Appendix 4 - Shipboard Oil Pollution Emergency Plan (SOPEP)

CHPE Project
Lake Champlain Cable Installation & Support Vessels
SHIPBOARD OIL POLLUTION EMERGENCY PLAN (SOPEP)

Prepared in accordance with the requirements of Title 33 - Navigation and Navigable Waters. CHAPTER I - COAST GUARD, DEPARTMENT OF HOMELAND SECURITY (CONTINUED). SUBCHAPTER O - POLLUTION. PART 151 - VESSELS CARRYING OIL, NOXIOUS LIQUID SUBSTANCES, GARBAGE, MUNICIPAL OR COMMERCIAL WASTE, AND BALLAST WATER. Subpart A - Implementation of MARPOL 73/78 and the Protocol on Environmental Protection to the Antarctic Treaty as it Pertains to Pollution from Ships. - Oil Pollution where feasible and applicable for an inland temporary work barge.

Electronic Copy

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Master's Overriding Authority

THE PROCEDURES OUTLINED IN THIS MANUAL ARE INTENDED AS A GUIDE WHICH DOES NOT LIMIT OR OVERRIDE THE AUTHORITY OF THE MASTER OR PERSON-IN-CHARGE AS THE SENIOR COMPANY OFFICER AT THE SCENE OF AN INCIDENT.

IN ALL CASES, THE MASTER OR PERSON-IN-CHARGE WILL TAKE WHATEVER ACTION DEEMED NECESSARY BASED ON AN ASSESSMENT OF THE SITUATION AND JUDGEMENT OF THE INCIDENT REQUIREMENTS AND PRIORITIES.

ALL PERSONNEL INVOLVED IN THE RESPONSE WILL KEEP A LOG OF ALL CRITICAL ACTIONS TAKEN OR COMPLETED INCLUDING APPROXIMATE TIME.

Lake Champlain Cable
Installation & Support Vessels

Shipboard Oil Pollution Emergency Plan (SOPEP)

DISTRIBUTION LIST

COPY #	LOCATION / NAME OR ORGANIZATION	TELEPHONE
1.	Vessel Copy	
2.	Vessel Master / Superintendent	TBD
3.	Caldwell Marine International (Office Copy)	732 557 6100
4.		
5.		
6.		
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8.		
9.		
10.		

INTRODUCTION

1. This Plan is written in accordance with the requirements of Title 33 - Navigation and Navigable Waters. CHAPTER I - COAST GUARD, DEPARTMENT OF HOMELAND SECURITY (CONTINUED). SUBCHAPTER O - POLLUTION. PART 151 - VESSELS CARRYING OIL, NOXIOUS LIQUID SUBSTANCES, GARBAGE, MUNICIPAL OR COMMERCIAL WASTE, AND BALLAST WATER. Subpart A - Implementation of MARPOL 73/78 and the Protocol on Environmental Protection to the Antarctic Treaty as it Pertains to Pollution from Ships. - Oil Pollution where feasible and applicable for inland temporary work barge.

2. The purpose of the Plan is to provide guidance to the Master and on shipboard personnel with respect to the steps to be taken when a marine pollution incident involving the vessel has occurred or is likely to occur.

3. The Plan contains all information and operational instructions required by the Guidelines. The appendices contain names, telephone numbers, pager numbers, etc., of all contacts referenced in the Plan, as well as other valuable reference material that would be used by the company's response team personnel.

4. A SOPEP is not required for this vessel; therefore, this Plan is monitored, checked and updated internally as part of the company's Safety Management System. It has not been examined by the Administration.

RECORD OF CHANGES

Amendment Number	Section and Page	Date Entered	Remarks	Name and Position of Person(s) Making Entry

VESSEL PARTICULARS

Name of Vessel:	*Insert vessel name*
Length Overall:	*Insert vessel particulars*
Breadth Molded:	*Insert vessel particulars*
Depth:	*Insert vessel particulars*

TABLE OF CONTENTS

1. PREAMBLE

1.1 PURPOSE OF THE PLAN

The purpose of this Plan is to guide vessel and shore personnel in responding QUICKLY, SAFELY, and EFFECTIVELY to a marine oil pollution incident involving the *Insert vessel name*.

It is prepared in accordance with the requirements of Title 33 - Navigation and Navigable Waters. CHAPTER I - COAST GUARD, DEPARTMENT OF HOMELAND SECURITY (CONTINUED). SUBCHAPTER O - POLLUTION. PART 151 - VESSELS CARRYING OIL, NOXIOUS LIQUID SUBSTANCES, GARBAGE, MUNICIPAL OR COMMERCIAL WASTE, AND BALLAST WATER. Subpart A - Implementation of MARPOL 73/78 and the Protocol on Environmental Protection to the Antarctic Treaty as it Pertains to Pollution from Ships. - Oil Pollution where applicable for an inland temporary work barge.

It is intended to be:

- **Realistic, practical, and easy to use for all personnel**
- **Clearly understood by vessel management personnel, both on board and ashore**
- **Evaluated, reviewed, and updated on a regular basis.**

1.2 VESSEL OPERATIONS OVERVIEW

Vessel Name is a *vessel description* built in the US for sheltered water work.

A detailed description of the vessel, including vessel particulars and drawings, is provided in *Appendix B - Vessel-specific Appendix.*

1.3 RESPONSE PRIORITIES

All emergency response activities will be carried out in accordance with the following overall priorities:

1. **Protection of Life (i.e., crew, public)**
2. **Protection of the environment**
3. **Securing the safety of the vessel and protecting property**

1.4 LINKAGE TO OTHER PLANS

This Plan is intended to guide the efforts of the Vessel Response Team in responding QUICKLY, SAFELY, and EFFECTIVELY to a marine emergency or oil spill incident involving the *Vessel Name*

Reference should also be made to the following company manuals and documentation for emergency procedures:

- *CHPE Lake Champlain Installation Methodology Document*
- *Site Specific HASP*

This Plan is also intended to work in coordination with the plans and resources of other responding agencies such as the **US Coast Guard (USCG)** which has jurisdiction over all marine originating oil spills in US waters.

In the event of a spill during an bunker transfer, the crew of the *Vessel Name* and the attending support vessel(s) will respond to contain and recover the spill in cooperation and coordination with other stakeholders and responders.

1.5 LOCATIONS OF THE PLAN

A copy of this Plan will be kept on the *Vessel Name* and at the CMI head office.

1.6 PLAN REVISION / UPDATE PROCEDURES

The JAG (parent company to CMI)- **Director of Safety and Compliance** is responsible for ensuring the plan is reviewed, revised, and updated as required. Proposed revisions to the Plan may be submitted in writing or faxed to the company's head office. *Figure 1.1* shows a copy of the *Revision Request Form* that can be used for this purpose.

Revision pages will be issued to all Plan holders as required and changes will be recorded on the *Record of Changes* located in the *Introduction* to the Plan. The Plan will be formally reviewed and updated annually and more frequently if required.

The **Plan Administrator** is responsible for:

- Establishing and maintaining a central registry of Plan Assignees
- Establishing maintenance procedures
- Coordinating revisions

1.7 Approval of Response Techniques

Without interfering with shipowners' liability, some coastal States consider that it is their responsibility to define techniques and means to be taken against an oil pollution incident and to approve such operations which might cause further pollution, i.e. lightening. States are in general entitled to do so under the International Convention relating to intervention on the High Seas in Cases of Oil Pollution Casualties. 1969 (Intervention Convention).

Revision Request Form

FROM	DEPARTMENT	DATE

MANUAL NAME

REVISION TYPE: ADDITION ☐ DELETION ☐ CORRECTION ☐

REVISION TO: SECTION _____ SUBJECT _____
(ATTACH SEPARATE SHEET IF NECESSARY)

TEXT OF CHANGE: _____

REASON FOR CHANGE: _____

Reviewed by _____ Date _____

ACTION ISSUE AS REVISION ☐ DEFER ☐ REJECT ☐

SIGNATURE OF AUTHORIZATION

Figure 1.1
Revision Request Form

2. REPORTING REQUIREMENTS AND PROCEDURES

2.1 General

The Oil Pollution Act (OPA) top priority is to prevent, prepare for, and respond to oil spills that occur in and around inland waters of the United States. EPA is the leading federal response agency for oil spills occurring in inland waters. The US Coast Guard is the lead response agency for spills in coastal waters and Deepwater ports. The intent this Shipboard Oil Pollution Emergency Plan (SOPEP) is to ensure that proper authorities are informed, without delay, of any incident giving rise to pollution, or threat of pollution, of the marine environment, as well as the need for assistance and salvage measures, so that appropriate action may be taken.

The reporting procedures to be followed by the Master or other person in charge of the vessel after an oil pollution incident, as outlined in this Plan, are based on guidelines developed by the International Maritime Organization.

2.2 WHEN TO REPORT

2.2.1 ACTUAL DISCHARGE

An immediate report to the proper authorities and management is required whenever there is:

- **A discharge of oil resulting from damage to the vessel or its equipment**
- **A discharge, during the operation of the vessel (i.e., during fuel transfer or maintenance)**
- **An emergency discharge for the purpose of securing the safety of the vessel or saving life**

2.2.2 PROBABLE DISCHARGE

Although an actual discharge may not have occurred, a report is required if there is the probability of a discharge.

In judging the probability of a discharge and whether a report should be made, the following factors as a minimum, should be taken into account.

