Illegal, unreported, and unregulated (IUU) fishing poses a significant threat to ocean health, geopolitical stability, and global food security. As the ocean faces increasing levels of exploitation and resource depletion, IUU fishing has become a leading maritime security risk. This project, in partnership with the Allen Institute for AI (AI2), seeks to promote effective IUU fishing interventions through:

- Ensuring that investments in monitoring and enforcement result in quantifiable protection and marine resource restoration.
- Empowering ocean conservation stakeholders to invest in effective and efficient technology solutions.
- Identifying strategic engagements to guide philanthropic investment in IUU fishing prevention.

Results and contributions

Bioeconomic Model
Evaluated how enhanced IUU fishing enforcement impacts harvest, profits, and the conservation status of Indian Ocean yellowfin tuna.

Results demonstrate that investments in monitoring and enforcement lead to better long-term stock outcomes, reduced illegal fishing harvest, and higher overall harvest.

IUU Fishing Dashboard
Created an interactive, accessible web app to provide asset investment guidance for sustainable fisheries management stakeholders.

The app recommends monitoring strategies for different types of IUU fishing events based on user-defined parameters, including cost, jurisdiction, and data requirements.

Skylight Adoption Analysis
Analyzed the characteristics of countries that have adopted Skylight, a tool developed by AI2 to support IUU fishing monitoring efforts.

Our analysis identified three key indicators of Skylight adoption and 13 ‘likely adopter’ countries, enabling Skylight to target their engagement efforts and maximize philanthropic impact.
The IUU fishing dashboard has garnered interest from multiple ocean conservation stakeholders, including affiliates from the United Nations Environment Programme, the U.S. Coast Guard, and the U.S. State Department. Feedback from stakeholders and discussions with potential partner organizations will inform how the dashboard evolves, with the potential for it to be adapted to better fit specific needs within the IUU fishing deterrence space. Continued partnership with AI2 and other interested parties aligns with the goal for the dashboard to be a useful resource in the effort to end IUU fishing.

**PROJECT IMPACT**

The bioeconomic model, IUU fishing dashboard, and Skylight adoption analysis represent a multifaceted approach to address IUU fishing monitoring and enforcement challenges. The bioeconomic model examines management decisions in a complex system where agencies set science-driven quotas while fishers make profit-driven choices. The dashboard is an innovative tool that helps fisheries management stakeholders make decisions about technology investments that will fit their specific monitoring needs. The adoption analysis supports AI2’s outreach and engagement efforts by identifying likely candidates for expanding IUU fishing monitoring efforts. These results can also assist other philanthropic partners invest their resources more effectively. Together, these findings support agencies, nonprofits, and other ocean conservation stakeholders looking to tailor their respective strategies to better address IUU fishing and promote sustainable global marine resources management.

**Future Work**

The IUU fishing dashboard has garnered interest from multiple ocean conservation stakeholders, including affiliates from the United Nations Environment Programme, the U.S. Coast Guard, and the U.S. State Department.

*Figure 1:* (Left) Indian Ocean yellowfin tuna harvest (MT) over time, under different levels of enforcement. Illegal fishing (red) decreases with increased enforcement while cumulative total harvest increases.

*Figure 2:* (Right) Our logistic regression model found three key indicators of Skylight adoption. The most important are the size of a country’s exclusive economic zone (EEZ), followed by GDP per capita and the level of democracy, or “voice and accountability.”

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**Possible Monitoring Strategies**

**Sensor and Platform Pairings:**
- **Hornet** with Hi-Def Range Cameras
  - High-definition cameras paired with technologies and personnel for monitoring IUU fishing activities
  - Cameras with limited optical zoom capabilities designed for capturing fine details at close range

**Satellite Options:**
- **Sentinel-1:** Satellite that monitors Earth’s surface with radar imaging
  - **Sentinel-2:** Satellite that specializes in high-resolution optical imaging of Earth’s surface
  - **Landsat 8 & 9:** A series of Earth-observing satellite missions jointly managed by NASA and the USGS

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**SKYLIGHT**
A product of AI2