

# A Management Framework for Aquatic Invasive Species

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Fisheries and Oceans  
Canada

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Canada

# Introduction

- ▶ Need to develop a regional plan
- ▶ Consistent with “Invasive Alien Species Strategy for Canada “
  1. Prevention
  2. Early detection
  3. Rapid response
  4. Management
- ▶ Management objectives to minimize impact:
  - Contain the problem to a given area
  - Control the population to slow its spread
  - Eradicate – but rarely possible
  - Contain the problem to a given area
  - Keep the species at an abundance below an economic or ecological threshold
  - Adapt to the problems caused by the species

# Constraints

- ▶ Regulatory regime is weak
  - ▶ Fishery (General) Regulations, *Fisheries Act*
    - prohibit release of “fish” into fish habitat without a licence
    - not really a proper authority
  - ▶ Ballast Water Control and Management Regulations, *Canada Shipping Act*
    - ballast water management to minimize uptake/dischage and render harmless
    - do not apply to pleasure vessels <50m or ships operated only in Canada
  - ▶ No applicable Provincial legislation
- ▶ Not possible to control all pathways of introduction and dispersal:
  - ▶ Ballast water
  - ▶ Recreational boats and trailers
  - ▶ Fouled commercial hulls and gear
  - ▶ Resource restoration or enhancement
  - ▶ Live seafood movements
  - ▶ Transfers of aquaculture stock
  - ▶ Aquarium trade

# Broader Principles

- ▶ Coordinated federal-provincial response
- ▶ Agreement on which species triggers response
- ▶ Clarification of regulatory responsibilities
- ▶ Clear communication
- ▶ Focus on ALL pathways of introduction and dispersal
- ▶ Risk-based management responses

# AIS: Trigger species and Species of Concern

## Trigger Species

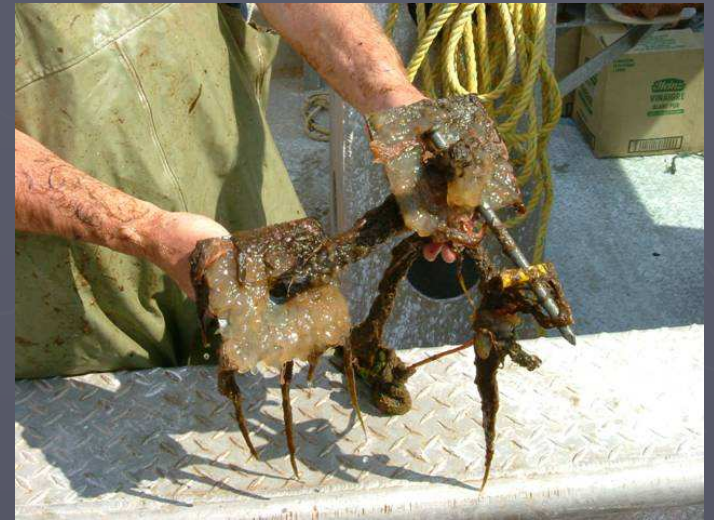
- ▶ Green crab, *Carcinus maenus*
- ▶ Colonial tunicates
  - Golden star, *Botryllus schlosseri*
  - Violet, *Botryloides violaceus*
  - *Didemnum sp.*
- ▶ Solitary tunicates
  - Vase, *Ciona intestinalis*
  - Club, *Styela clava*
- ▶ Carp

