

AIS Vector Workshop
December 2, 2009 Admiral Fell Inn, Baltimore
Workshop Participants Responses to Vector Management Survey

To facilitate discussion at the workshop and to understand some of the *a priori* assumptions that workshop participants had regarding preventing aquatic invasive species introductions through vector management, we developed a pre-workshop survey that participants completed 3 days prior to the workshop. In particular, we wanted to know what vectors were of primary concern to workshop participants and what actions did participants currently take or wished they could take to address those vectors. The survey results were then analyzed and the pertinent findings provided electronically to the workshop steering committee and the workshop facilitators. The survey information provided useful background on the interests and vector management/research experiences of the participants and enabled the workshop presenters and discussion leaders to appropriately focus the workshop in areas most relevant to the audience. This approach improved the efficiency and outcomes of the meeting, so that the one-day meeting timeframe did not limit the meeting's success.

Survey participants were asked to identify a particular “vector of concern” in a specific “geographic location” and then respond to 6 follow-up questions regarding specifics about managing that vector. These 6 questions considered regulatory authority and practices in vector management. The respondents were provided space to answer these questions for up to 3 vectors and 3 locations of their choosing. There was also a “comment section” at the end of the survey that invited respondents to discuss additional vectors they manage or other information regarding their existing vector management efforts.

Vector of Concern

Table 1 is a summary of the results for the vectors selected by the respondents. This was important information for the workshop as it helped us to focus on the pathways of most concern to the participants. The survey provided a drop down box with possible vectors to be selected (e.g. aquaculture, aquarium trade, bait trade, ballast water, fishing gear, horticulture, and hull fouling). Respondents could also enter a different vector under the “other” category. Respondents most frequently selected ballast water as the vector of most interest (Table 1), three vectors were added by respondents through the “other” category.

Table 1. The frequency of selection and ranking by frequency of each vector.

Vector	Total Responses	Rank (1-5)
Aquaculture	6	3
Aquarium trade	7	2
Bait trade	5	4
Ballast water	10	1
Fishing gear	3	
Horticulture	4	5
Hull fouling	4	5
Other: Illegal stocking	1	
Other: Live fish importation	1	
Other: Non specific	1	
Grand Total	42	

Geographic Region

Respondents were asked to identify a primary and secondary geographic region for the vector they selected under the “vector of concern” (Table 1). This helped clarify what regulatory framework (e.g. federal, state, local) they were discussing when they responded to the survey questions regarding regulatory authority and practices in vector management. Respondents could select a geographic location from a drop down box list (e.g federal government; local government; a region: Chesapeake Bay; mid-Atlantic; northeast; southeast; west coast; western mountain; and other; or a state: DE; MD; VA; NC; NY; NJ; WVA; District of Columbia; and other). As shown in Table 2, “other” locations included: international, national, Perkiomen Creek watershed, and undesignated “other”. Not surprisingly, the mid-Atlantic and states within the mid-Atlantic were the regions of particular interest to the workshop participants (Table 2).

Table 2. The geographic regions and the number of times they were selected for each vector.

Vector	Primary Region	Total	Secondary Region	Total	Total for Vector
Aquaculture	?	1	?	3	
	Federal	3	Federal	2	
	-MD	1			
	-Mid-Atlantic	1	VA	1	12
Aquarium trade	Federal	2	?	3	
	-Mid-Atlantic	1	Federal	2	
	-NC	1	MD	1	
	Region	2	VA	1	
	-Southeast	1			14
Bait trade	Federal	1	?	3	
	-MD	3	Chesapeake Bay	1	
	-Mid-Atlantic	1	Federal	1	10
Ballast water	?	1	?	3	
	-Chesapeake Bay	1	Federal	2	
	Federal	4	Federal Global	1	
	-Mid-Atlantic	1	- other	1	
	Other	1	Other International	1	
	-West Coast	2	- other national	1	20
			-VA	1	
Fishing gear	-MD	3	?	3	6
Horticulture	-MD	2	?	2	
	-Mid-Atlantic	2	- other	1	
			- VA	1	8
Hull fouling	Federal	1	?	1	
	-NY	1	Federal Global	1	
	Other	1	-NJ	1	
	-West Coast	1	Other International	1	8
Illegal stocking	?	1			1
Live fish importation	Federal	1	-Chesapeake Bay	1	2
Non specific	-Mid-Atlantic	1	Other Perkiomen Creek watershed (Montgomery, Bucks, Berks, Lehigh Counties, PA)	1	2
Grand Total		42		42	84

