

Washington Department of Fish and Wildlife

# State Marine Debris Response Plan: Aquatic Invasive Species



By

Allen Pleus

Aquatic Invasive Species Unit

April 8, 2016

# **WDFW Mission**

**The Washington Department of Fish and Wildlife's Aquatic Invasive Species (AIS) Program serves Washington's citizens by protecting, restoring, and enhancing fish and wildlife and their habitats, while providing sustainable and wildlife-related recreational and commercial opportunities.**

**The AIS program supports this goal by working to prevent the introduction of new AIS and controlling or eradicating established AIS populations.**

# Statewide AIS Prevention Risks



**NUTRIA . . . NEWEST OPPORTUNITY**

New fur-bearing animal now being bred in U.S. Offers huge profits to breeders. This fur is next to Mink NOW in price and will soon surpass it. 15 to 20 young per year. Most easily and economically raised animal known. 1 1/4¢ per day to feed. ANY CLIMATE, disease resistant. The Cabana Marrone strain is obtainable ONLY through Cabana Nutria, Inc. and its authorized dealers and distributors. For free booklet and address of Cabana ranch nearest you write:

**CABANA NUTRIA, INC. Dept. 97**  
636 West Lemon A



70,000 miles rivers - 8,000 lakes - 3,000 miles coastline

# Statewide AIS Program Core Functions

- Prevention
- Early detection
- Rapid response
- Infested site management
- Local/regional coordination
- Education/outreach
- Enforcement



**Zebra &  
Quagga  
Mussels**



**Ballast  
Water**



**New Zealand  
Mudsnails**



**African  
Clawed  
Frogs**

# Marine Debris Response: Invasive Ecology 101

## Aquatic animal invasive species

Pathway: Biofouling/“raft dispersal”

- Coastal or terrestrial species growing/attached when launched
- Ocean species join/attach when drifting

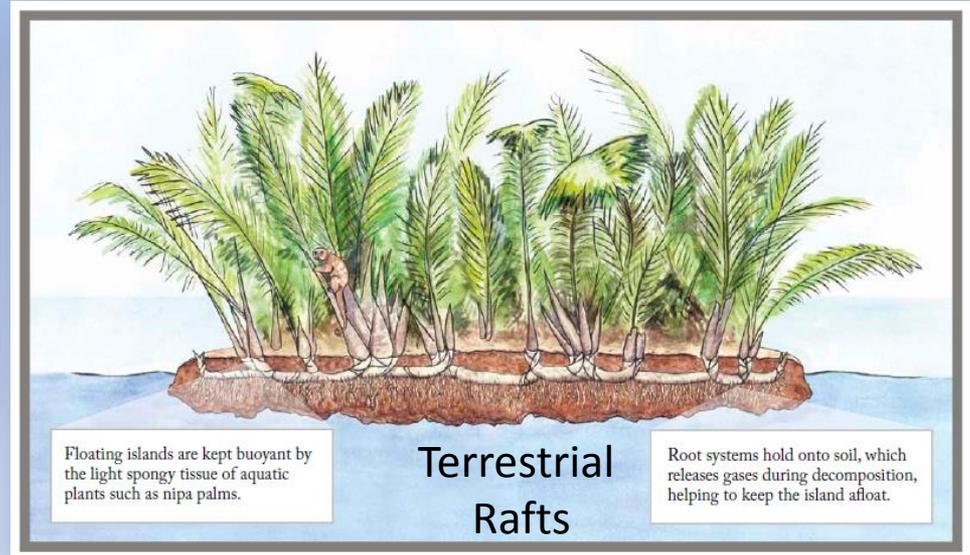
Invasive Risk:

- Outcompete native species/alter ecosystem
- May have new diseases/parasites

Invasion Mechanism:

- Reproduce and/or abandon raft

# Rafting Dispersal of Species



- **Natural Matter**
- **100's of Miles/  
Kilometers**
- **Months**



# 2011 Great Tōhoku Tsunami

**Marine  
Origin Debris**

**Terrestrial  
Origin Debris**

**~1.5 million tons floating debris**

**Main concerns:**

- **Hazardous materials**
- **Debris-fouled beaches**
- **Habitat damage**

# State Marine Debris Response Plan



Washington State  
Marine Debris Response Plan  
September 2012



## State Rapid Response Team:

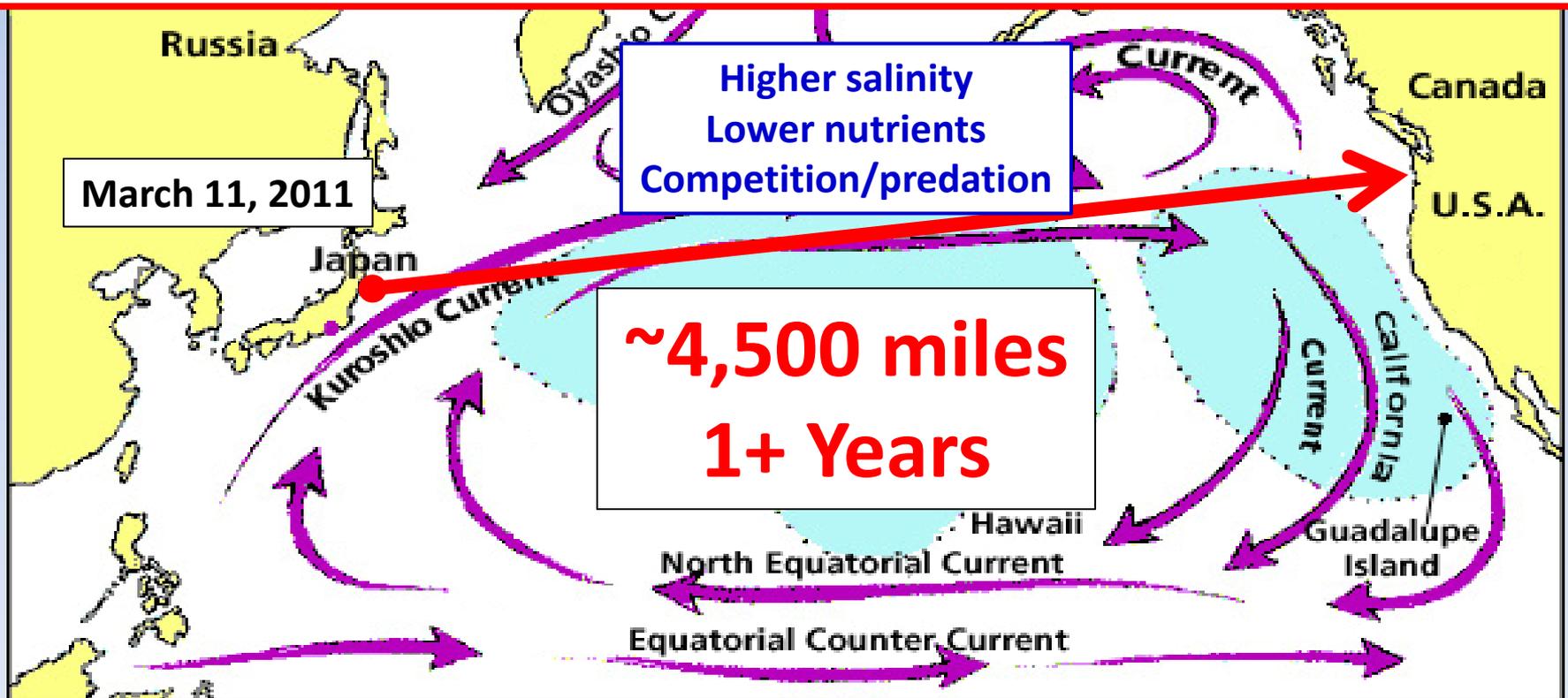
- Emergency Management (MIL – State lead)
- Dept of Ecology (Hazard/regular debris & communications)
- [Dept of Fish and Wildlife \(Invasive species\)](#)
- State Parks (Coastal land manager)
- Dept of Health (Radioactive substances)
- Dept of Natural Resources (Derelict vessels)
- Dept of Enterprise Services (Service contracts)

## Federal/Other Response Partners:

- NOAA (Federal marine debris lead)
- U.S. Coast Guard (Reporting/navigation hazards)
- Tribes (Makah, Quileute, Hoh, Quinault, Shoalwater Bay)
- Olympic National Park (Landowner)
- U.S. Fish & Wildlife Services (ESA/landowner)
- Olympic National Marine Sanctuary

