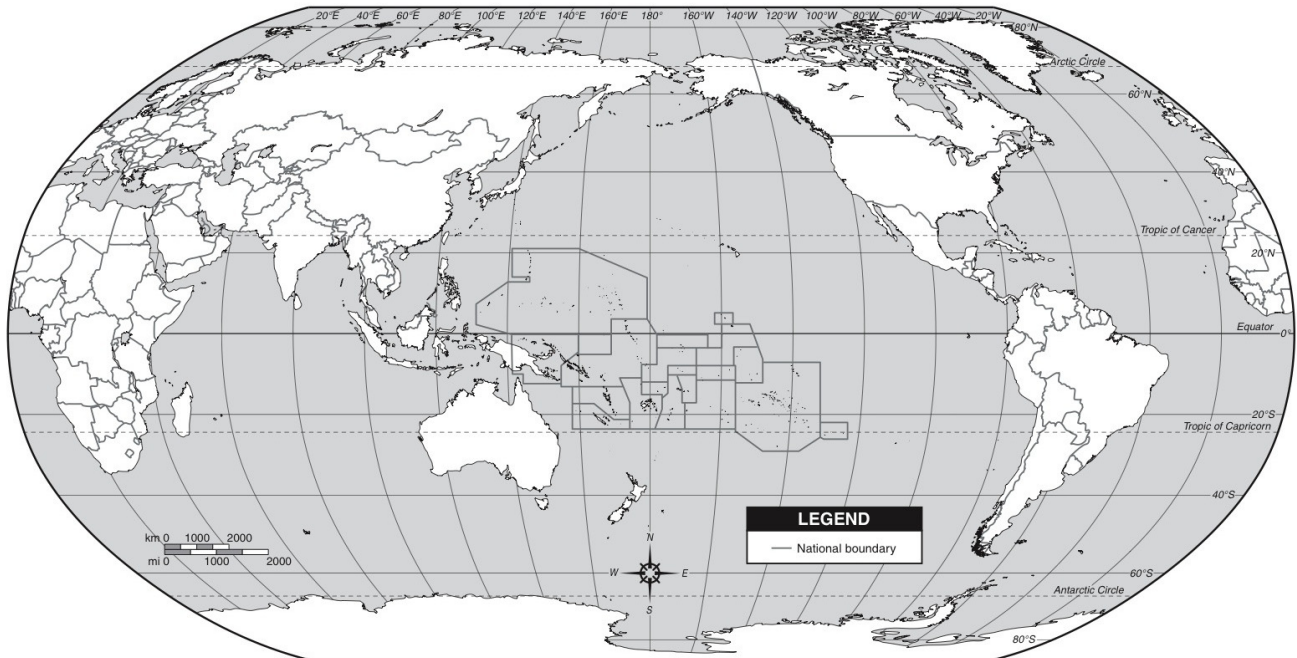
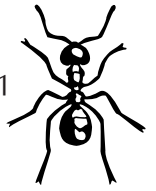


# Exercise 1: Where Do They Come From?

Below you'll find a list of invasive species that are now found in Hawai'i. Where did they come from? Do some research to find out. Map their origins below. Draw a line from each plant or animal's place of origin and suggest a possible **vector**, or means of **dispersal**. For instance, do you think miconia seeds blew here on the wind or did someone bring a live plant over on the plane? Create a legend to indicate the various vectors.

- Coqui frog (*Eleutherodactylus coqui*) \_\_\_\_\_
- Fountain grass (*Cenchrus setaceus*) \_\_\_\_\_
- Ivy gourd (*Coccoloba grandis*) \_\_\_\_\_
- Miconia (*Miconia calvescens*) \_\_\_\_\_
- Pampas grass (*Cortaderia jubata*) \_\_\_\_\_
- Rubber vine (*Cryptostegia grandiflora*) \_\_\_\_\_
- Veiled chameleon (*Chamaeleo calytratus*) \_\_\_\_\_





# Exercise 2: Where Can They Invade?

Common Name: \_\_\_\_\_

Scientific name: \_\_\_\_\_

Description: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Origin: \_\_\_\_\_

Preferred climate type: \_\_\_\_\_

Rainfall: \_\_\_\_\_

Elevation: \_\_\_\_\_

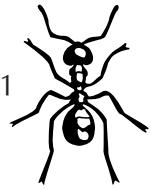
Impacts in Hawai'i: \_\_\_\_\_

\_\_\_\_\_

Ecosystems this species can invade in  
Hawai'i: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



## Exercise 2: Where Can They Invade?

Once a plant or animal species arrives on our shores, it has to settle in suitable habitat in order to survive. It needs the right amount of rain, sunlight, and heat, in addition to the adequate food, mates, and/ or pollinators. Below are descriptions of ecosystems found on Maui. Which one(s) can your species invade?

