisco Bay three or four new non-native species are established each year.

Why Can't This Indicator Be Reported at This Time? There are neither nationwide monitoring programs for coastal non-native species nor agreed-upon methods for combining information on the number of species and the area they occupy into a single index. Individual studies have documented the occurrence of non-native species in major estuaries, but this information has not been gathered regularly or on a broad scale.

Discussion Several more decisions about the scope of this indicator are required: whether to focus on all non-natives or only on invasive species; whether North American species that are found outside their normal range should be treated as non-natives; and whether there is a time (e.g., 50 or 100 years) after which an introduced species is considered to be native.

The technical note for this indicator is on page 222.