PROBABLE SPILL ASSESSMENT FACTORS

- **Level of risk to crew members and their condition, morale, and state of calmness**
- **Nature and extent of damage sustained by the vessel**
- **Failure or breakdown of machinery or equipment which may adversely affect ability to maneuver, navigate or operate pumps**
- **The location of the vessel and its proximity to land or other navigational hazards**
- **Traffic density**
- **Weather, tide, current, and sea state**

As a general guide, the Master should report in cases of:

- **Damage, failure or breakdown which affects the safety of the barge/tug and crew, or other shipping such as collision, fire, explosion, structural failure, instability, or excessive list**
- **Failure or breakdown of machinery or equipment which results in impairment of the safety of navigation such as steering gear, electrical generating system, propulsion, or essential ship borne navigational aids**

2.2.3 Follow Up Reports

Once the vessel has transmitted an initial report, further reports should be sent at regular intervals to keep those concerned informed of developments. Follow up reports to the USCG should be in the style given in *Section 2.2,* and should include information about every significant change in the vessel's condition, the rate of the release and spread of oil, weather conditions, and details of agencies notified and clean-up activities.

2.3 INFORMATION REQUIRED

Copies of the *Initial Incident Report Form* are located in *Appendix G - Forms*. This form outlines the critical information about a marine casualty or spill incident that should be communicated clearly and accurately throughout the initial notification process to enable appropriate action to be taken by all responders.

The format is consistent with the General Principles for Ship Reporting Systems and Ship Reporting Requirements, including Guidelines for Reporting Incidents Involving Dangerous Goods, Harmful Substances and/or Marine Pollutants, adopted as Resolution A.851(20) by the International Maritime Organization (IMO), as amended by Res. MEPC. 138(53). and should be followed so far as possible, (Note: The reference letters in the form do not follow the complete alphabetical sequence as certain letters are allocated to information required for other reporting formats).

The following information should be included when completing the report form:

AA/ Ship Identity (name, official number, flag, towing vessel if applicable and call sign)

BB/ Date and time of incident: a 6-digit group giving day of month (first two digits), hours and minutes (last four digits)

CC/ Ship's position, giving latitude: a 4-digit group in degrees and minutes suffixed with N (North) or S (South); and longitude: a 5-digit group in degrees and minutes suffixed with E (East) or W (West); or

DD/ Ship's position by true bearing (first 3 digits) and distance (stated) from a clearly identified landmark

EE/ True course (as a 3-digit group)

FF/ Speed (in knots and tenths of a knot as a 3-digit group)

LL/ Route information - details of intended track

MM/ Full details of radio stations and frequencies being guarded

NN/ Time of next report (a 6-digit group as in B)

PP/ Types and quantities of cargo and bunkers on board

QQ/ Brief details of defect, damage, deficiency, other limitations

RR/ Description of pollution. These should include the type of oil, an estimate of the quantity discharged, whether the discharge is continuing, the cause of the discharge, and, if possible, an estimate of the movement of the slick.

SS/ Weather and sea condition, including wind force and direction and relevant tidal or current details

TT/ Name, address, telex, facsimile, and telephone numbers of the ship's owner or representative (manager or operator of the ship, or their agents)

UU/ Details of length, breadth, tonnage, and type of ship

XX/
- Brief details of the incident
- Current condition of the barge/tug
- Names of other ships involved
- Action taken with regard to the discharge and movement of the ship
- Personnel injuries sustained
- Whether medical assistance is required.

If no assistance is required, this should be clearly stated.

Sufficient information about the incident must be obtained to enable those contacted to react appropriately to the situation and specific circumstances of the incident. This information must then be communicated CLEARLY, ACCURATELY, and CONCISELY at all levels of the notification process. As more information becomes available, it can be added to what is already known, or to replace outdated or inaccurate information.

Reports should be transmitted by the quickest available means to the US Coast Guard, Marine Safety Inspector or Marine Communications and Traffic Services Officer.

The following additional information should be sent to the Jag Companies (CMI) Director of Safety and Compliance/DPA either at the same time as the initial report or a soon as possible thereafter:

- further details of damage to ship and equipment
- whether damage is still being sustained
- assessment of fire risk and precautions taken
- disposition of cargo on board and quantities involved

- number of casualties
- damage to other ships or property
- time assistance was requested, and time assistance expected to arrive at the scene
- name of salvor and type of salvage equipment
- whether further assistance is required
- priority requirements for spare parts and other materials
- details of outside parties advised or aware of the incident
- any other important information

After transmission of the information in an initial report, as much as possible of the information essential for the safeguarding of life and the protection of the ship and the marine environment should be reported in a supplementary report to USCG and the CMI on-call Incident Commander, in order to keep them informed of the situation as the incident develops. This should include items A, P, Q, S, and X as appropriate as well as any changes in any items already relayed.

2.4 WHOM TO CONTACT

Figure 2.1 at the end of this section show the initial notification/ reporting procedure, for US waters that is to be followed for all oil spill or marine emergency incidents involving company owned or operated vessels. This will ensure that a standard spill reporting procedure is in place, that adequate internal and external response personnel and resources are mobilized during the critical first hours following detection, and that the appropriate regulatory and other government agencies are properly notified.

2.4.1 INTERNAL NOTIFICATION

All spills or potential spills are to be reported immediately by the **Master** or **Person-In-Charge** of the *Vessel Name* to company management by paging the CMI Incident Commander at **732 557 6100** and leaving a call-back number.

The CMI Incident Commander will complete the mandatory Coastal State Notifications as outlined in *Section 2.3.2*. If the CMI on-call Incident Commander cannot be immediately reached or if the circumstances warrant it, the Master or Person In Charge of the vessel must directly notify the appropriate government agencies. The CMI Incident Commander or their designate will notify the **Response Management Team (RMT)** as needed and required. Contact numbers for all RMT personnel are listed in *Appendix A*.

2.4.2 REGULATORY SPILL REPORTING REQUIREMENTS

The CMI Incident Commander (or Master or Person-In-Charge) will report the incident **WITHOUT DELAY** to the US Coast Guard's **Marine Communications and Traffic Services Centre (MCTS)** in New York:

Coast Guard MCTS Centre (New York)

1-718 354 4088/9 (24 Hours)
VHF Radio: New York Channel 11,12,14 & 16

Coast Guard Group Burlington (VT)

1-802 951 6760 (24 Hours)

New York State DEC

1-800 457 7362 (24 Hours, within NY State)
(518) 457 7362 (24 Hours, outside NY State)

New Jersey State DEC

1-877 927 6337 (24 Hours)

Vermont State DEC

1-802 828 1138 (Business Hours: weekdays 7:45am – 4:30pm, Waste Management & Prevention Division)
1-800 641 5005 (24-hour State Police Dispatch)

New York Harbor Port Authority will in turn notify, as required, the agencies listed below (see *Appendix A* for 24 Hour Emergency Numbers): 718 354 4089

- **USCG Marine Safety Branch (Marine Safety Inspector)**
- **Corporation Port/Commission Port (spills in a Port)**
- **State Emergency Program (SEP) (all land sourced spills greater than 100 Litres)**

USCG will in turn notify government agencies who might become involved in the response effort.

See *Appendix A* for contact numbers.

DEC Spills will be notified by CMI for spill discoveries greater than 5 gallons at the NYS Spills Hotline: 1-800-457-7362

NOTE:

Corporate policy is that all spills will be reported directly to key government agencies by Company personnel as soon as it is safely possible, rather than relying on other agencies to do so. This policy applies to all spills in US waters.