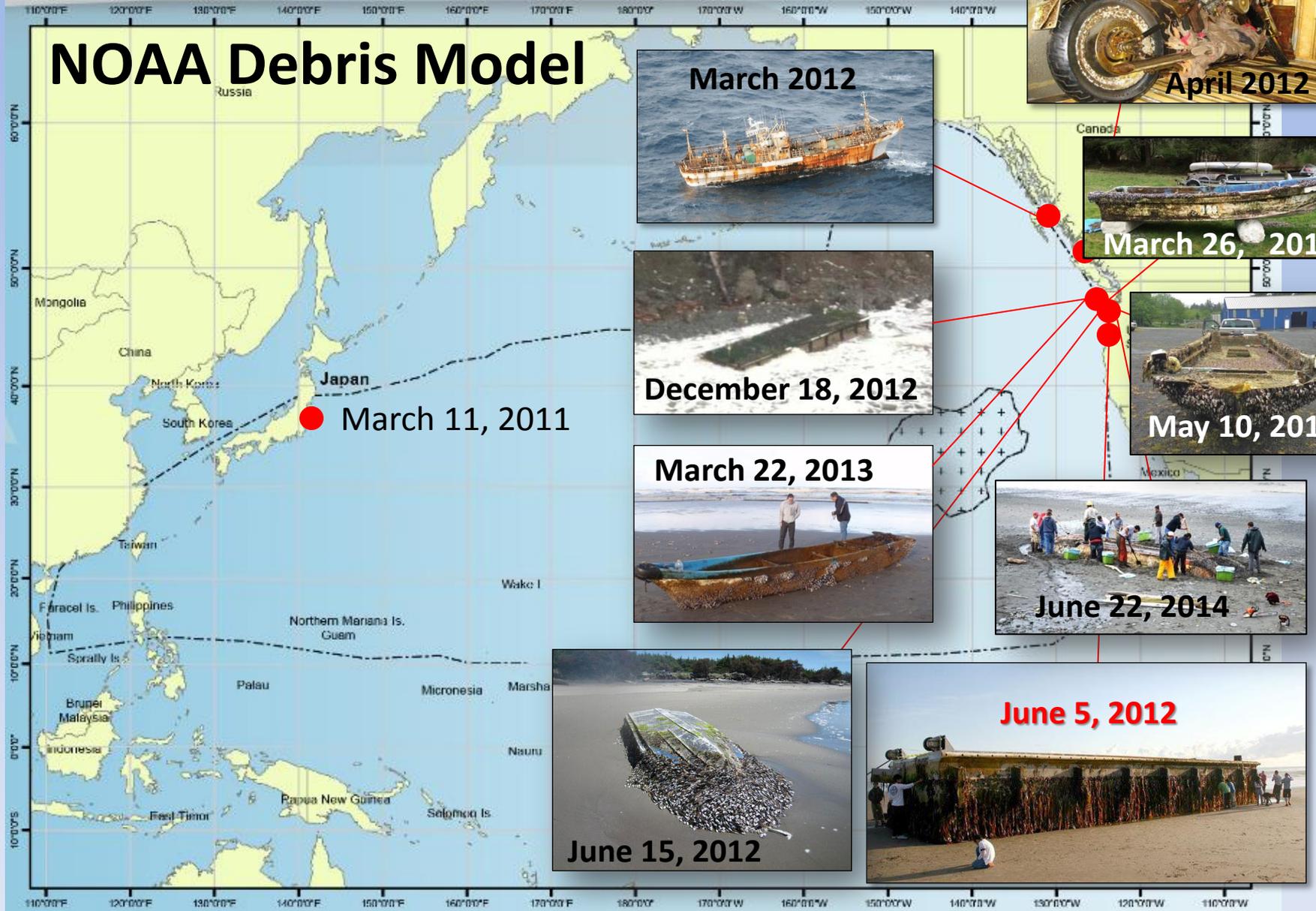
# 2011 Tōhoku Tsunami

**No Invasive Species Expected from  
Japanese Tsunami Marine Debris**



# Expected Distribution of Computer Simulated Particles Through Monday, 09/23/16

## NOAA Debris Model



March 2012

April 2012

March 26, 2016

December 18, 2012

March 22, 2013

May 10, 2015

June 22, 2014

June 15, 2012

June 5, 2012

# Misawa "1" Dock: Oregon



4 concrete docks from the Port of Misawa  
were swept away by tsunami

June 5, 2012

Marine Organisms Found Living on a Floating Dock from Misawa, Aomori Prefecture, Japan dislodged by the 2011 Tōhoku Earthquake and Tsunami

1 species of urchin



Northern Pacific seastar  
*Asterias amurensis*



Japanese shore crab  
*Hemigrapsus sanguineus*



Granular claw crab



*Oedignathus inermis*

4+ species of barnacle

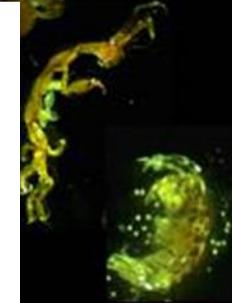


Solitary tunicate

**1.2 years at Sea  
120+ Living Japanese  
Species**



**120+ Living Japanese  
Species**



Bryozoans



+ species of amphipod



*galloprovincialis*

*Undaria pinnatifida*



Sponge on mussel



11 species of mollusk



Anemone



17+ species of worm



*Halosydna brevisetosa*



*Trypanosyllis zebra*

# Misawa "1" Dock: Oregon



~ 2 Tons Fouling  
Organisms Removed  
And Buried

Need for extensive response equipment highlighted



# 3 Elements of Response

- **Reminder of tragedy to Japanese people**
  - Respectful that “debris” came from shattered lives
- **Concern for aquatic invasive species**
  - Prevent species from becoming established
- **Participating in new scientific discoveries**
  - Excitement to be investigating this pathway; transcends Japanese tsunami event