Legislative Authority and Current Practices

After respondents identified a vector of interest and a geographic location, they answered a series of questions regarding legislative authority, regulations and their current practices in managing the selected vector. The responses were grouped by pathway (maritime or live trade).

Because the original questions in the survey regarding vector regulations, legislation and current vector management practices were lengthy, we abbreviated them in our results tables (Tables 3 and 4). The original survey questions (with the tables' abbreviated questions in parenthesis) were as follows:

Legislative Practices Questions

1. What regulations, legislation or rules does your agency/organization currently apply to manage this vector? (Regulations used?)
2. What regulations, legislation or rules could/might your agency/organization apply, but currently does not, to manage this vector? (Regulations available?)
3. If you had legislative authority what regulation would you create to manage this vector? (Regulations wished for?)

Current Practices

1. What current practices does your agency/organization apply to manage this vector? (Current practices used?)
2. What current practices could/might your agency/organization apply, but currently does not, to manage this vector? (Current practices available?)
3. If you had the authority what practices would you create to manage this vector? (Practices wished for?)

Final Comments

The final survey question asked respondents to discuss additional vectors they manage or their thoughts on their agency/organization's current efforts in vector management. Their responses are as follows:

- Terrestrial invaders just as much a problem...
- As a research agency, USGS does not manage any vectors potentially introducing AIS, except for our own field gear. Rather, we provide the science to hopefully better inform those who do have management/regulatory authority.
- Even once we have authority to control a vector and regulations in place, public outreach still is a major uphill battle. It is troubling to think that one person who is not aware of an invasive vector issue can cause a species to be introduced unintentionally.
- There are lots of other Aquatic Pathways that worry me: - Transportation of Dredge Spoil Material - Live Seafood Trade - Introduction of Species for Cultural or Religious Purposes - Importation of Species for Non-Pet Purposes (research, zoos, public aquaria, etc.) - Interconnected Waterways - Interbasin Transfers.
- Fishing gear - NC does not have boat/trailer washing stations. There is some education outreach on wading gear washing and prevention of didymo spread, trailer and boat washing for prevention of hydrilla and zebra/quagga spread. However, public does not know enough.
- Professionally, I work at the global level with connections to federal agencies. On my personal time, I work as a Naturalist with a partial focus on wetland areas around the Potomac and thereby connections to the Chesapeake. This work tends to focus more on management of existing invasives (plants) and less on the vectors for their introduction. So my interest in the workshop is coming from both a global and a local perspective.
- As a privately funded, non-profit we can only help where asked or where we can make the case for grant funding. Likewise, we can help spread the word about how invasives enter our area but we have no authority to enact anything.

Table 3.

Maritime Vectors						
	Legislative Authority			Current Practices		
VECTOR	What regulations, legislation or rules does your agency/organization currently apply to manage this vector?	What regulations, legislation or rules could/might your agency/organization apply, but currently does not, to manage this vector?	If you had legislative authority what regulation would you create to manage this vector?	What current practices does your agency/organization apply to manage this vector?	What current practices could/might your agency/organization apply, but currently does not, to manage this vector?	If you had the authority what practices would you create to manage this vector?
Ballast Water Responses						
1	SOLAS, MARPOL, EPA, USCG	None	Obtainable, verifiable standards for ballast discharge content	Ballast exchange	Ballast treatment systems	Institute fully compliant system to the applicable regulations
2	None			Conduct research on methods to detect organisms in ballast water as well on treatment methods to remove organisms from ballast water		

