



**The State Museum of Natural and Cultural History
Honolulu, Hawai'i**

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Invertebrate Zoology**

**Hull Fouling of Maritime
Vessels as a Pathway for
Marine Species Invasions to the
Hawaiian Islands**

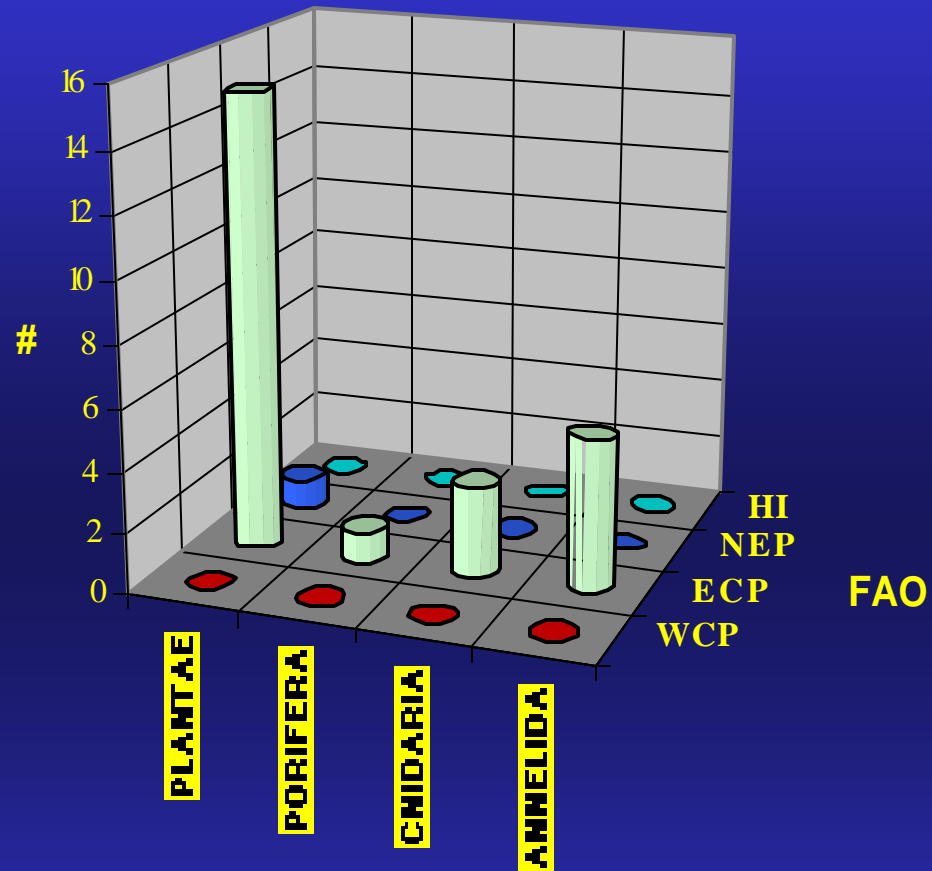






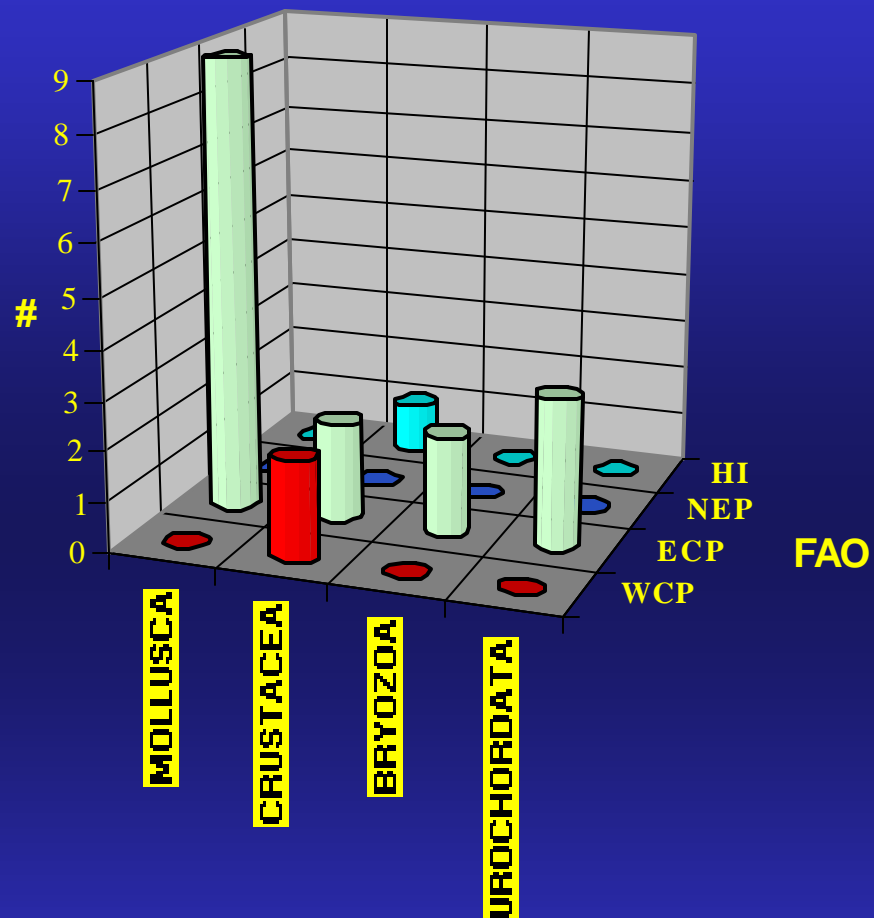


Hull Fouling NIS Taxa by FAO N=8

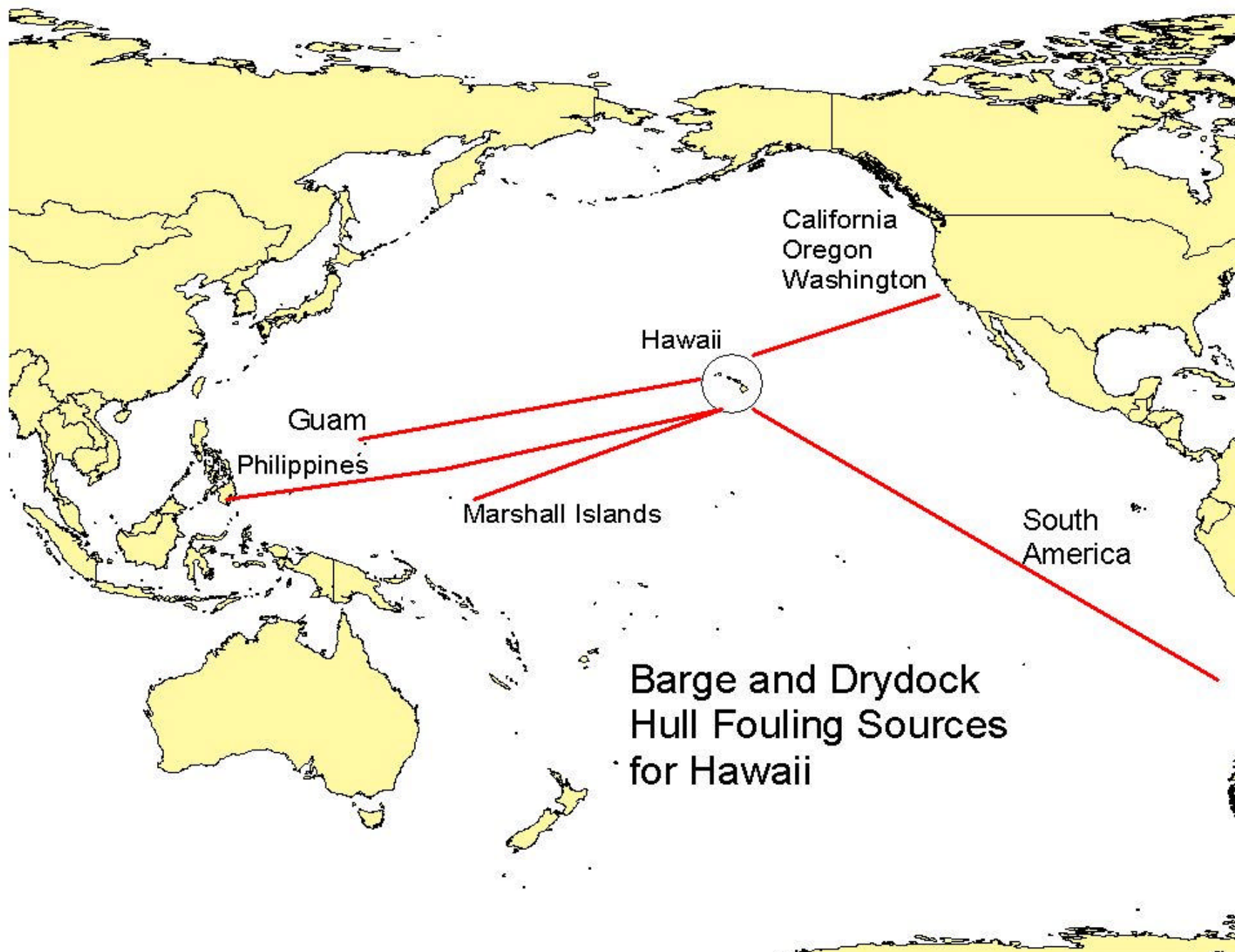


	PLANTAE	PORIFERA	CNIDARIA	ANNELIDA
WCP	0	0	0	0
ECP	15	1	3	5
NEP	1	0	0	0
HI	0	0	0	0

Hull Fouling NIS Taxa by FAO N=8



	MOLLUSCA	CRUSTACEA	BRYOZOA	UROCHORDATA
WCP	0	2	0	0
ECP	9	2	2	3
NEP	0	0	0	0
HI	0	1	0	0