## Species of Concern

- ▶ Bryozoan, *Membranipora*
- ▶ Oyster thief, *Codium fragile*

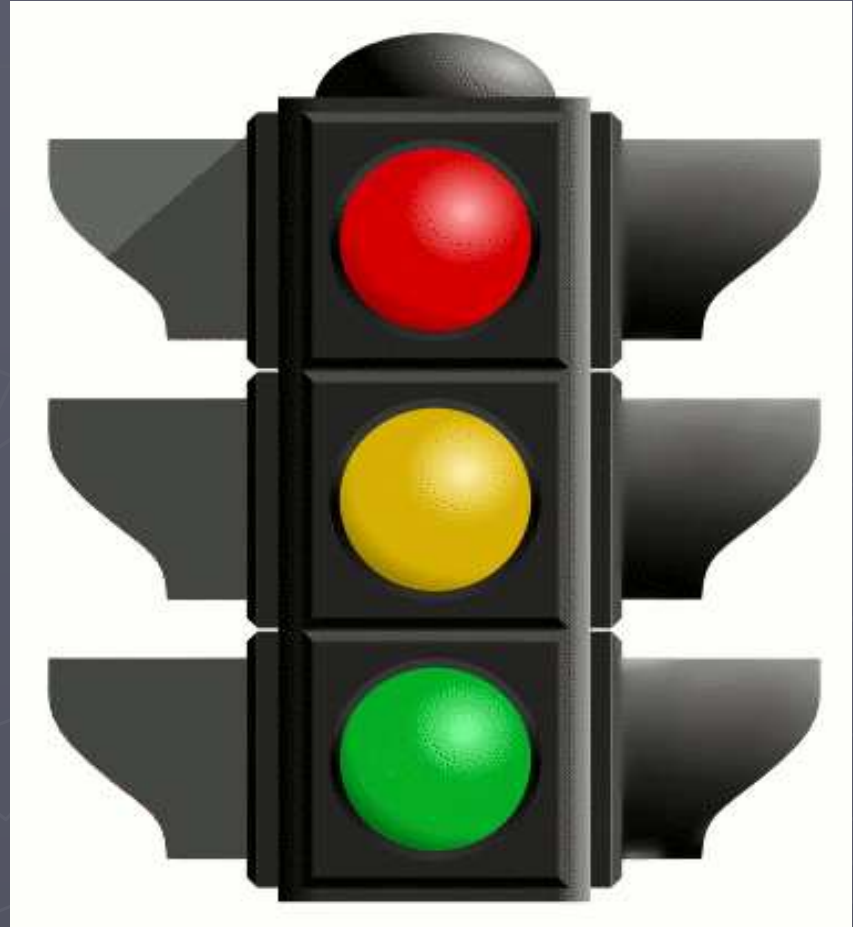
# AIS Monitoring and Surveys

- ▶ Monitoring protocols
- ▶ Identification capacity
- ▶ AIS Steering Committee to facilitate communication and to discuss research priorities
- ▶ Collaboration between stakeholders
- ▶ Passive collectors
- ▶ Navigational buoy survey
- ▶ Province-wide surveys
  - High risk ports, yacht clubs, processing plants, aquaculture sites, boats, shorelines
  - Environmental data