### Maui Ecosystems

#### Alpine Aeolian

This high-altitude region of Maui is characterized by sparse vegetation and an extreme climate with widely varying daily temperatures, intense solar radiation, and an average of 30-50 inches of rain per year. Few plants thrive here: the spectacular Haleakalā silversword or ‘āhinahina (*Argyroxiphium sandwicense* subsp. *macrocephalum*), ‘ōhelo (*Vaccinium reticulatum*), hinahina (*Artemisia australis*), and kupa‘oa (*Dubautia ciliolata*). This describes the summit of Haleakalā, above 7,500 feet.



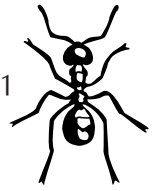
Haleakalā National Park  
(Photo: Forest and Kim Starr)



Auwahi Forest Preserve  
(Photo: Forest and Kim Starr)

#### Mesic Forest

Mesic forests occur on both East and West Maui, mostly between 2,500-4,100 feet elevation, with between 40 to 100 inches of rain per year. Before human contact, this was probably the most botanically diverse of all Hawaiian forests. *Koa* (*Acacia koa*), ‘ōhi‘a (*Metrosideros polymorpha*), and sandalwood or *iliahi* (*Santalum haleakalae*) trees are common, in addition to a mixture of plants adapted to both wet and dry areas such as *maile* (*Alyxia stellata*) and *halapepe* (*Pleomele auwahiensis*). Good examples can be found in East Kaupo gap, Kahikinui, upper Auwahi and ‘Ulupalakua, Polipoli, and Makawao Forest Reserve.



*Thick forest understory in East Maui  
(Photo courtesy of Shannon Wianecki)*

### Rain Forest

These wet, windward areas occur from 1,900 to 6,200 feet. Hawaiian forests get between 80 and 390 inches of rain per year. The native plants that evolve here are used to lots of water: lobelias, ferns, 'ōhia (*Metrosideros polymorpha*), and 'ie'ie (*Freycinetia arborea*). Waikamoi, Olinda, Ha'iku, Huelo, Ke'anae, Nāhiku, Hāna, Kīpahulu, and Upper West Maui Mountains are examples.

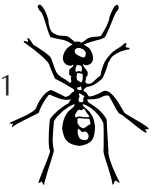
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### Dryland Forest

Dryland forests occur at low elevation, from sea level to 3,000 feet. These drier areas get less than 20 inches of rain per year. Temperatures are typically warm to hot. Plants adapted to this climate tend to be drought tolerant and stress resistant: wiliwili (*Erythrina sandwichensis*), 'a'ali'i (*Dodonaea viscosa*), pua kala (*Argemone glauca*), 'āwīkīwīkī (*Canavalia pubescens*). Central and Leeward Maui, Kanaio, Makena, Wailea, Kīhei, Mā'alaea, Kahului, Wailuku, Ukumehame, Launiupoko are examples.



*Wiliwili trees at  
Pu'u o Kali  
(Photo courtesy of Maui  
Invasive Species  
Committee)*



### Coastal

These areas are close to the ocean so plants must be salt tolerant. Plants that have evolved here tend to be low to the ground due to constant wind. Windward coastal areas may receive up to four times more rain (up to 120 inches per year) than leeward areas, with strong winds being common. Coastal plants such as *hala* (*pandanus tectorius*), *pā'ū o Hi'iaka* (*Jacquemontia sandwicensis*) and *naupaka* (*Scaevola sericea*) grow on substrates that range from old coral colonies to basalt cliffs and boulders, and from sandy beaches to lava and ash. Find this ecosystem in the salt spray zone along the coast of Maui.



Waihe'e Coast  
(Photo courtesy of Maui Invasive Species Committee)



Cauliflower corals (*Pocillopora meandrina*)  
(Photo courtesy of Lissa Strohecker)

### Marine

Marine habitats include coral reefs of various types, boulder fields, sandy bottoms, areas where the reef drops steeply to great depths, caves, caverns, and lava tubes. Native sea plants such as *limu kala* (*Sargassum echinocarpum*) grow here, along with endemic fish such as the saddle wrasse (*Thalassoma duperrey*). From shallow waters found near shore to deeper waters further offshore surrounding Maui.