2.4.3 NOTIFICATION OF RESPONSE CONTRACTOR(S)

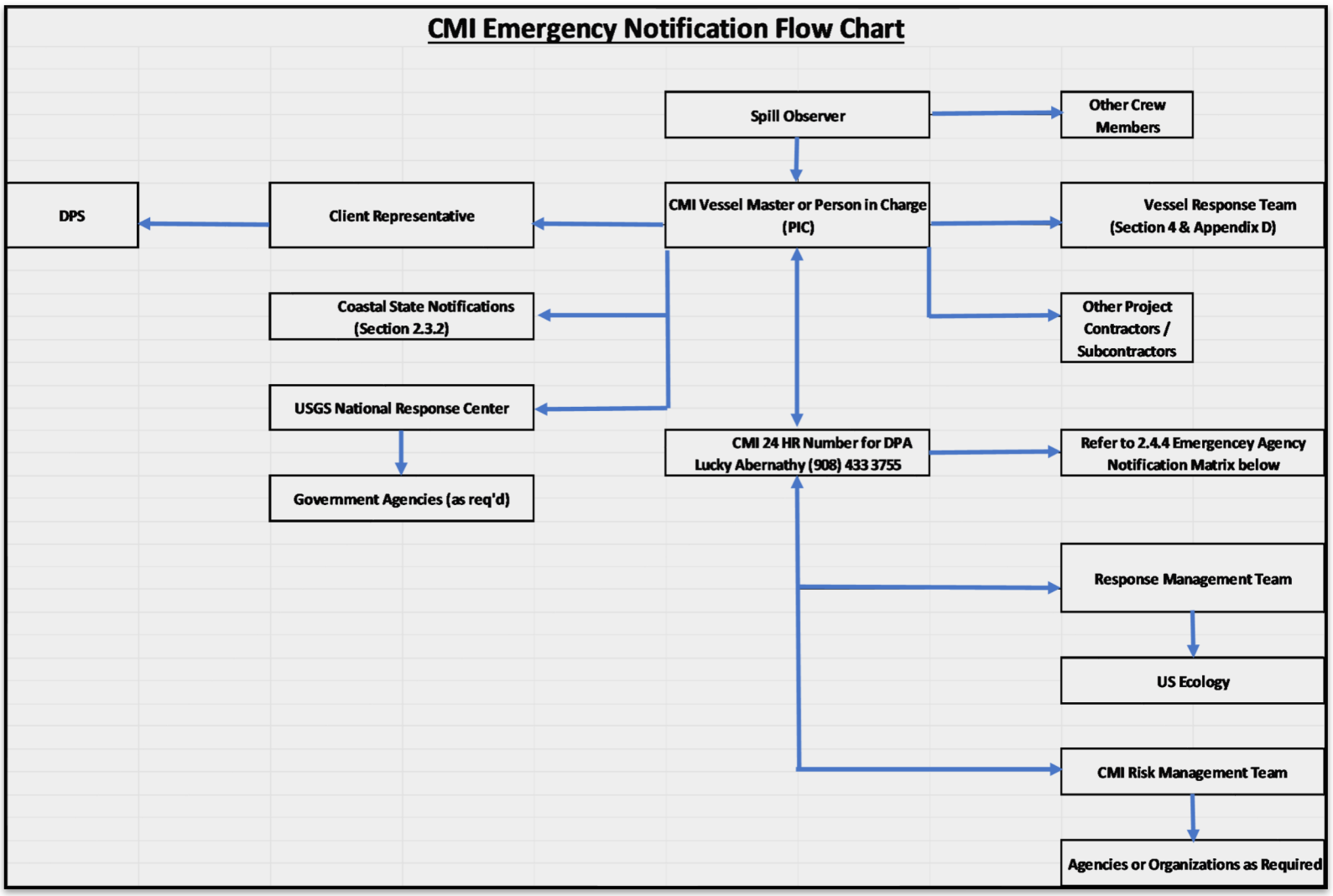
If a spill has occurred as a result of the incident, the Master (or CMI Incident Commander) will also alert appropriate contractor(s) to begin or prepare for potential deployment of response personnel and equipment to the spill site.

The company's primary oil spill response contractors for marine oil spill incidents are:

LOCATION	SPILL RESPONSE CONTRACTOR
US Waters	• US Ecology

A list of contractors and suppliers relating to a vessel casualty and/or marine oil spill incident is provided in *Appendix A - Contact Listing*.

Figure 2 - CMI Spill Emergency Notification Flow Chart



2.4.4 Emergency Agency Notification Matrix

Type of Emergency	Agencies to be Notified	Telephone	Notification Criteria	Notification Time Frame	Information to Report
Oil Spill to Land or Marine Waters	**NYS DEC Spill Hotline**	**(800)-457-7362**	Reportable Spills to land or water	Immediately	1. Location of release or threatened release 2. Qty released 3. Type of oil 4. Your name and phone number
	National Response Center	**(800) 424-8802**			
	USCG	**(805) 985-9822**			
	NYS DPS	**(562) 590-5201**			

3. STEPS TO CONTROL DISCHARGE

3.2 OPERATIONAL SPILLS

WHENEVER AN OIL SPILL OCCURS IT IS THE DUTY OF THE PERSON FINDING THE SPILL TO IMMEDIATELY INFORM THE MASTER OR PERSON-IN-CHARGE, WHO SHOULD CALL OUT THE VESSEL RESPONSE TEAM. REMEMBER THAT AN OIL SPILL MAY CREATE A FIRE OR EXPLOSION HAZARD, REQUIRING SAFETY PRECAUTIONS TO BE OBSERVED.

Immediately following the discovery of a spill, the Master and crew members (i.e., Vessel Response Team) will initiate action to protect the crew, secure the vessel, stop the flow, control or contain the spill, and notify as per contact instructions. The CMI Marine Incident Commander and Response Management Team (RMT) will provide whatever practical support is required to assist the vessel team in dealing effectively with the incident.

The following operational spill occurrences are covered separately in this section:

THESE PROCEDURES ARE A GUIDE WHICH DOES NOT LIMIT THE AUTHORITY OF THE MASTER OR PERSON-IN-CHARGE AS THE SENIOR COMPANY OFFICER AT THE SCENE OF AN INCIDENT.

IN ALL CASES, THE MASTER OR PERSON-IN-CHARGE WILL TAKE WHATEVER ACTION HE DEEMS NECESSARY BASED ON HIS ASSESSMENT AND JUDGEMTENT OF THE INCIDENT REQUIREMENTS AND PRIOITIES

3.1.1 PIPELINE LEAKAGE DURING FUEL TRANSFER

The following procedures are only to serve as a guide to the actions to be taken in the event of an incident. The order in which they are laid out is not necessarily chronological and the circumstances at hand may dictate an alternate order of response actions. In the event of a pipeline leakage or hose failure during fuel transfer, the following steps/measures should be considered and/or taken:

1. IMMEDIATE ACTIONS

- Stop transfer operations immediately.
- Close fuel line(s) and manifold valves at the vessel and tank,
- Sound General Alarm and notify the Master.
- **Eliminate** all avoidable sources of ignition where flammable vapors could be present (e.g., naked lights, unprotected light bulbs, electric hand tools, etc.).
- Consider whether to stop air intake into accommodation areas and non-essential air intake to engine-room.

2. STOP PRODUCT FLOW / CONTAIN THE SPILL

- Ensure scuppers are secured/block potential escape points.
- Locate the hose break or source of leakage and secure immediately.
- Drain affected section of hose to an empty or slack tank or to the shore as necessary.
- Trim and/or list vessel accordingly.

3. SECURE THE SPILL AREA / ENFORCE SAFETY PROCEDURES

- Clear the area around the spill of all unauthorized or non-essential personnel.
- Enforce all safety measures and wear appropriate personal protective equipment (e.g., hard hats, gloves, and rubber boots).
- Follow standard confined space entry procedures before entering enclosed spaces.

4. ASSESS THE SITUATION AND REPORT THE SPILL
(Use the *Initial Incident Report Form* for guidance if readily available)

- Determine the product spilled; estimated quantity, actions taken, and level and type of assistance required.
- **Complete notification responsibilities** as outlined in *Section 2 - Reporting Requirements.* See *Appendix A* or the summary sheet for emergency numbers.

5. CONTAIN / CLEAN UP THE SPILL ON VESSEL

- Stay upwind of vapors - do not walk-through spilled oil.
- Spread sorbent boom, sheets, sweeps, or other available material to limit the spread of spilled oil across the deck.
- Use sorbent pads or other available material to soak up spilled oil.
- Use clean, non-sparking tools to recover used sorbent materials.
- Store waste materials in leak-proof, sealable containers (e.g., steel or plastic drums, heavy duty 6 mil plastic bags).
- Identify the type of waste in each container clearly.
- Store waste materials safely aboard the vessel in a contained area to prevent further leakage or spillage. (May request if waste materials can be stored on shore due to safety or space considerations.)
- Consult with BC Environment Waste Management Branch before removing waste material for disposal.

6. FURTHER ACTIONS

- After dealing with the cause of the spill, it may be necessary to obtain permission from the local authorities to resume normal operations.

3.1.2 TANK OVERFLOW DURING FUEL TRANSFER

The following procedures are only to serve as a guide to the actions to be taken in the event of an incident. The order in which they are laid out is not necessarily chronological and the circumstances at hand may dictate an alternate order of response actions. In the event of a tank overflow during fuel transfer, the following steps/measures should be considered and/or taken:

1. IMMEDIATE ACTIONS

- Inform bunkering personnel to shut down transfer operations immediately.
- Close fuel line(s) and manifold valves at the vessel and on dock/tank.
- Sound General Alarm and notify the Master.
- **Eliminate** all avoidable sources of ignition where flammable vapors could be present (e.g., naked lights, unprotected light bulbs, electric hand tools, etc.).
- Consider whether to stop air intake into accommodation areas and non-essential air intake to engine-room.

2. STOP THE PRODUCT FLOW / CONTAIN THE SPILL

- Ensure scuppers are secured / block potential escape points.
- Reduce the tank level by transferring fuel to an empty or slack tank.
- Drain the fuel line to an empty or slack tank, if possible to do so safely, and without risk of further spillage.

3. SECURE THE SPILL AREA / ENFORCE SAFETY PROCEDURES

- Clear the area around the vessel/dock of all unauthorized or non-essential personnel.
- Enforce all safety measures and wear appropriate personal protective equipment (e.g., hard hats, gloves, and rubber boots).
- Follow standard confined space entry procedures before entering enclosed spaces.

4. ASSESS THE SITUATION AND REPORT THE SPILL

(Use the *Initial Incident Report Form* for guidance if readily available)

- Determine the product spilled; estimated quantity, actions taken, and level and type of assistance required.
- **Complete notification responsibilities** as outlined in *Section 2 - Reporting Requirements.* See *Appendix A* or the summary sheet for emergency numbers.