# Zoning

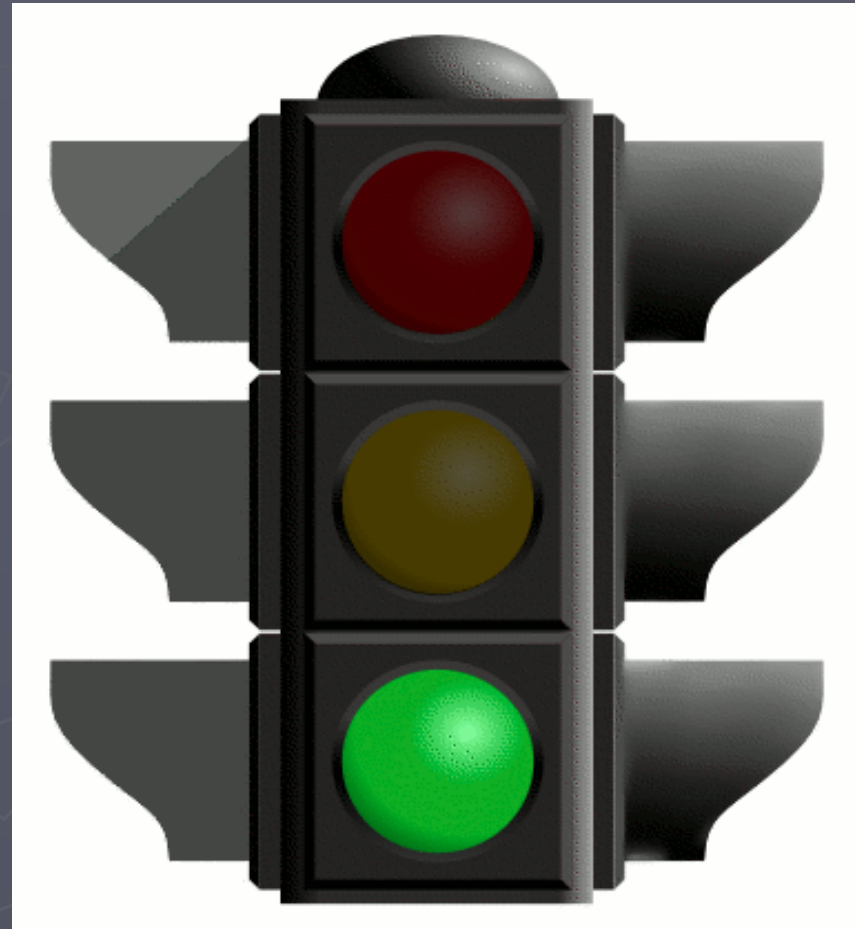
- ▶ Framework to manage movements upon detection of trigger species
- ▶ Modified traffic light approach with 4 proposed zones
- ▶ Zone sizes are species specific
- ▶ Risk-based:
  - Allows for movements if risks are low
  - Provides some protection to limit spread of AIS if risks are high



# The Four Zones

## Negative zone

- ▶ Areas where AIS have not been detected
- ▶ Movements within the zone considered low risk