Hull Fouling as a Mechanism for:

- **Introduction of marine alien species to the Main Hawaiian Islands**
- **Dispersal of established marine alien species between the Main Hawaiian Islands**

Hull Fouling as a Mechanism for:

- **Introduction of marine alien species to the Main Hawaiian Islands**
 1. **Direct introduction of mobile organisms**
 2. **Introduction through reproduction activities**

HULL FOULING INTRODUCTION OF MOBILE ORGANISMS TO HAWAII

ORGANISM	STATUS
<i>Jassa falcata</i> Crustacea: Amphipod Native Range: Indo-Pacific (Except Hawaii)	Established
<i>Omobranchus ferox</i> Chordata: Fish Native Range: Indian Ocean, Philippines	Possibly established
<i>Nanosesarma minutum</i> Crustacea: Crab Native Range: SE Asia	Established

HULL FOULING INTRODUCTION TO HAWAII THROUGH REPRODUCTIVE ACTIVITY

ORGANISM	STATUS
<i>Dictyota flabellata</i> Plantae: Brown Algae Native Range: East Central Pacific	Established
<i>Chama macerophylla</i> Mollusca: Jewel Box Oyster Native Range: Caribbean	Established
<i>Mytilus galloprovincialis</i> Mollusca: Blue Mussel Native Range: SW Europe and Mediterranean	Established????

Hull Fouling as a Mechanism for:

- **Dispersal of established marine alien species between the Main Hawaiian Islands**