5. CONTAIN / CLEAN UP THE SPILL ON VESSEL

- Prepare a portable pump to transfer spilled fuel to a slack tank or to the waste oil tank.
- Stay upwind of vapors - do not walk through spilled oil.
- Use sorbent boom, sheets, sweeps, or other available material to limit the spread of spilled oil across the deck.
- Spread sorbent pads or material to soak up spilled oil.
- Use clean, non-sparking tools to recover used sorbent materials.
- Store waste materials in leak-proof, sealable containers (e.g., steel or plastic drums, heavy duty 6 mil plastic bags).
- Identify the type of waste in each container clearly.
- Store waste materials safely aboard the vessel in a contained area to prevent further leakage or spillage. (May request the terminal if waste materials can be stored on shore due to safety or space considerations)
- Consult with BC Environment Waste Management Branch before removing waste material for disposal.

6. FURTHER ACTIONS

- After dealing with the cause of the spill, it may be necessary to obtain permission from the local authorities or the terminal to resume normal operations.

3.1.3 FIRE / EXPLOSION

The following procedures are only to serve as a guide to the actions to be taken in the event of an incident. The order in which they are laid out is not necessarily chronological and the circumstances at hand may dictate an alternate order of response actions.
A fire or explosion involving the vessel can be in the deck area, engine room, accommodation area, and may involve the dock. In the event of a fire/explosion situation the following steps should be considered and/or taken.

1. IMMEDIATE ACTIONS

- Sound General Alarm and muster crew to Emergency Stations.
- Shut down ventilation systems and close fire barriers to contain the fire.
- Inform the terminal / local fire department, if at dock.
- **Eliminate** all avoidable sources of ignition.
- **Fix position and complete notification responsibilities** as outlined in *Section 2 - Reporting Requirements.* See *Appendix A*

2. CREW SAFETY

- Ensure that appropriate personal protective equipment is worn by crew.
- Determine whether there are any injuries or missing personnel.
- Prepare serious injuries for immediate evacuation.
- Advise Master on crew status and head count.
- Follow confined space entry procedures before entering enclosed spaces.

3. FIRE CONTROL AND SUPPRESSION

- Inspect the fire location to assess immediate damage and risk.
- Use available conventional equipment to control or extinguish, if possible to do so safely.
- Quickly assess the danger to crew and the vessel and advise the Master:
  - What is the cause (i.e., electrical, fuel, other)?
  - Can it be brought under control?
  - Can it be isolated?
  - Can it be extinguished?

If fire is in the engine room:

- First attempt conventional firefighting methods.
- If conventional methods are unsuccessful, consider activating the fixed fire suppression system. This should only be done by the Engineer after warning other crew members and confirming no personnel are in the engine room.

If fire is in the accommodation area:

- Use portable extinguishers or fire hose to extinguish fire, depending on size and severity.
- Position the vessel to minimize wind exposure to the fire area and clear the accommodation compartment of smoke via venting.

If fire is on deck:

- Confirm the nature and risk of the material(s) on fire.
- Use appropriate personal protective equipment and breathing apparatus.
- Use portable extinguishers or fire hose to extinguish fire, depending on size and severity.
- Position the vessel to minimize wind exposure to the fire area.

If fire is on the dock:

- Identify possible emergency escape routes.
- Consider the necessity of vacating dock for vessel's safety.

4. DAMAGE ASSESSMENT

- Test stability, trim, handling, propulsion, navigation and communications capabilities.
- Evaluate immediate threats such as potential hull damage, loss of stability, oil pollution, etc., in connection with the fire / explosion.
- Report status of fire to **US Coast Guard** and **CMI Incident Commander**
- If there is a spill of oil in connection with the fire or explosion advise **CMI Incident Commander** and **Coast Guard,** and request oil spill response contractor assistance.

IF THE FIRE DOES NOT POSE AN IMMEDIATE RISK TO CREW MEMBERS AND THE VESSEL CAN BE SAFELY MOVED TO A SUITABLE SHORE LOCATION OR ANCHORAGE:

5. PROCEED TO ANCHORAGE AND CONTINUE FIRE FIGHTING ACTION

If the vessel is able to proceed under its own power:

- Confer with RMT (i.e., Incident Commander/Vessel Casualty Officer/Response Planning and Operations) and Coast Guard to discuss vessel movement options.
- Identify shore support requirements - e.g., medical aid, firefighting equipment, personnel.
- Proceed to nearest anchorage and continue efforts to control and extinguish the fire with the assistance of shore equipment and personnel.
- Be prepared to vacate anchorage if fire threatens local area.

3.1.4 CONTAINMENT SYSTEM OVERFLOW

The following procedures are only to serve as a guide to the actions to be taken in the event of an incident. The order in which they are laid out is not necessarily chronological and the circumstances at hand may dictate an alternate order of response actions. In the event of a loss of containment of the spill trays on deck, the following steps/measures should be considered and/or taken:

1. IMMEDIATE ACTIONS

- Inform terminal/bunkering personnel to shut down transfer operations immediately.
- Close fuel line(s) and manifold valves at the vessel and on dock.
- Sound General Alarm and notify the Master.
- **Eliminate** all avoidable sources of ignition where flammable vapors could be present (e.g., naked lights, unprotected lights, electric hand tools, etc.).
- Consider whether to stop air intake into accommodation areas and non-essential air intake to engine-room.

2. STOP THE PRODUCT FLOW / CONTAIN THE SPILL

- Identify where loss of containment has taken place.
- Ensure scuppers are secured / block potential escape points.
- Use sorbent booms to create secondary containment on deck.
- Reduce the level in the containment area by draining to waste tanks
- Drain the fuel line to an empty or slack tank, if possible to do so safely, and without risk of further spillage.

3. SECURE THE SPILL AREA / ENFORCE SAFETY PROCEDURES

- Clear the area around the vessel/dock of all unauthorized or non-essential personnel.
- Enforce all safety measures and wear appropriate personal protective equipment (e.g., hard hats, gloves, and rubber boots).
- Follow confined space entry procedures before entering enclosed spaces.

4. ASSESS THE SITUATION AND REPORT THE SPILL

(Use the *Initial Incident Report Form* for guidance if readily available)

- Determine the product spilled, estimated quantity, actions taken, and level and type of assistance required.
- **Complete notification responsibilities** as outlined in *Section 2 - Reporting Requirements.* See *Appendix A* or the summary sheet for emergency numbers.

5. CONTAIN / CLEAN UP THE SPILL ON DECK

- Stay upwind of vapors - do not walk through spilled oil.
- Use sorbent boom, sheets, sweeps, or other available material to limit the spread of spilled oil across the deck.
- Spread sorbent pads or material to soak up spilled oil.
- Use clean, non-sparking tools to recover used sorbent materials.
- Store waste materials in leak-proof, sealable containers (e.g., steel or plastic drums, heavy duty 6 mil plastic bags).
- Identify the type of waste in each container clearly.
- Store waste materials safely aboard the vessel in a contained area to prevent further leakage or spillage. (May request the terminal if waste materials can be stored on shore due to safety or space considerations)
- Consult with BC Environment Waste Management Branch before removing waste material for disposal.

6. FURTHER ACTIONS

- When the oil spilled on the vessel has been cleaned up and the vessel fully secured, the master may offer assistance to the terminal response team in containing, recovering or cleaning up oil spilled on the water. In that case shipboard personnel will work under the direction of the terminal's on-scene commander.
- After dealing with the cause of the spill, it may be necessary to obtain permission from the local authorities or the terminal to resume normal operations.

3.1.5 HAZARDOUS VAPORS RELEASES

The following procedures are only to serve as a guide to the actions to be taken in the event of an incident. The order in which they are laid out is not necessarily chronological and the circumstances at hand may dictate an alternate order of response actions.
A Hazardous Vapors Release involving the vessel can be in the deck area or may involve the dock. In the event of a Hazardous Vapors Release the following steps/measures should be considered and/or taken.

1. IMMEDIATE ACTIONS

- Sound General Alarm and muster crew to Emergency Stations.
- Shut down ventilation systems and close fire barriers to contain the vapors if safe to do so.
- Inform the terminal / local fire department, if at dock.
- **Eliminate** all avoidable sources of ignition.
- **Fix position and complete notification responsibilities** as outlined in *Section 2 - Reporting Requirements.*

2. CREW SAFETY

- Evacuate up wind until an assessment van be made and the product's identification/MSDS can be confirmed.
- Do not attempt to respond unless it is safe to do so.
- Identify the source of the Hazardous Vapors.
- Ensure that appropriate personal protective equipment is worn by crew.
- Determine whether there are any injuries or missing personnel.
- Prepare serious injuries for immediate evacuation.
- Advise Master on crew status and head count.
- Follow confined space entry procedures before entering enclosed spaces.

3. FIRE CONTROL AND SUPPRESSION

- Inspect the Hazardous Vapors Release location to assess immediate damage and risk.
- Use available conventional equipment to control the vapors, if possible, to do so safely.
- Quickly assess the danger to crew and the vessel and advise the Master:
  - What is the cause (i.e., electrical, fuel, other)?
  - Can it be brought under control?
  - Can it be isolated?
  - Can it be contained?

If release is on deck:

- Evacuate to a safe distance up wind.
- Confirm the nature and risk of the material(s).
- Use appropriate personal protective equipment and breathing apparatus.
- Position the vessel to minimize wind exposure to the Hazardous Vapors.

If release is on the dock:

- Identify possible emergency escape routes.
- Consider the necessity of vacating dock for vessel's safety.