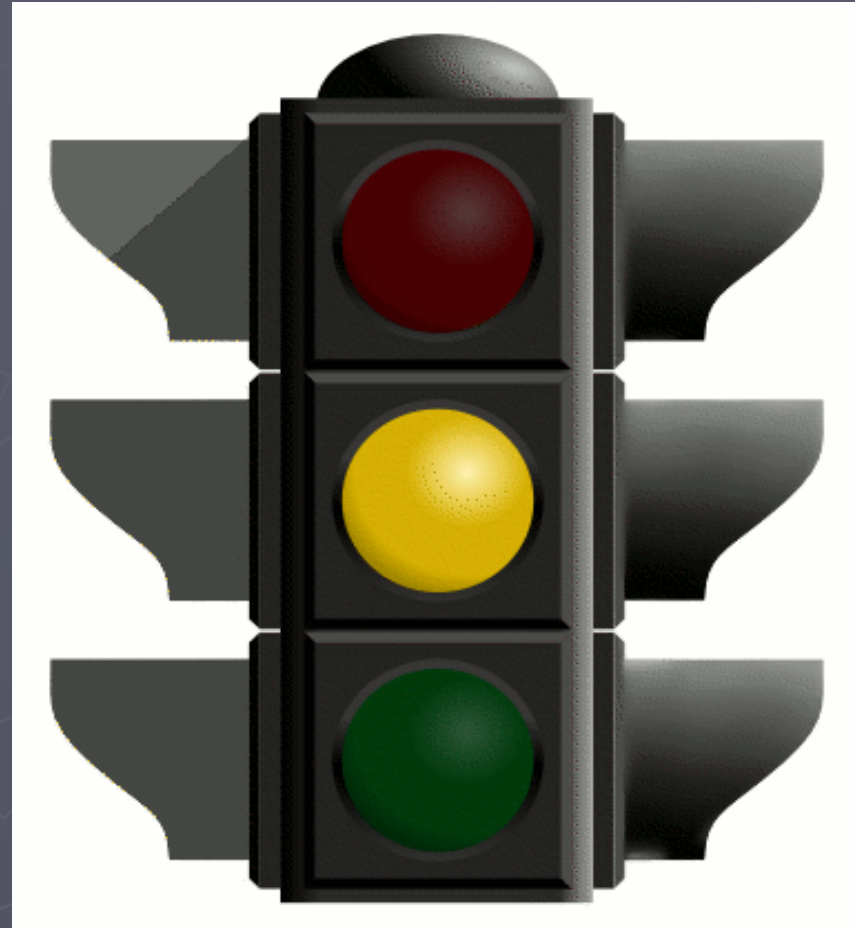




# The Four Zones

## Surveillance Zone

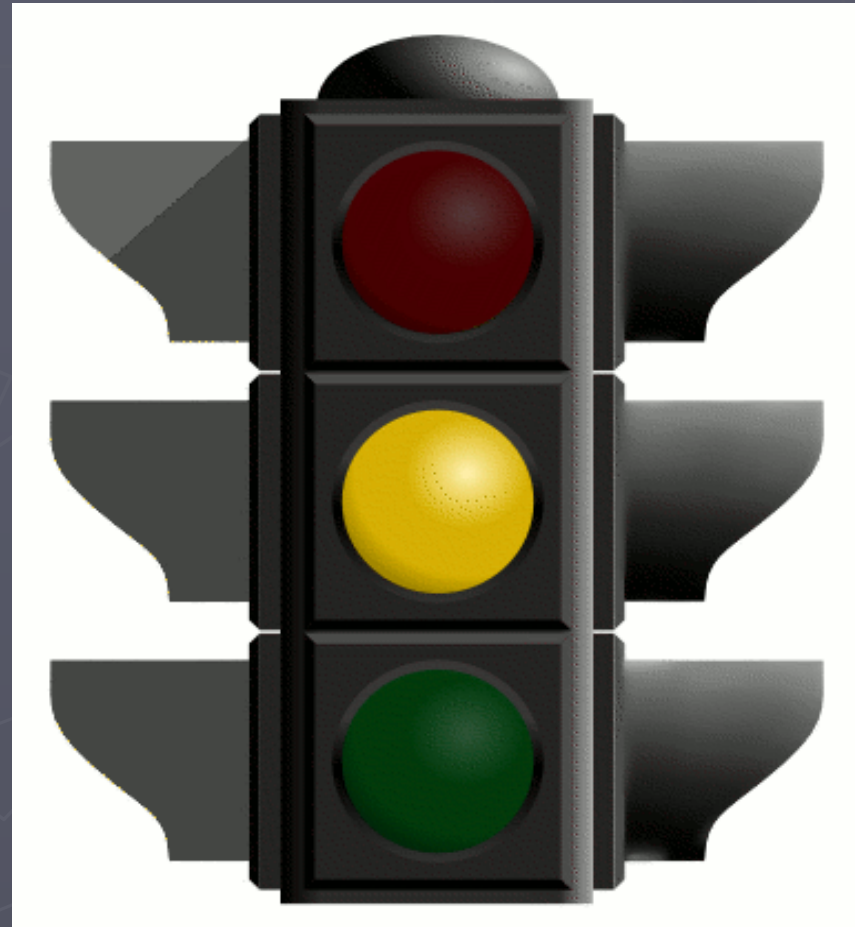
- No known AIS, so technically also a negative zone
- “High Risk Areas” – i.e. a port of entry or concentration of farms
- Detection would have significant negative consequences
- Surveillance required
- Mitigation requires management of dispersal vectors



