

The Arctic Invasive Alien Species (ARIAS) Strategy and Action Plan



Advancing Technologies to Prevent, Detect, and Eradicate
Invasive Alien Species

JAMIE K. REASER
U.S. NATIONAL INVASIVE SPECIES COUNCIL

OCTOBER 2018



ARIAS Strategy and Action Plan

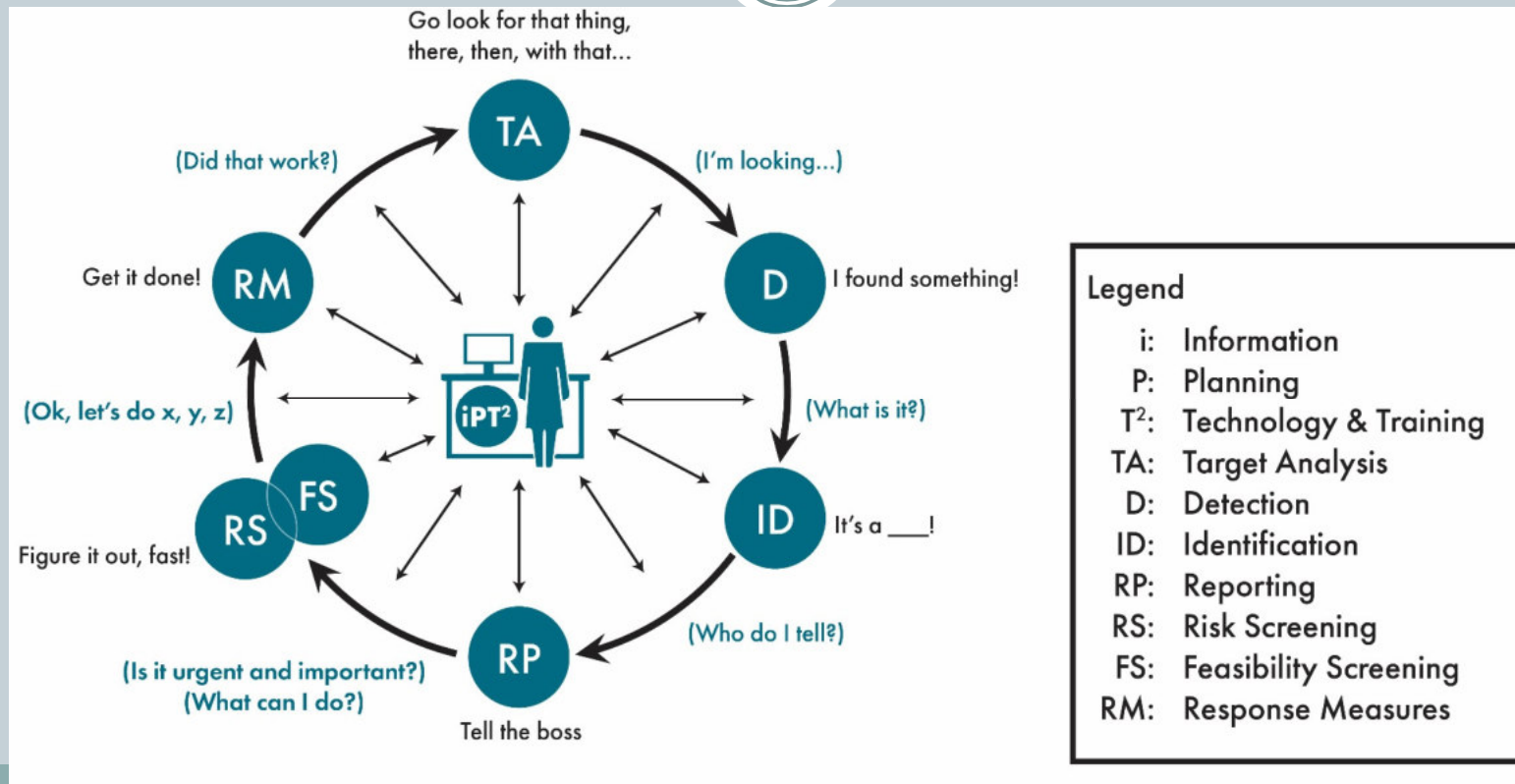
Priority Actions

3.3 Encourage the development and sharing of tools for EDRR

3.7 Foster the development of innovative research, tools, and technologies needed to advance prevention and EDRR



EDRR and Technology Innovation



Considerations

- Social license (public permission)
- Technophobia vs. technophilia
- Legal and policy frameworks
- Species variation
- Pathway variation
- Ecosystem variation
- Effective (timely)
- Cost-efficient
- Arctic-specific conditions
 - Weather/temperatures
 - Short seasonality
 - Remoteness/accessibility