Table 3 continued

Maritime Vectors						
	Legislative Authority			Current Practices		
VECTOR: Ballast Water Responses	Regulations used?	Regulations available?	Regulations wished for?	Current practices used?	Current practices available?	Practices wished for?
3	CWA, VGP			VGP	WQ standards	Standards
4	NANPCA 90 NISA 96			BW management requirement (BWE, retention, alternative) BW reporting	BW discharge standard	
5	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
6	None	None	Mandated mid-ocean ballast exchange & port monitoring of ballast water & sediments	None	None	Mandated mid-ocean ballast exchange, with inspectors

Table 3 continued

Maritime Vectors						
	Legislative Authority			Current Practices		
VECTOR: Ballast Water Responses	Regulations used?	Regulations available?	Regulations wished for?	Current practices used?	Current practices available?	Practices wished for?
7	We are working to enhance connections across international agencies addressing the issue (IMO, Convention on Biological Diversity) particularly on targeting gaps (i.e. ships covered) and opportunities to build capacity at the national level	Development and dissemination of best practice guidance	Attention to gaps (relevance to ships that carry ballast but are too small to be covered under the IMO Ballast Water Convention)	Training workshops on ballast water management; cooperation with institutions and agencies on monitoring	Greater scope of 6 (training has been limited to east Africa and central America but interest is greater)	
8	Marine Invasive Species Act of 2003 (AB 433) Coastal Ecosystems Protection Act of 2006 (SB 497) Amendments to the Marine Invasive Species Act (2007) (AB 740) Amendments to the Marine Invasive Species Act (2008) (SB 1781) Amendments to the Marine Invasive Species Act (2009) (Assembly Bill 248) Regulations (California Code of Regulations Title 2, Division 3, Chapter 1) Articles 4.5 through 4.9	None at this time	None at this time	Develop and implement inspection, enforcement, policy development, data collection, fee collection, research	None at this time	No additional authority needed

Table 3 continued

Maritime Vectors						
	Legislative Authority			Current Practices		
VECTOR	Regulations used?	Regulations available?	Regulations wished for?	Current practices used?	Current practices available?	Practices wished for?
Hull Fouling Responses						
1	NISA 96		More specific hull fouling management requirements	Requirement for regular cleaning and disposal of materials		
2	Not available	Not available	Stricter guidelines for hull cleaning	Public Education and Outreach		Hull cleaning
3	To date there are only technical discussions regarding regulations/guidance at the international level (IMO)	See 3 left	Develop codes of conduct or best practices for use and eventual conversion into an international legal standard	Currently only working through partners on the issue (nothing substantive ourselves)	Further development of guidelines/best practices and training	See 7

Table 3 continued

Maritime Vectors						
	Legislative Authority			Current Practices		
VECTOR: Hull Fouling Responses	Regulations used?	Regulations available?	Regulations wished for?	Current practices used?	Current practices available?	Practices wished for?
4	Marine Invasive Species Act of 2003 (AB 433) Coastal Ecosystems Protection Act of 2006 (SB 497) Amendments to the Marine Invasive Species Act (2007) (AB 740) Amendments to the Marine Invasive Species Act (2008) (SB 1781) Amendments to the Marine Invasive Species Act (2009) (Assembly Bill 248) Regulations (California Code of Regulations Title 2, Division 3, Chapter 1) Articles 4.5 through 4.9	We are required by law to consider regulations to address hull fouling on commercial vessels by 2012. We are conducting the necessary research and data analysis to identify potential management requirements	None at this time. We have fairly complete legislative authority at this time. We are collecting data and working with stakeholders to identify potential management requirements by January 2012	Develop and implement inspection, enforcement, policy development, data collection, fee collection, research	None at this time	None at this time. We are collecting data to assess the risk and identify management changes. We are required to complete this analysis and develop regulations by January 2012

Table 4.