# Terrestrial-Origin Debris



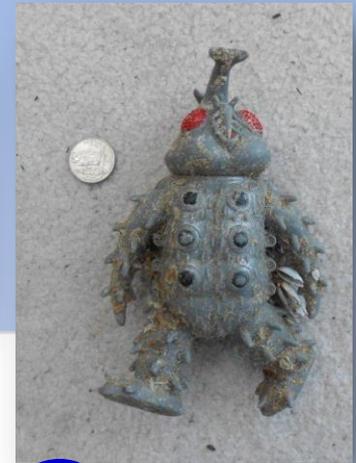
100,000's of Debris Washed Ashore



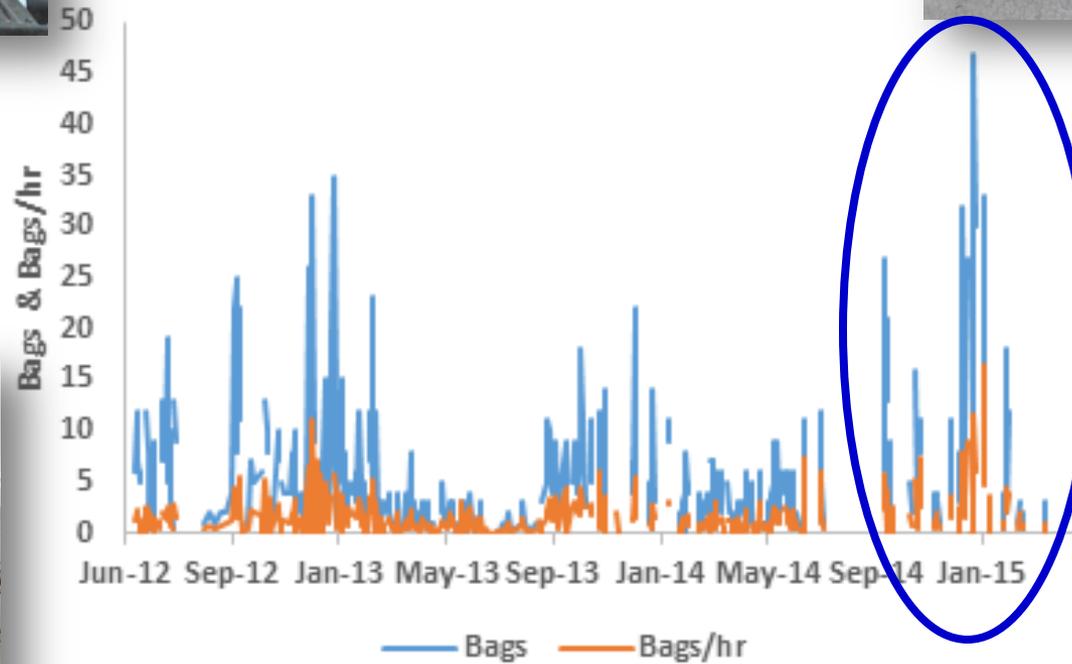
100's of Debris Sampled



# Types/Debris Landing Frequency



Russ Lewis-Long Beach, WA



7 mile stretch of Long Beach Peninsula

# Invasive Species Risks

- **Over 350 individual Japanese species identified – 100 in WA (algae, amphipods, anemones, molluscs, starfish, tunicates, fish, etc.)**
- **Perhaps millions of individuals on some single objects**
- **Many species are reproductive**
- **Species not found on earlier debris still arriving**
- **Four separate findings of Stripped Beakfish between Monterey California and Long Beach Washington**
- **Two of the Beakfish findings were free-living and no longer associated with the debris**
- **We do not have reliable estimates of how many mobile species abandon the debris in the surf or on the beach before it is sampled.**

# Continuing JTMD Response Needs

- **Small and large debris expected over next 2-5 years**
  - 2 more “Misawa” docks at sea
  - Data suggests more boats and other debris to come
- **Species identification ongoing**
  - Working with international scientific group
  - Unknown how long Japanese coastal species will keep surviving at sea
- **Unknown impacts – long-term monitoring required**
- **General marine debris invasive pathway research needed**

# Contact Information

**Allen Pleus**

360-902-2724

Allen.Pleus@dfw.wa.gov

[www.wdfw.wa.gov/ais](http://www.wdfw.wa.gov/ais)

[www.wdfw.wa.gov/tsunami](http://www.wdfw.wa.gov/tsunami)