Photo: Steve Ebbert

Photos: © Jamie K. Reaser

Detection/Identification

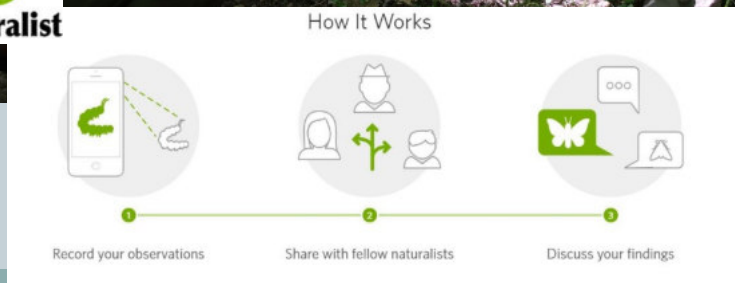
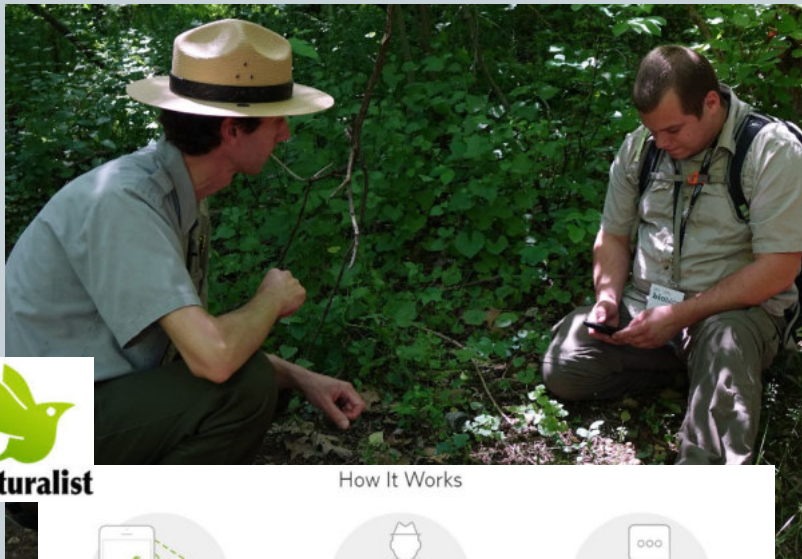
- What's native?
- Don't know what's coming or how
- Anything could be coming in lots of different ways
- Small population size
- Seasonality for detection/ID
- Cryptic



Photo: © Jamie K. Reaser

Detection/Identification

Photo: © Jamie K. Reaser



- Detection/ID/reporting all in one
- Laboratory to field-based/internet
- Automation
- Non-expert capacity
- Intelligence dual-use

- Camera trapping
- Visual, acoustic, chem sensors
- Genetic tools (eDNA, barcoding)
- AI (machine learning)
- Smartphone apps

Eradication/Containment

- Humane
- Low/no risk to human health
- Minimize non-target impacts
- Species-targeted
- Greater knowledge of:
 - Biology (genetics/behavior)
 - Other disciplinary approaches
 - Whose tried what, where
- Collaboration – across disciplines, countries, w/private sector



Photo: © Jamie K. Reaser

Eradication/Containment



Success in the Aleutian Islands, Alaska

- Upscaling the old
- Combining tools (new/old)
- Aquatic/marine/island systems
- Robotics/Drones (UAV/ROV)
- Toxicants
- Toxicant delivery
- Genetic tools (editing/drives)

Fostering Innovation

- Bringing together invasive species experts with problem solvers across disciplines, sectors, and the world
- Ideation/hackathons
- Challenges/prizes
- Small business development
- The Digital Makerspace

<https://conservationx.com/challenges>



TECHNOLOGY CHALLENGES

Advancing Innovation for Invasive Species Management

Open for entries

In the United States, invasive species are a major economic, biosecurity, and environmental threat to natural resources, infrastructure, agricultural production, human health, and wildlife health. The total economic damages of invasive species are estimated at almost \$120 billion per year, and a result of increasing international travel and trade.

The large scale complexity of the invasive species issue frequently results in inaction; there is a common belief that, once established, it is no longer logistically or financially feasible to eradicate or control populations of invasive species. Through this series of challenges, we invite the use of open data, new technology applications, and creative solutions to address old and evolving invasive threats. We can do this!

Challenges:

- 1 [Saving the 'Ohi'a: Hawai'i's Sacred Tree](#)
- 2 [Find the Killer Frog Fungus](#)
- 3 [Confirming Zero](#)