Live Trade Vectors						
	Legislative authority			Current Practices		
VECTOR	What regulations, legislation or rules does your agency/org. currently apply to manage this vector?	What regulations, legislation or rules could/might your agency/org. apply but currently does not, to manage this vector?	If you had legislative authority what regulation would you create to manage this vector?	What current practices does your agency/org. apply to manage this vector?	What current practices could/might your agency/org. apply, but currently does not, to manage this vector?	If you had the authority what practices would you create to manage this vector?
Aquaculture Responses						
1	Legislative rules to get permits for culturing species. Published list with species that are okay to culture without permit and also a published black list			Permit review along with a site inspection. Permittee must meet specific standard operating procedures to reduce escapement risk		More education outreach
2	None			Conduct research and risk assessments on aquatic organisms escaping from aquaculture facilities as needed/requested		
3	NANPCA and Injurious Wildlife listings via the Lacey Act	Unsure	Black and White lists of what can and cannot be imported and raised	Education and outreach; Enforcement of Lacey Act		Limitations on what could be raised in aquaculture, greater precautions to prevent accidental introductions

Table 4 continued

Live Trade Vectors						
	Legislative Authority			Current Practices		
VECTOR: Aquaculture Responses	Regulations used?	Regulations available?	Regulations wished for?	Current practices used?	Current practices available?	Practices wished for?
4	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
5	Annotated Code of Maryland, Natural Resources Code Title §4-11A Aquaculture §4-205.1 Non-native Aquatic Organisms; Code of Maryland Regulation 08.02.11.14 Aquaculture, 08.02.11.19 Nuisance and Prohibited Species	Don't know	Don't know	Import Policy, MOU with Agriculture on Aquatic Animal Health		
6	None	None	Required monitoring for exogenous taxa beyond those in culture	None	None	Required monitoring, likely using molecular tools
VECTOR: Aquarium Trade Responses						
1	NANPCA and those species listed as Injurious Wildlife	Unsure	Some sort of white and black list such as what was proposed in the recent HR669	Habitattitude national public awareness campaign; other miscellaneous education/outreach efforts	More direct education of the pet industry	Easy methods for folks to get rid of pets without having to dump them
2	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown

Table 4 continued

Live Trade Vectors						
	Legislative Authority			Current Practices		
VECTOR: Aquarium Trade Responses	Regulations used?	Regulations available?	Regulations wished for?	Current practices used?	Current practices available?	Practices wished for?
3	For non-native species affecting site management objectives, control is recommended or required; Clean Water Act may help for certain activities and situations	Prohibitions on disposal or release of aquaria species into waters and wetlands	Regulations that would clearly prohibit the release of aquatic species into waters and wetlands backed up by fines	Public education or management if species is causing considerable harm or threat to resources	More focus on prevention through public education through presentations, brochures and signs at entrances to waterways	Those mentioned in no. 7
4	Legislative rules for do not possess, transport, sell. Rules establish black lists		No permits, but shop registration with species list	Enforces species on prohibition list when notified		Education outreach to the shops on proposed registration list
5			Pre-import risk screening for all non-native species			Pre-import risk screening for all non-native species
6			Pre-import risk screening for all non-native species			Pre-import risk screening for all non-native species
7	None			Conduct research and risk assessments on species in the aquarium industry as requested/needed		

Table 4 continued

Live Trade Vectors						
	Legislative Authority			Current Practices		
VECTOR	Regulations used?	Regulations available?	Regulations wished for?	Current practices used?	Current practices available?	Practices wished for?
Bait Trade Responses						
1	NANPCA	Unsure	Penalties for dumping of bait; perhaps restricting bait sellers to only native species	100th Meridian Initiative has helped states develop states regs on bait and bait dumping. Also education/outreach through Stop Aquatic Hitchhikers and other activities		Allow only native species to be sold as bait
2	Broad authority	more restrictions on bait transfer and commerce	Have it	Regulations on some species	Bans on bait species, particularly crabs, a few other inverts, maybe fish	Have authority, lack will
3	Code of Maryland Regulations (COMAR) 08.02.11.20 Bait					Are in the process of developing new bait regulations
4	Natural Resources Article, Sections 4-205.1 and 4-219, Annotated Code of Maryland	lists of species which can be used as bait	we have authority, regulations are proposed yet	public outreach and education	more regulations and outreach	limiting the types of species which can be sold and/or used as bait
5	None	Oversight of legal bait	authority for inspection of bait shops	None	Safe list	Safe list