# The Four Zones

## Suspected Zone

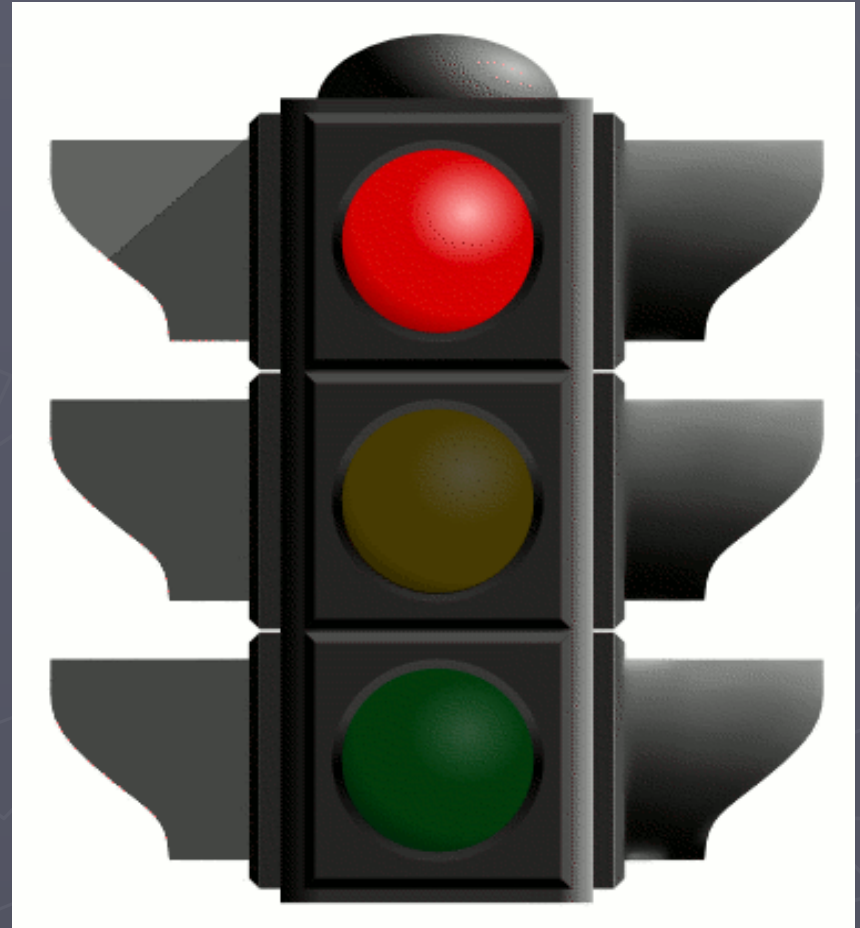
- AIS not detected but...
  1. Vector or vectors for dispersal from positive zone exists
  2. Suitable habitat exists
  3. Susceptible species or activities present
- Surveillance required
- Mitigation requires vector management AND AIS treatment



# The Four Zones

## Positive Zone

- Area where AIS have been detected
- Zone size is species specific
- Mitigation requires AIS treatment to reduce the risks to low



# Conditions for movement controls for AIS trigger species

		<b>Destination Zone</b>			
<b>AIS Zone</b>		Negative	Surveillance	Suspected	Positive
<b>Supplying Zone</b>	Negative	Low risk	Low risk	Low risk	Low risk
	Surveillance	Manage vector	Manage vector	Manage vector	Low risk
	Suspected	Manage vector and AIS treatment	Manage vector and AIS treatment	Manage vector and AIS treatment	Low risk
	Positive	High risk	AIS treatment	AIS treatment	Low risk

# Mitigation: Vector Management

- ▶ Prevention – non-regulatory measures:
  - Farm husbandry
  - Boat hull and gear cleaning and disinfection
- ▶ Seasonality
- ▶ Life cycle stage sensitive
- ▶ Harvesting practices
  - E.g. on-site declump and wash

# Mitigation: AIS treatments

- ▶ Dips - brine or lime dips followed by air exposure
- ▶ Biological controls
- ▶ Other chemical controls
- ▶ Air exposure
- ▶ Mechanical removal
- ▶ Farm husbandry and harvesting practices
- ▶ Processing effluent controls
- ▶ Bounties or selective harvests

# Management: Applying the Framework

We have detected three species since 2006

- ▶ Golden star tunicate
- ▶ Violet tunicate
- ▶ Green crab

Two related questions:

1. How do we control, contain or eradicate the aquatic invaders we have detected?
2. Should we control aquaculture-related activity?