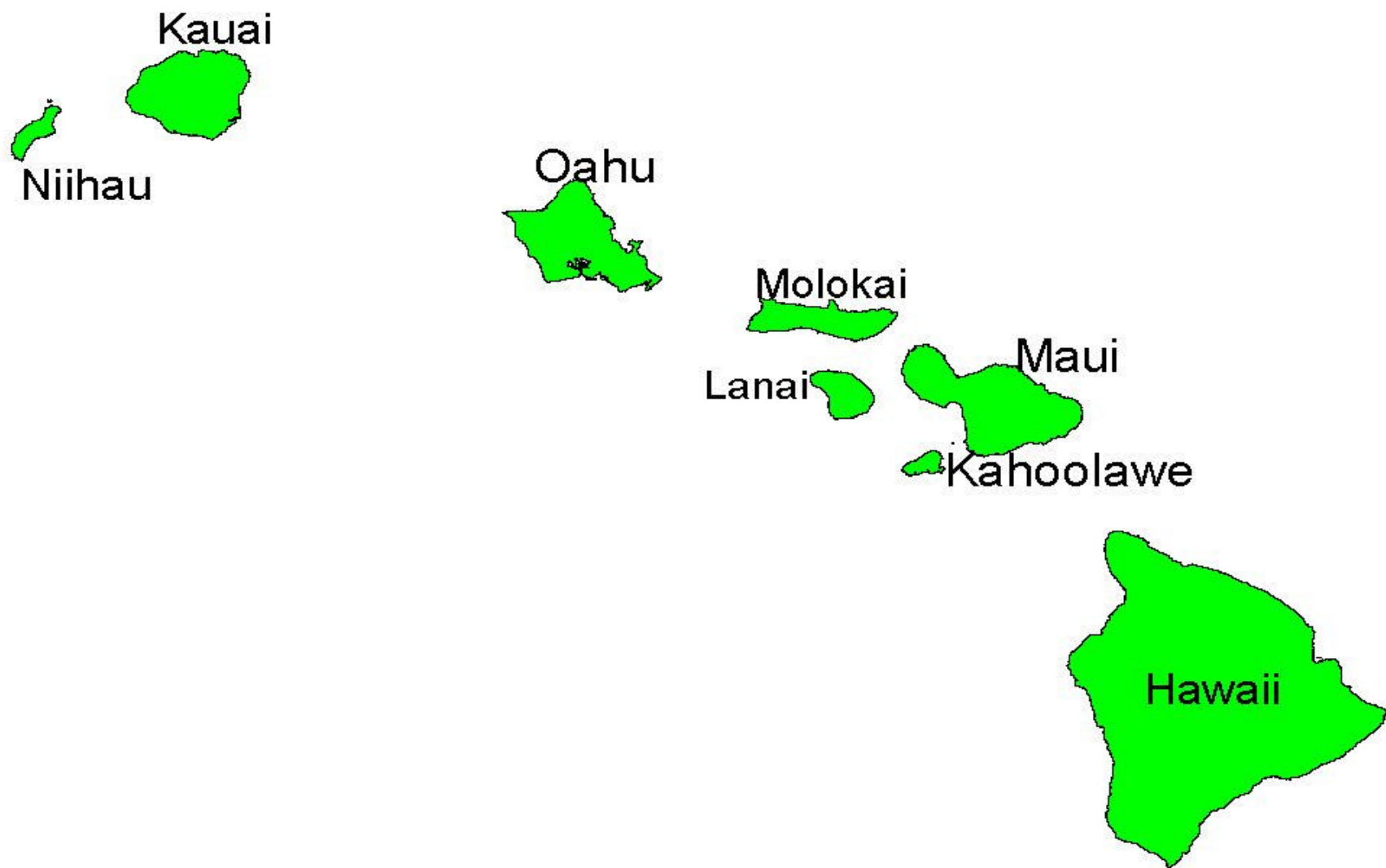
Example: *Chthamalus proteus*

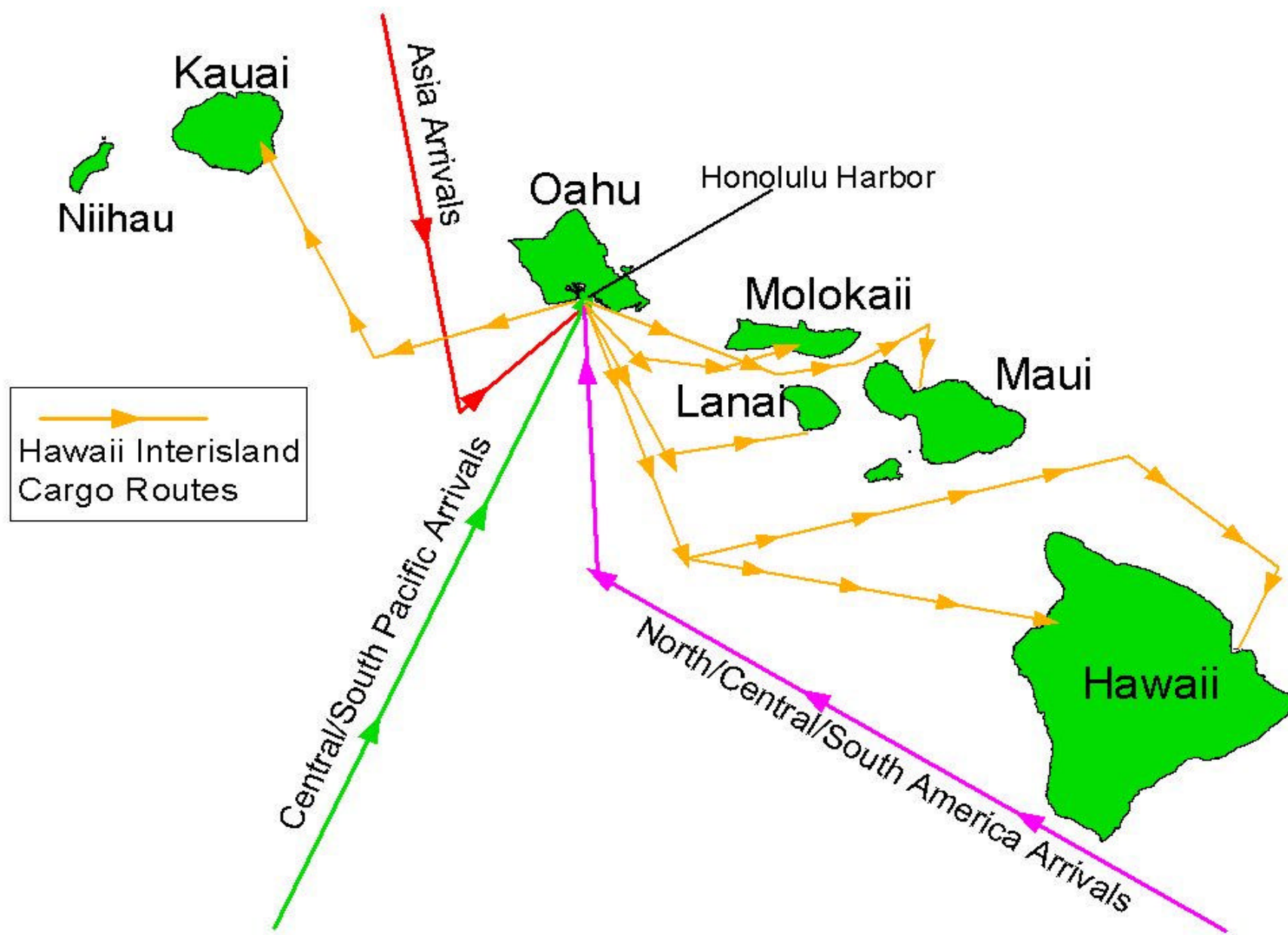
Crustacea: Barnacle











CASE STUDIES IN HAWAII

- **USS MISSOURI Memorial**
- **Multi-agency interdiction of potential hull fouling introduction event**



Upcoming Hull Fouling Efforts in Hawaii

- **In-depth survey of overseas and interisland vessel traffic to assess level of contribution as marine alien species transport mechanisms**
- **Assess the contribution motor yachts, foreign fishing boats and sailboats from overseas locations as hull fouling pathways**
- **Review activities of shipyards to determine if their practices are a potential contributor of marine alien species**
- **Form a committee of maritime industry representatives and marine resource managers to create a draft management plan concerning hull fouling**