4. DAMAGE ASSESSMENT

- Identify the Hazardous Vapors from a safe distance and/or from the manifest.
- Do not attempt to respond unless you have the proper equipment and training for the specific Hazardous Vapors.

IF THE VAPORS RELEASE DOES NOT POSE AN IMMEDIATE RISK TO CREW MEMBERS AND THE VESSEL CAN BE SAFELY MOVED TO A SUITABLE SHORE LOCATION OR ANCHORAGE:

5. PROCEED TO ANCHORAGE AND CONTINUE FIRE FIGHTING ACTION

If the vessel is able to proceed under its own power:

- Confer with CMI Incident Commander and Coast Guard to discuss vessel movement options.
- Identify shore support requirements - e.g., medical aid, firefighting/Hazmat equipment, personnel.
- Be prepared to vacate anchorage if Hazardous Vapors threatens local area.

4. NATIONAL AND LOCAL COORDINATION

4.1 RESPONSIBILITY OF THE VESSEL MASTER (or Person-In-Charge)

The **Master** or **Person-In-Charge** is designated as the **Vessel Response Team (VRT) Leader** (see *Appendix D - Vessel Response Team Organization*). Immediately following an emergency incident or spill they are responsible for:

- **Ensuring the safety of crew members and the vessel**
- **Notifying the On-Call CMI Incident Commander and ensuring the proper authorities are notified**
- **Directing crew members in performing their emergency duties**
- **Working with the appropriate authorities (i.e., US Coast Guard, appropriate Port Authority) to coordinate response actions until relieved by management.**

The Master or Person-In-Charge will be the point of contact for coordinating shipboard activities with national and local authorities and will be responsible for overseeing the action of the salvage or spill contractors employed until such time as he is formally advised by the Company that he has been relieved of these responsibilities.

4.2 RESPONSIBILITY OF THE INCIDENT COMMANDER

The designated **Incident Commander** for all marine emergencies and oil spills involving the *Vessel Name* is the CMI Vice President. The designated alternate is the Director of Safety and Compliance/DPA.

Upon being notified, the Incident Commander will proceed immediately to the Command Centre at the company's Wall Township office to provide assistance and support to the VRT. The Incident Commander's duties and those of key RMT members are described in the CMI *Shipboard Oil Pollution Emergency Plan.* The Vessel Master or Person-In-Charge will continue to direct the crew and shipboard response activities.

4.3 RESPONSIBILITY OF THE RESPONSE MANAGEMENT TEAM

The **Response Management Team's (RMT)** role is to support the crew as effectively as possible, to provide tactical planning assistance, and to manage vital shore-based aspects of the response effort. RMT actions include:

- ☐ Arrange whatever outside or contractor assistance is requested by the Master or Person-In-Charge:
  - air transportation
  - medical assistance or evacuation
  - towing
  - oil spill response
  - trim / stress / stability calculations
  - damage assessment (i.e., Naval Architect).
- ☐ Notify the Company's lawyers and insurance company.
- ☐ Verify notification of key government / regulatory agencies.
- ☐ Contact crew members families as required to apprise them of the situation.
- ☐ Set up and secure the primary Command Centre.
- ☐ Consider setting up a Command Centre closer to the site of the incident if desirable.
- ☐ Set up Emergency Information Centre for responding to media and public inquiries.
- ☐ Assemble a back-up crew (i.e., Master, Engineer) plus Vessel Casualty Officer for deployment to the vessel to assist the crew and assess damages if required.
- ☐ Develop a Vessel Movement/Salvage Plan based on situation assessment, condition of the vessel, and local wind/wave/current/tide conditions.
- ☐ Consult with the Master or Person-In-Charge regularly on the status of response actions and the barge.
- ☐ Work with senior US Coast Guard officials under a unified command structure to coordinate response efforts and resources.
- ☐ Issue appropriate news/information releases and deal with media representatives as require

4.4 UNIFIED COMMAND ORGANIZATION

Where allowed under local regulations, the **Incident Commander** and response personnel will work within a unified command structure in cooperation with the US Coast Guard's Federal Monitoring Officer (FMO).

The USCG is the designated agency for anyincident, involving a ship in US waters, except within the port limits of Corporation Ports and Commission Ports. Local governments (e.g., provincial/state, municipal) may be represented on the Unified Command Team depending on the threat to near shore or foreshore areas.

Response personnel (i.e., **Vessel Response Team (VRT)** and **Response Management Team (RMT)**) will work with their counterparts from the Lead and other government agencies to ensure maximum coordination of planning and resources.
The Incident Commander will retain control of the response effort and the unified command team unless officially relieved by the Lead Agency OSC.

4.5 PLAN ACTIVATION / INITIATING THE RESPONSE

This Plan can be activated by any employee who detects or observes an oil spill originating from the *Vessel Name*

Once activated, the Master (or Person-In-Charge) and management personnel have authority under the Plan to commit whatever resources and expenditures are necessary to mount an effective response effort (see *Appendix A* for individual contact numbers). The Master or Person-In-Charge and Company management has authority to:

- **call out some or all designated Response Management Team (RMT) members**
- **mobilize outside contractors (e.g., US Ecology and suppliers necessary to support the response**
- **approve expenditures related to the response effort**
- **act on behalf of the company and represent its interests (until relieved by a more senior company official)**

4.5.1 EMERGENCY RESPONSE PRIORITIES

All marine oil spill response activities described in this Plan will be carried out in accordance with the following overall priorities:

1. **PROTECTION OF LIFE (i.e., crew, public)**
2. **PROTECTION OF THE ENVIRONMENT (i.e., spill response)**
3. **SECURING THE SAFETY OF THE VESSEL AND PROTECTION OF PROPERTY**

In the case of an oil spill while underway or due to a casualty incident, the first priority of company vessel and shore personnel will be to ensure the safety and security of the crew and the vessel. Response to the spilled oil will be a lower priority until the primary objectives are fully achieved.

Under these circumstances, personnel will mainly rely on its designated oilspill response contractors, to contain, recover, and clean up any spilled oil on its behalf.

4.5.2 SMALL SPILLS

All petroleum spills that occur within New York State (NYS) must be reported to the NYS Spill Hotline (1-800-457-7362) within 2 hours of discovery, except spills which meet all of the following criteria:

- The quantity is known to be less than 5 gallons; and
- The spill is contained and under the control of the spiller; and
- The spill has not and will not reach the State's water or any land; and
- The spill is cleaned up within 2 hours of discovery."

In the event of a small operational spill (less than 5 gallons), where crew members and the vessel are not placed at risk, such as spill during fuel transfer or while berthed, vessel/shore personnel will take immediate action to:

- **Detect and eliminate the source of discharge.**
- **Control the spill on the vessel deck and prevent it from entering the water.**
- **Notify the proper authorities.**
- **Contain and recover the spilled oil.**
- **Contact outside assistance and secure the necessary response personnel and equipment.**

If the vessel is fully secured, the Master may aid the facility response team. In this case, the crew will work under the direction of the facility Incident Commander.

4.5.3 LARGE SPILLS

In the case of larger spills (greater than 5 gallons), which are considered to pose a significant threat to the environment and/or human health, or spills resulting from a casualty all the crew's efforts will be directed at protecting life and securing the vessel. The spill **Response Organization (RO)**, such as US Ecology, will be required to deal with any oil spilled on the water because of the casualty on its own until the vessel and barge have been fully stabilized and secured.

The **Response Management Team** will be mobilized to direct the overall response effort under the Incident Commander, to protect the crew, secure the vessel, and work with the spill response organization.

The RO will provide a **Spill Response Manager** to oversee the oil spill response and direct their personnel and equipment. The Spill Response Manager will report directly to the Incident Commander during the response operation.

A CMI EMERGENCY RESPONSE TEAM CONTACT LIST

CMI 24 Hour Emergency Number- 732 557 6100

June 2023

CORPORATE EMERGENCY RESPONSE TEAM
POSITION AND NAMES

	NAME	OFFICE	CELL
Incident Commander			
President - JAG Corporation	Roly Acosta	732 557 6100 0165	**732 684 7028**
VP CMI	Brett Bailey	732 557 6100	**732 620 8197**
Director Safety and Compliance/DPA	Lucky Abernathy	732 557 6100 0184	**908 433 3755**
Media / Public Relation	Greg Goett (Inhouse council)	731 557 6100 0194	**732 759 5174**
Safety / Health / Security	Lucky Abernathy	732 557 6100 0184	**908 433 3755**
External/Government Liaison	Greg Goett (Inhouse council)	731 557 6100 0194	**732 759 5174**
Risk/Insurance	Adrian Acosta	732 557 6100 0123	**732 740 3520**
	Marcelo Afonso (CFO)	732 557 6100 0112	**731 684 3504**
Human Resources	Anna Camooso	732 557 6100 0130	**732 740 3520**
IT	Anthony Rettino	732 557 6100 0131	**732 575 4038**
Planning Section Chief	Brett Bailey	732 557 6100 0202	**732 620 8197**
Alt. Planning Chief	Tom Ulisse	732 557 6100	**732 620 3470**
Operations Section Chief	Paul Larrabee		**732 620 3938**
Alt. Operations Chief	Adam Brown		**732 620 4239**
Operations	Fred Baker		**732 803 5706**
Logistics Section Chief	William Pedalino	732 557 6100 4354	**516-532-6322**
Finance Section Chief	Marcelo Afonso (CFO)	732 557 6100 0112	**732 684 3504**
Alt. Finance Chief	Sue Ryan (controller)	732 557 6100	**908-415-5810**
Staten Island Office - 2851 Richmond Terrace, Staten Island, NY 10303		**347-857-6330**	Fax: 347-466-5128
New Gretna Shop - 5714 Rt. 9 New Gretna, NJ 08224		732 557 6100	**609 296 3061**
Shop Bay No. 1		*New Gretna Shop*	0502
Shop Bay No. 3		*New Gretna Shop*	0503
Break Room		*New Gretna Shop*	0505
Assistant's Desk		*New Gretna Shop*	0514
Dive Bay		*New Gretna Shop*	0508
Survey Conference Room		*New Gretna Shop*	0512

