Gaps & Opportunities for Invasive Species Prevention

Brown tree snakes (Boiga irregularis) on Guam

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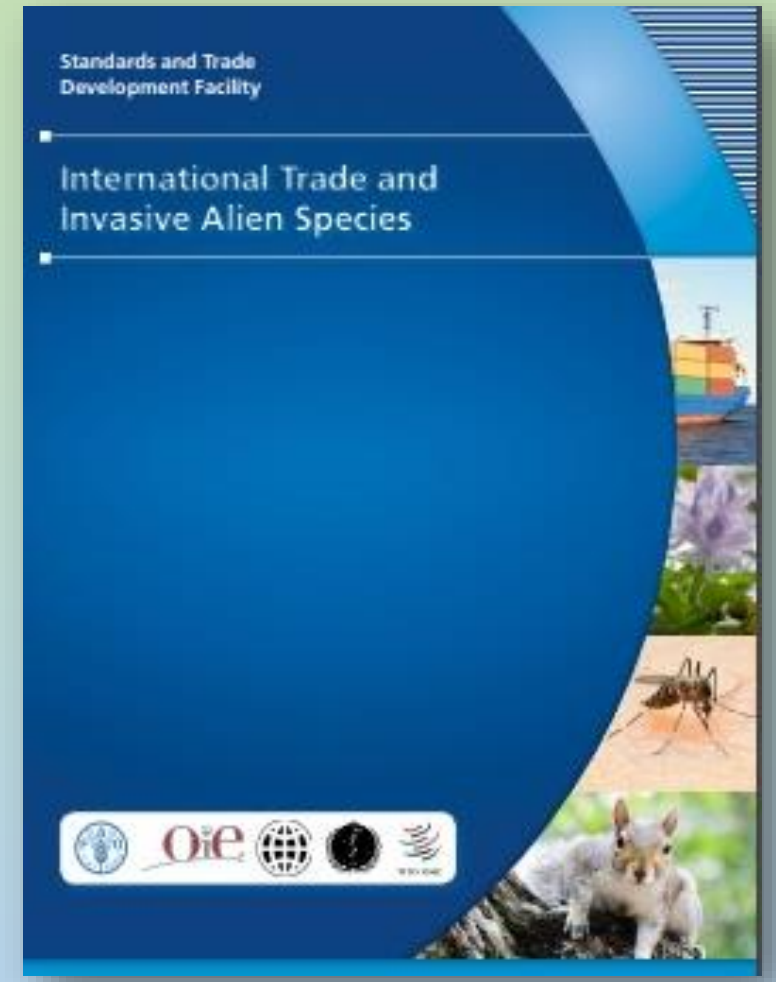
Hawai'i from the International Space Station by NASA

Invasive Species Prevention Issues

- **One of the most serious and rapidly growing threats** to biodiversity, ecosystem services, food, health, livelihood, security (IPBES 2018)
- **Trade is a main pathway** (Standards and Trade Development Facility 2012)
- **Disconnect between inspection and mitigation.** Inspection by agricultural agencies while control is responsibility of resource management agencies



Meta-analyses such as this 2012 report by the Standards and Trade Development Facility are helpful. http://www.standardsfacility.org/sites/default/files/STDF_IAS_EN_0.pdf

Invasive Species Prevention Issues (cont.)

- We know relatively little about the **interaction of pests of agriculture and factors related to climate change** (Ziska et al. 2010)
- Assessments **must also include these interactions and impacts on the environment that provides clean water, air**, and other vital resources
- **~25% of non-native species that became established were novel**—a consequence of **expanding trade networks and environmental change** (Seebens et al. 2018)
- ~**10-20%** of species introduced outside their native range **become invasive** (Williamson 1996, Arriaga et al. 2004)

Photo: Invasive and fire-prone fountain grass (*Pennisetum setaceum*) endangers dry forests and homes on Hawai‘i island

2020 Global Targets for the Prevention of Invasive Species…

- **Aichi Biodiversity Target 9:** *Pests and pathways identified and prioritized, priority species controlled or eradicated, measures in place to manage pathways to prevent introduction and establishment.*
- **UN SDG Goal Target 15.8:** *Measures introduced to prevent, reduce impact, control and eradicate priority species*.


ʻŌhiʻa lehua (Metrosideros polymorpha)

…globally, we are not on target

Prevention Challenges & Opportunities

- **Navigating federal rules and processes**
- **States' focus may not always align with federal agencies**
- **States are allies, but can do more with additional communication and collaboration**
- **Focus on science and policies for a changing world**

Photo: Endemic ʻōhiʻa lehua (*Metrosideros* spp.) are the foundational species in Hawaiʻi forests and culture. State and federal protection petitions are underway

Prevention Gaps and Opportunities

Example #1: Gap analyses are important!

- TSA-CBP inspects and enforces for some other agencies' authorities via MOA.
- CBP doesn't have authority to take action if human health vector species are encountered.
- CBP-CDC MOA needed for CBP to act (i.e. hold or treat the shipment).

Photo: One of the malaria vectors, *Anophelese merus* by James Gathany/CDC. There are more than 3000 species of mosquitoes in the world. The U.S. currently has fewer than 200 of these species. Further, an unknown number of animal and public health risks can arrive with any of these species.

Prevention Gaps and Opportunities

Example #2: Vessel Biofouling

- Vessel biofouling, the species that grow and are transported on the hulls and niche areas of vessels, is largely unregulated
- Underwater hull maintenance/cleaning can be a high risk pathway for some vessels
- New federal law changes how discharges from vessels (including underwater hull cleaning) are regulated in state waters
- Critical 4 year timeline for states to work with EPA and USCG to develop regs

Graphic: One year's worth of vessel traffic data show the connectivity and need to mitigate risks posed by biofouling and cleaning of vessel hulls in US waters and even between states or regions.

Prevention Gaps and Opportunities

Example #3: Science and Technology

- Reduce pest numbers in key areas, e.g., fruit flies in HI and BTS on Guam to reduce chances of spread
- Focus on enhancing regional biocontrol capacity
- Supporting new technologies, e.g., new technologies that could render mosquitoes unable to spread diseases

Photo: Wiliwili (*Erythrina sandwicensis*) by Rosa Say. Endemic wiliwili trees were threatened with extinction by an invasive gall wasp. A biological control species was found by the Hawai‘i Department of Agriculture, tested to ensure its efficacy and safety, and released, “reuniting” a pest with its natural control.