Table 4 continued

Live Trade Vectors						
	Legislative Authority			Current Practices		
VECTOR	Regulations used?	Regulations available?	Regulations wished for?	Current practices used?	Current practices available?	Practices wished for?
Fishing Gear Responses						
1	Natural Resources Article, Section 4-205.1, Annotated Code of Maryland; COMAR 08.02.19.01-.06; COMAR 08.02.11.04	Broader gear authority	Limiting gears based on possibilities of introductions related to the gear type	Limiting gear types related to species we have listed as nonnative nuisance species	More widespread gear control	Prohibitions on certain types of gear
2	Some sections in Annotated Code of Maryland, Natural Resources Article, Title §4 can be used, but not specific to gear	Annotated Code of Maryland, Natural Resources Article §4-600's Code of Maryland Regulations (COMAR) 08.02.11.04	Prohibition of certain gear, bait prohibition	Advisories to the public through press release, sportfishing guide, on sight informational signs, internet messages	More outreach to general public through meetings, public service announcements	No others
3	No wader regs. Regs of inter-watershed regs that are generally not known to public	Gear (wader) restrictions for freshwater rec. anglers	Authoritarian dictatorship	Wader wash stations, bait regs, public outreach, media	Mandatory gear inspections	Mandatory gear cleaning, inspections
VECTOR: Horticulture Responses						
1	None, horticultural regulation rests with MDA	A Departmental policy not to plant specific invasive species at agency facilities, which we are working on currently		None	Do Not Plant list mentioned above	A complete risk assessment similar to APHIS Q37 rules

Table 4 continued

Live Trade Vectors						
	Legislative Authority			Current Practices		
VECTOR: Horticulture Responses	Regulations used?	Regulations available?	Regulations wished for?	Current practices used?	Current practices available?	Practices wished for?
2	None	None	Invasive Plant Species Ban	Inform, and encourage, the public to avoid buying invasive plant species at nurseries	Introduce state legislation (in alliance with other stakeholders) to address the trade and introduction of highly invasive plant species to the state of Maryland (and the District of Columbia)/ Educate the public and foster the use of native species or non-invasive alien species./ Encourage the nursery industry to sell native germplasm	Create a proper legislative framework to address the problem, and, empower the public agencies, or the pertinent institutional mechanism available, to make the right decisions and secure the appropriate law enforcement to tackle the introduction, trade, and intentional spread of invasive species
3	None, covered by Dept of Ag	Prohibited species other than federal list	Authority to go on private property to control ANS; authority to prohibit releases in tidal & non-tidal waters	Control of released ANS on public waters	Prohibiting release of water gardening species	Prohibit release of non-native flora and fauna in both tidal & non-tidal waters

Live Trade Vectors						
	Legislative Authority			Current Practices		
VECTOR: Horticulture Responses	Regulations used?	Regulations available?	Regulations wished for?	Current practices used?	Current practices available?	Practices wished for?
4	Virginia Pest Law	Noxious Weed Law	Virginia Precautionary Principle Law (a.k.a., Guilty Until Proven Innocent Law) where species must meet criteria establishing them as non-invasive before they are allowed into the Commonwealth	Inspections and when necessary, local quarantines	State-wide quarantine	See #5 left
VECTOR: Illegal Stocking Responses						
1	Legislative rules - Must obtain permit from the NC Wildlife Resources Commission to stock fish into public waters. This also includes grass carp			Permits		Education outreach and enforcement. Establish civil and criminal penalties
VECTOR: Live Fish Importation Responses						
1	Endangered Species Act Lacey Act		Clean list			