Response Organizations		
NAME	**BUSINESS**	**EMERGENCY**
US Ecology	**800 592 5489**	**800 899 4672**
Clean Harbor	**800 645 8265**	**800 645 8265**
Witt O'Brien's	**1 281 320 9796**	**1 985 781 0804**
MSRC (Marine Spill Response Organization)	**703 326 5600**	**1 800 645 7745**

Regulatory Reporting		
NAME	**BUSINESS**	**EMERGENCY**
US Coast Guard National Response Centre		**1 800 424 8802**
NYS Spills Hotline		**1-800-457-7362**

Regulatory Reporting		
NAME	**BUSINESS**	**EMERGENCY**
Port Metro New York Emergencies	**718 330 2950**	**212 435 7777**

B VESSEL-SPECIFIC APPENDIX

This Appendix is intended to provide information about the Support Vessel, *Vessel Name* that may be useful to response personnel in the event of a casualty or oil spill response. Vessel particulars will be provided prior to commencement of construction.

B.1 GENERAL DESCRIPTION

Vessel Name is a *vessel description* built in the US for sheltered water work.

Vessel Particulars	
REGISTERED OWNER:	*Insert vessel details (as applicable)*
PORT OF REGISTRY:	*Insert vessel details (as applicable)*
IMO NO.:	*Insert vessel details (as applicable)*
DESIGNER:	*Insert vessel details (as applicable)*
YEAR BUILT:	*Insert vessel details (as applicable)*
GROSS REGISTERED TONNAGE:	*Insert vessel details (as applicable)*
Net REGISTERED TONNAGE:	*Insert vessel details (as applicable)*
DIMENSIONS:	Length: *Insert vessel details (as applicable)* Breadth: *Insert vessel details (as applicable)* Depth: *Insert vessel details (as applicable)*
CLASSIFICATIONS:	*Insert vessel details (as applicable)*
SPILL PREVENTION FEATURES:	*Insert details* *Insert details* *Insert details*

C OIL SPILL RESPONSE TECHNIQUES

This section provides a general overview of the tactical priorities and countermeasure techniques that may be employed to contain, recover, and clean up a marine oil spill. The actual tactics that will be used to respond to a particular incident will depend on the unique circumstances and requirements of each spill (e.g., time of day, weather conditions, tidal flow, product(s) involved).

C.1 TACTICAL PRIORITIES

Once the safety of all personnel has been ensured, the source of discharge is secured and initial notification has been activated, the overall tactical priorities are:

- identification and protection of biological, physical, and economic resources,
- containment and recovery of spilled oil, and
- site and shoreline clean-up.

Response tactics will be determined by the Person-In-Charge or by the Corporate Incident Commander. Critical advice will be provided by representatives of key government agencies (e.g., U.S. / US Coast Guard, EPA, New York State).

Response operations will be physically conducted by Vessel Response Team (VRT) personnel and equipment in conjunction with the personnel and resources of various response contractors. Contractors will provide the majority of necessary response equipment and trained personnel for all spills beyond the capability of response personnel.

C.2 ROLE Of US Ecology Response Corporation

US Ecology is the primary response organization for marine oil spills in US waters. US Ecology has committed to providing marine oil spill response equipment including boats, skimmers, booms, communications equipment, and trained personnel to Lake Champlain waters.

C.3 FUEL CHARACTERISTICS

The volatility and flammability of petroleum products creates a safety hazard in the event of a spill. Volatility is a measure of a liquid's tendency to vaporize. Flammability refers to the ease with which vapors will ignite and is measured by its flash point. All gasolines readily give off vapors that can form ignitable mixtures at ambient temperatures. Diesel fuel and stove oil do not normally give off these vapors but may do so under certain temperature and air pressure conditions. Given the presence of air and a source of ignition, gasoline will ignite more easily than diesel fuel and stove oil. Middle distillate fuels (i.e., diesel, stove oil) and gasoline are classified as 'non persistent' oils. When spilled on water, they display the following general characteristics.

- gasoline is highly flammable due to vapors formation
- spread quickly across the surface of the water in a thin film or sheen
- may cover a wide area if uncontained
- fairly strong odor may be present, at non-toxic levels
- toxic to fish, wildlife, and marine plants in concentrated form
- evaporate fairly rapidly compared to thicker or more viscous products
- evaporation and wave action will dissipate spilled oil usually within 12-24 hours after the spill
- does not lead to extensive or heavy shoreline oiling or clean-up[1]

The behavior of these products on water determines the most appropriate and effective response tactics to be taken by responders to contain and recover spilled oil, to protect sensitive areas, and to clean up the spill site.

[1] Diesel fuel or heating oil may leave a light residue of heavier fractions on the surface of the water after the lighter components have evaporated. It may emulsify to a yellowish 'mousse' if mixed with fine sand in a sheltered area.

C.4 CONTAINMENT AND RECOVERY TACTICS

Open water containment booming and recovery is the first line of defense for distillate spills. Oil which cannot be contained using other containment booming techniques, should be boomed using shoreline booming techniques if feasible. Shoreline booming techniques can be used to protect sensitive shoreline resources. The three main shoreline boom deployment patterns are:

- Exclusion Booming
- Deflection Booming
- Diversion Booming

Containment booming and shoreline booming are briefly described on the following pages and are summarized in *Figure C.7*. A more detailed description of shoreline protection techniques is contained in the BC Environment Marine *Oil Spill Shoreline Protection and Clean-up Manual*.[2]

CONTAINMENT BOOMING (Distillates Only)

The goals of containment are to:

- contain as much as possible near the source of discharge,
- limit the spread of the oil across the water, and
- maximize the thickness of the spilled oil on water to facilitate recovery efforts.

NOTE: Containment should only be attempted with distillates such as diesel fuel, stove oils, jet A/A-1, and lubricating oils. Gasolines should NOT be contained or boomed under any circumstances due to the risk of fire or explosion.

Product can be boomed using one or more boats. The objective is to create and maintain a holding position until contractor skimming equipment is on site. *Figure C.1* illustrates containment booming using one work boat. A pile cluster, a corner of the barge, a buoy with anchor, etc. can be used to secure boom ends.

