

# OVERVIEW OF PROBLEMS AND BROAD-BRUSH SOLUTIONS

## CLIMATE DISRUPTION

*Reduce effects of climate disruption by decreasing greenhouse gas emissions, and by implementing adaptation strategies to deal with the consequences of climate change already underway.* Viable approaches include accelerating development and deployment of carbon-neutral energy technologies to replace fossil fuels; making buildings, transportation, manufacturing systems, and settlement patterns more energy-efficient; and conserving forests and regulating land conversion to maximize carbon sequestration. Adapting to the inevitable effects of climate change will be crucial for coastal areas threatened by sea-level rise; ensuring adequate water supplies to many major population centers; maintaining agricultural productivity; and for managing biodiversity and ecosystem reserves.

## EXTINCTIONS

*Slow the very high extinction rates that are leading to a global loss of biodiversity.* Viable approaches include assigning economic valuation to the ways natural ecosystems contribute to human well-being and managing all ecosystems, both in human-dominated regions and in regions far from direct human influence, to sustain and enhance biodiversity and ecosystem services. It will be critical to develop cross-jurisdictional cooperation to recognize and mitigate the interactions of global pressures (for example, climate change, ocean acidification) and local pressures (land transformation, overfishing, poaching endangered species, etc.).

## ECOSYSTEM TRANSFORMATION

*Minimize transformation of Earth's remaining natural ecosystems into farms, suburbs, and other human constructs.* Viable agricultural approaches include increasing efficiency in existing food-producing areas; improving food-distribution systems; and decreasing waste. Viable development approaches include enhancing urban landscapes to accommodate growth rather than encouraging suburban sprawl; siting infrastructure to minimize impacts on natural ecosystems; and investing in vital 'green infrastructure,' such as through restoring wetlands, oyster reefs, and forests to secure water quality, flood control, and boost access to recreational benefits.

## POLLUTION

*Curb the manufacture and release of toxic substances into the environment.* Viable approaches include using current science about the molecular mechanisms of toxicity and applying the precautionary principle (verification of no harmful effects) to guide regulation of existing chemicals and design of new ones. We have the knowledge and ability to develop a new generation of materials that are inherently far safer than what is available today.

## POPULATION GROWTH AND CONSUMPTION

*Bring world population growth to an end as early as possible and begin a gradual decline.* An achievable target is no more than 8.5 billion people by 2050 and a peak population size of no more than 9 billion, which through natural demographic processes can decrease to less than 7 billion by 2100. Viable approaches include ensuring that everyone has access to education, economic opportunities, and health care, including family planning services, with a special focus on women's rights.

*Decrease per-capita resource use, particularly in developed countries.* Viable approaches include improving efficiency in production, acquisition, trade, and use of goods and promoting environmentally-friendly changes in consumer behavior.

**O**verall, we urge the use of the best science available to anticipate most-likely, worst-case, and best-case scenarios for 50 years into the future, in order to emplace policies that guide for environmental health over the long-term as well as adapting to immediate crises.