

OCEANS

UNIVERSITY OF CALIFORNIA ALIANZA MX BINATIONAL WORKING GROUP

The University of California Alianza MX Binational Working Group on Oceans supports deeper understanding of the ocean as an essential shared resource. Industrialization in coastal urban areas and regulations on the exploitation of marine resources have the potential to affect the integrity of marine ecosystems in profound ways, including across international borders. Collaborative research offers the potential to support the implementation of new conservation and resource management strategies.

The working group provides a space to discuss emerging policy challenges and design research programs that can offer innovative solutions. By convening UC and Mexican experts on issues such as biodiversity, coastal resilience, and pollution, the working group allows participants to showcase projects and identify knowledge gaps through direct engagement among academic researchers and non-academic stakeholders.

These efforts build on a long history of research and policy collaboration on oceans between the UC system and Mexico, including numerous collaborative research projects co-funded by the UC Institute for Mexico & the United States (UC MEXUS) and Mexico's National Science & Technology Council (CONACYT, now known as CONAHCYT) and working papers prepared by members of the UC-Mexico Initiative.

Topics for Discussion

- Biodiversity
- Coastal Resilience
- Pollution

Biodiversity

Offshore ecosystems are major sources of biodiversity as well as economic activity for communities in both Mexico and the United States. Giant kelp forests stretching from central Baja California in Mexico to central California in the United States support high levels of species diversity and productivity as well as crucially important ecosystem services for humans in coastal regions, including acting as a reserve and sink for carbon dioxide. And commercial and recreational fishing for a broad range of aquatic species provides both revenue and jobs. Given the binational benefits and challenges of preserving biodiversity, research on effective species management strategies can provide insights that inform greater policy coordination.

Binational Issues

- **Giant kelp forests:** These habitats in the Northeastern Pacific anchor one of the most productive marine ecosystems on the planet, but they are also vulnerable to anthropogenic changes such as warming waters and reduced nutrients.
- **Overfishing:** Commercial fishing continues to take place in regions where fish stocks have been severely depleted, reducing not only the availability of important food sources but also key pillars of in local ecosystems.
- **Conservation:** Discharges and runoff via estuaries have led to changes in the temperature and salinity of coastal waters, particularly in the Gulf of California, thereby requiring new measures to protect threatened species.

Potential Research

- **Blue economy:** Transitioning towards sustainable utilization of ocean resources and generating new sources of economic activity, ensuring growth while safeguarding the health of marine environments.
- **Sustainable fishing:** Promoting and regulating responsible fishing practices through stronger monitoring and controls; reducing illegal, unreported, and unregulated fishing; and minimizing bycatch, discards, and waste in supply chains.
- **Binational coordination:** Implementing conservation and management strategies on a regional (and global) scale through diplomacy, including initiatives such as the UN Ocean Decade and High-Level Panel for a Sustainable Ocean Economy.

Coastal resilience

Both Mexico and the United States are home to many coastal communities that are vulnerable to the negative effects of climate change on sea levels, temperatures, salinity, and marine life. Natural habitats such as dunes, mangroves, and reefs are also frequently threatened by human activities in both countries. Actions to reduce risk or expand protection of coastal communities can also have a profound effect on resilience by improving their ability to adapt to changing conditions and mitigate disruptions. Research on coastal resilience allows the unique experiences of specific communities to inform higher-level economic and policy decisions with broad impact.

Binational Issues

- **Sea level rise:** Rising sea levels can lead to the inundation of low-lying areas, erosion of shorelines, damage to human infrastructure, and increased flows of salt water into estuaries and groundwater aquifers.
- **Extreme weather:** Increased temperature variability can generate extreme events such as storms and flooding in coastal regions where key aspects of human infrastructure are vulnerable to damage or destruction.
- **Algal blooms:** Rapid plankton growth can present a nuisance or have deleterious health effects, both for humans (including toxins) and for natural systems (by blocking access to sunlight and oxygen required to sustain life).
- **Climate justice:** Small and low-income communities that rely on marine resources are often vulnerable to climate change effects that threaten key sources of food and income, particularly from local fisheries.

Potential Research

- **Climate data:** Modeling the specific extreme weather effects of climate change, particularly in coastal communities that have limited access to other sources of income and economic opportunity.
- **Nature-based solutions:** Expanding and/or restoring key natural elements of natural infrastructure—including reefs, marshes, and mangroves—to reduce the likelihood of erosion and flooding or harmful algal blooms.
- **Insurance markets:** Catalyzing new investments in coastal resilience through the design and adoption of comprehensive risk indexes that account for specific challenges facing local communities.

Pollution

Pollution has a profound impact on both sides of the border in the Gulf of Mexico as well as the Pacific Ocean. Onshore runoff has contaminated beaches. Offshore plastic debris such as nylon fishing nets affects a wide range of habitats, from sea turtle nesting areas to sensitive mangrove communities. And exploitation of offshore mineral resources, from hydrocarbons production to mining,

Binational Issues

- **Plastic pollutants:** Inadequate systems for disposal and waste management have led to the formation of ocean garbage patches and increased amounts of microplastics, trends that can disrupt marine ecosystems and endanger marine life.
- **Wastewater and sediment:** Drainage of wastewater and storm water, coastal sedimentation due to land use practices, and disposal of dredged sediments all have significant effects on coastal ecosystems.
- **Undersea mining:** Exploitation of offshore mineral deposits may rely on techniques that can generate light and noise pollution, sediments affecting marine life, and geological disturbances to the seabed.

Potential Research

- **Environmental Impact:** Investigating the specific effects of transboundary flows of polluted water, offshore oil spills, and agricultural runoff—particularly on coastal communities—can help mitigate damages or facilitate cleanup and restoration.
- **Policy analysis:** Reviewing the effectiveness of Mexico's existing solid waste legislation and regulation of single-use plastics—including federal, state, and local measures—to determine the potential for expanded policy action that could limit plastic pollution.