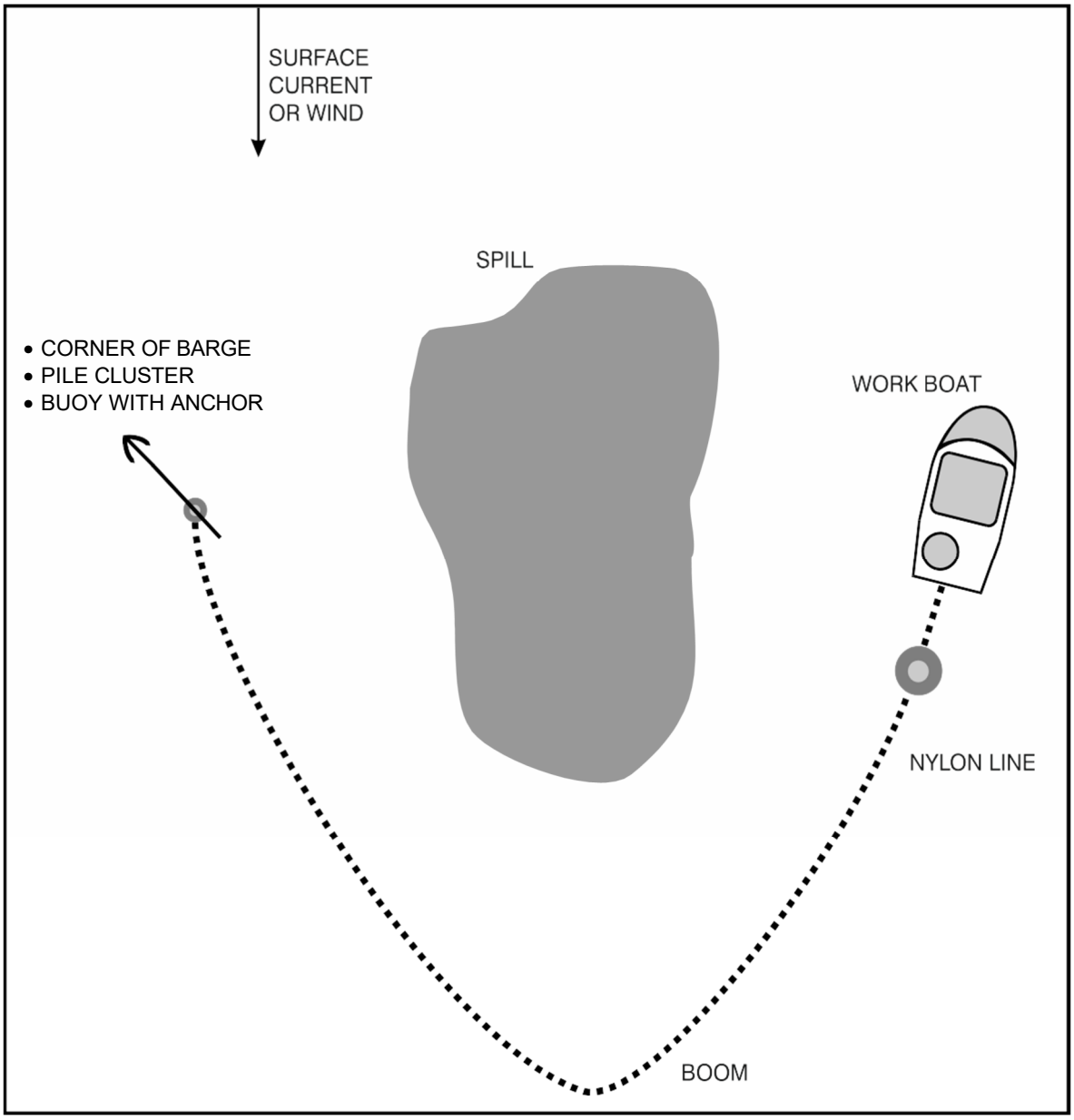


Figure C.1
Initial Containment Booming Using One Boat

Mechanical Recovery Tactics (Skimming)

To be effective, skimmers must be deployed as soon as possible after the spill is detected before the oil spreads into a thin sheen. Disc skimmers are recommended for mediumto light fuel products. Surface skimming is not recommended for gasolines and similar low flash products.

Mobile disc skimmers can be deployed within a primary containment area such as that shown in *Figure C.2*. The spilled oil which is recovered by the skimmer is pumped into a floating bladder attached to the response boat, or into the storage tank on the recovery vessel, or directly into vessel slop tanks for return to refinery. In *Figure C.2*, the oil is being pumped into a storage bladder.

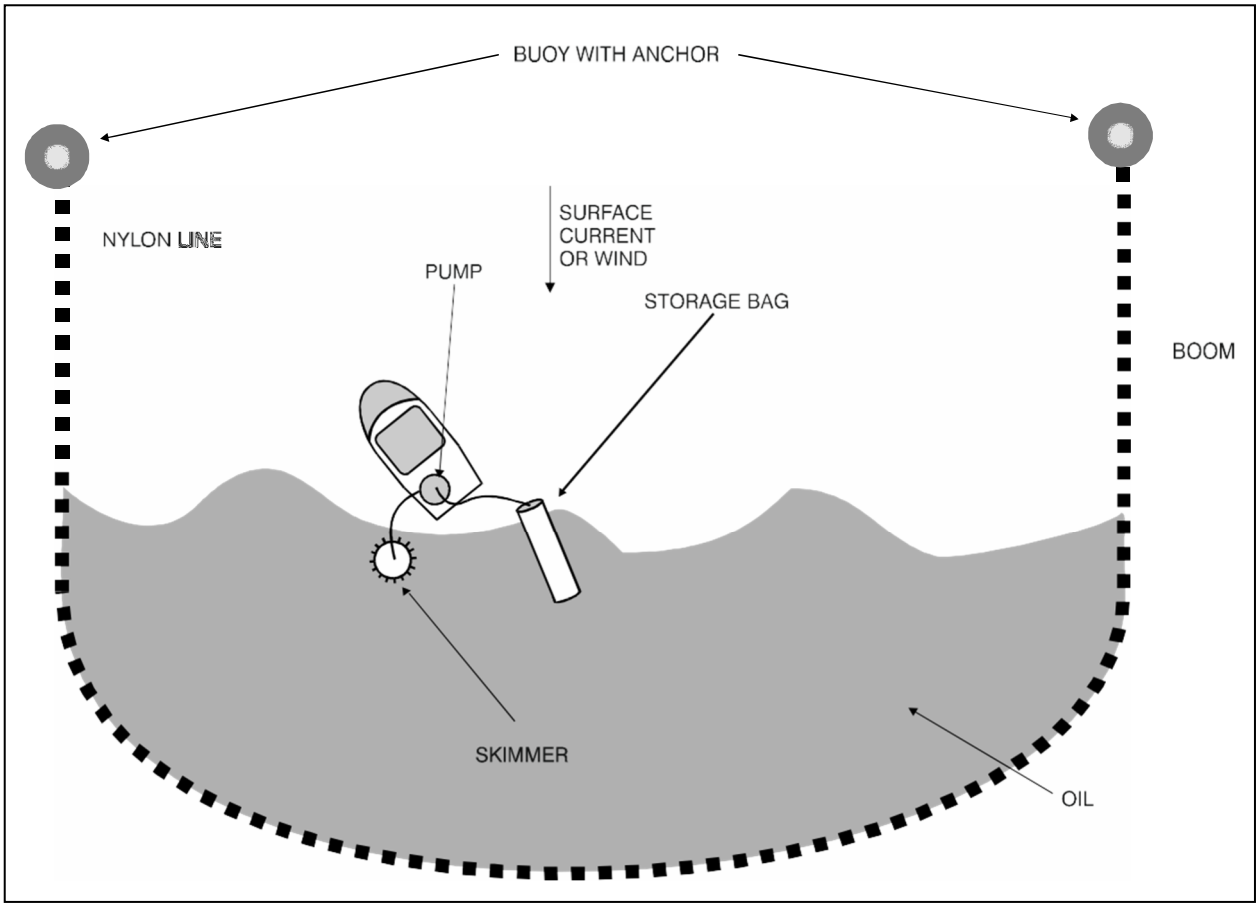


Figure C.2
Skimmer Deployment within a Boomed Area

Manual Recovery Tactics (Sorbent Pads)

Manual recovery involves spreading sorbent pads onto the surface of the water to soak up spilled oil. Sorbent pads are effective on thin sheens of oil or for small amounts of oil escaping from the containment boom. Sorbent pads can be used when the oil film is too thin to permit effective skimming.

Mechanical and manual sorbent recovery techniques are not mutually exclusive. An effective response can involve both sorbent material and mechanical skimming. Good commercial pads will selectively absorb oil rather than water and are very effective when used properly. For a fast response, sorbent pads should be applied generously.

NOTE: Oiled sorbent pads are classified as Special Waste and must be treated accordingly.

EXCLUSION BOOMING (Distillates and Gasolines)

Exclusion booming can be used to protect marinas and sensitive areas such as river estuaries. An exclusion boom deployment to protect a marina is shown in *Figure C.3*.

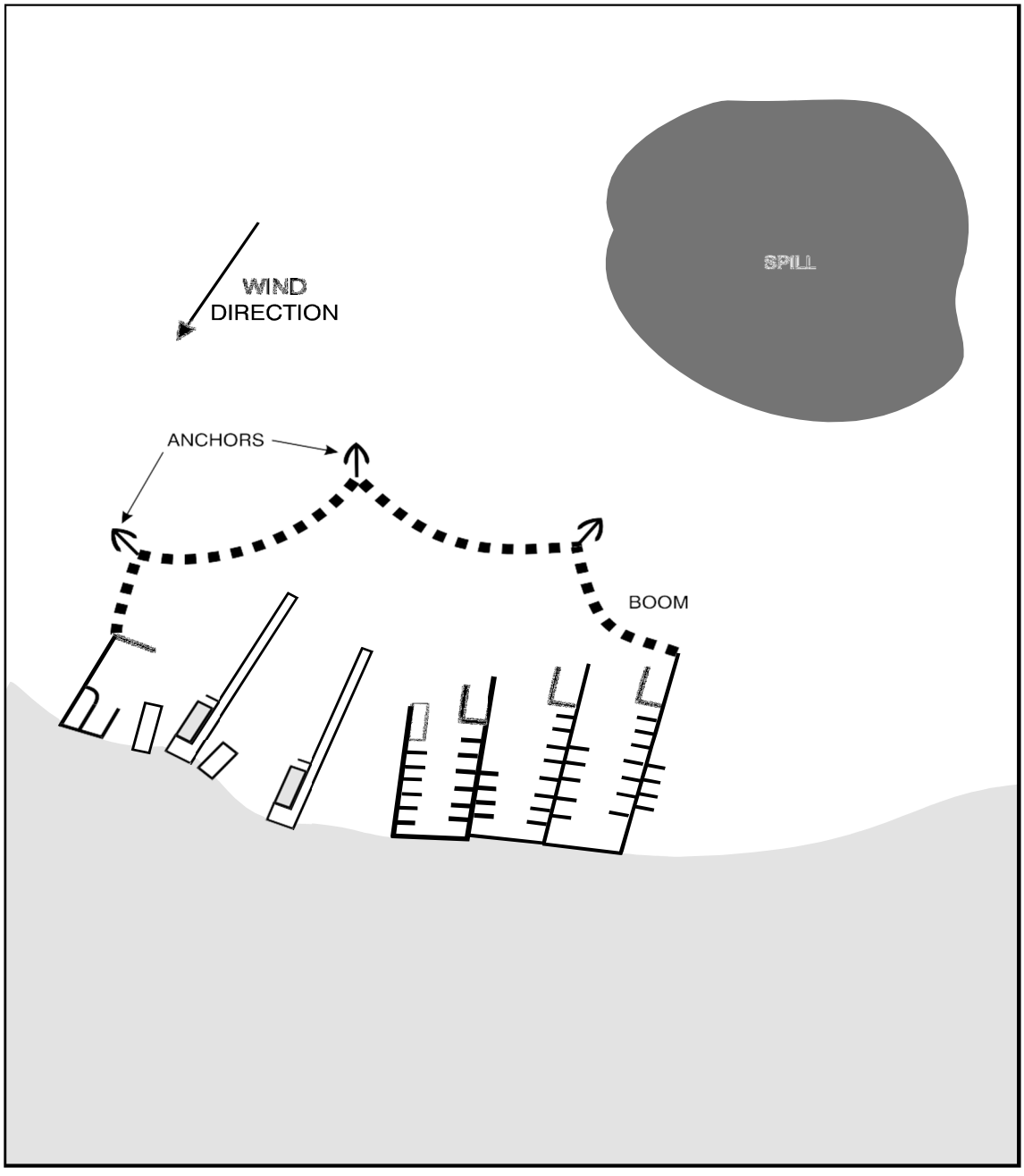


Figure C.3
Exclusion Booming of a Boat Basin

DIVERSION BOOMING (Distillates Only)

Diversion booming is aimed at directing oil towards the shoreline to a pre-selected collection point on the shore (i.e., a 'sacrificial beach). Once the oil has been diverted to the selected collection point, it can be collected using skimmers, vacuum trucks and/or sorbent materials.[3] Diversion booming can be accomplished using a single boom as shown in *Figure C.4*

Sacrificial beaches should only be chosen in close consultation with key government agencies including US Coast Guard, EPA, and applicable New York State Regulators

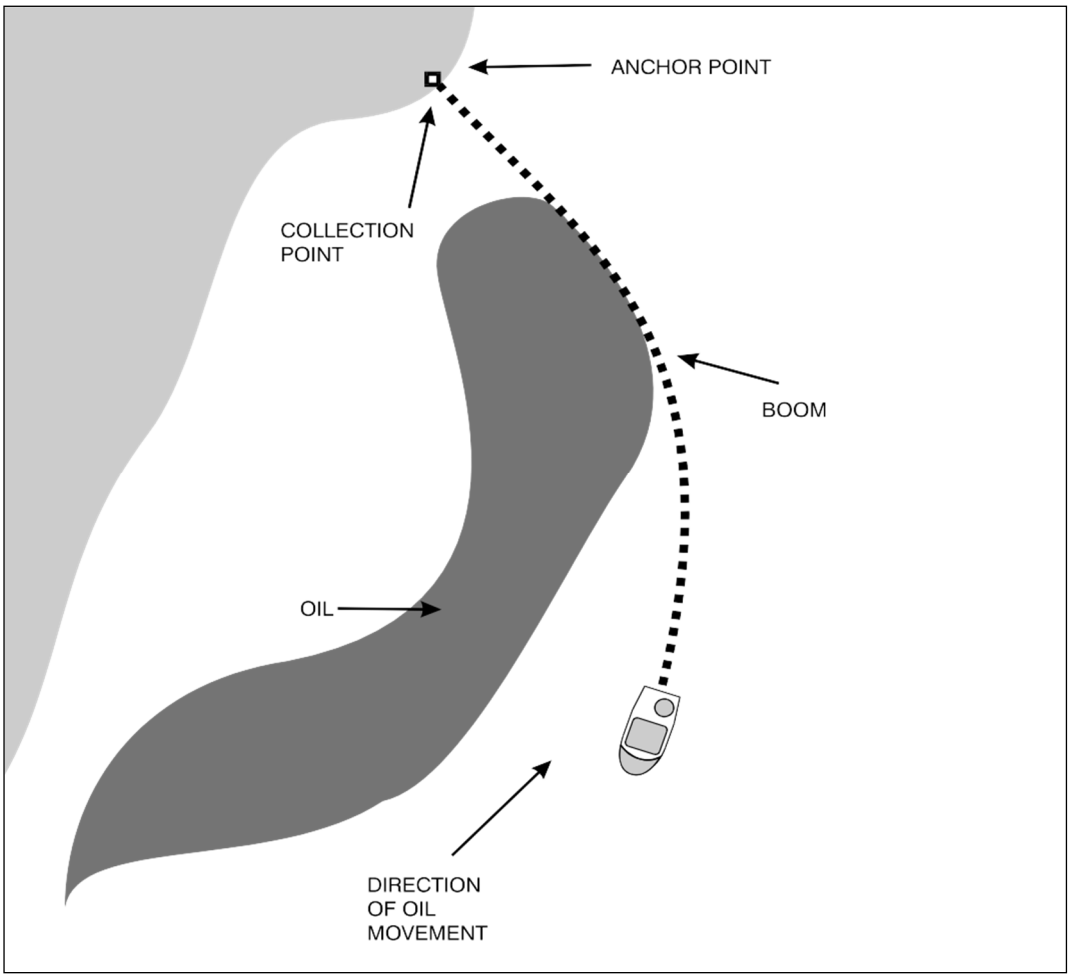


Figure C.4
Diversion Booming Along a Shoreline

[3] Although diversion booming requires the oiling of a shoreline area, it does allow more sensitive areas to be protected by directing oil onto a less sensitive sector or 'sacrificial beach'.

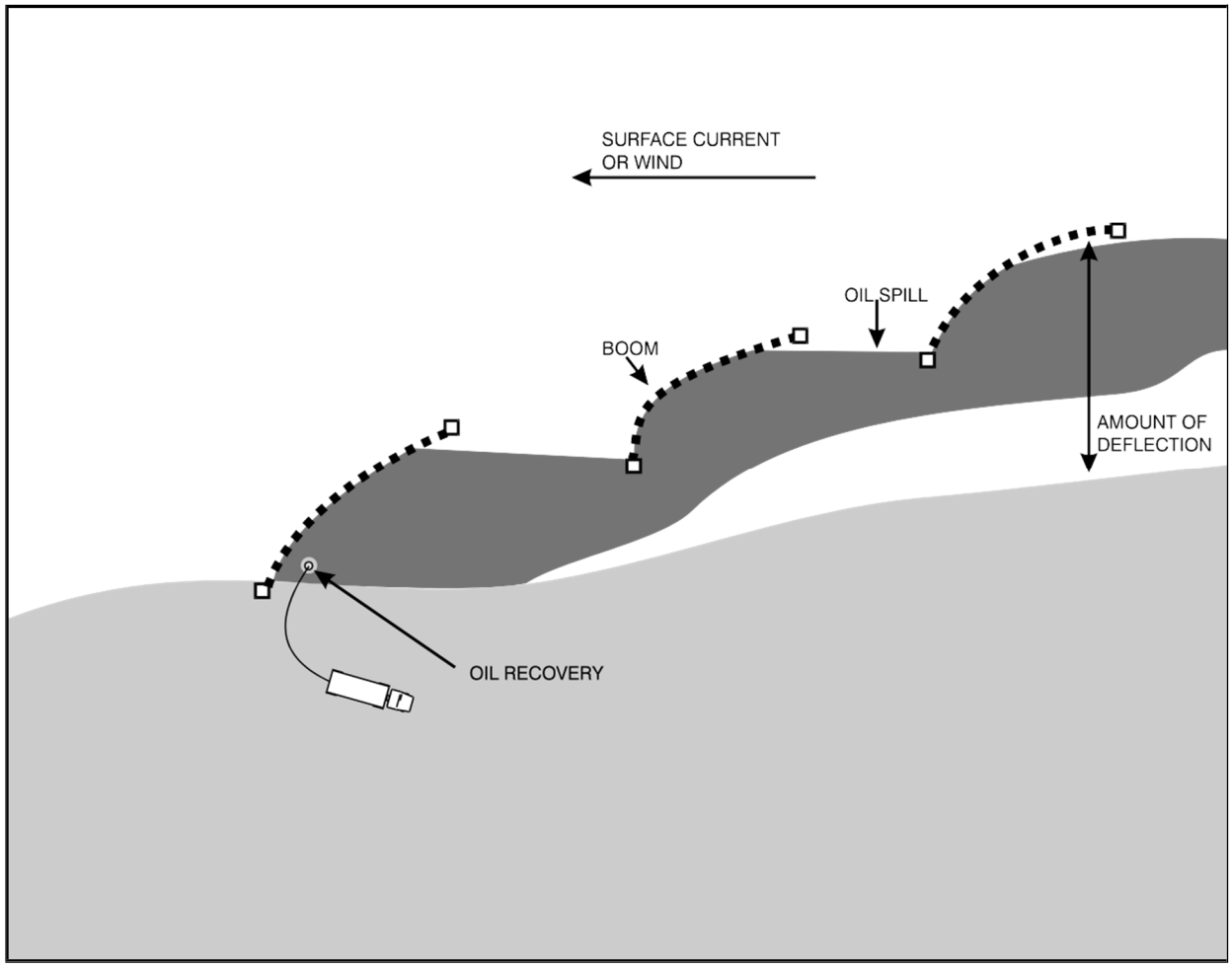


Figure C.5
Cascading Boom Deployment (Chevron)

DEFLECTION BOOMING (Distillates and Gasolines)

Deflection booming is aimed at directing the oil away from the shore to protect a sensitive shoreline area or resource. A typical deflection boom configuration is shown in *Figure C.3.*

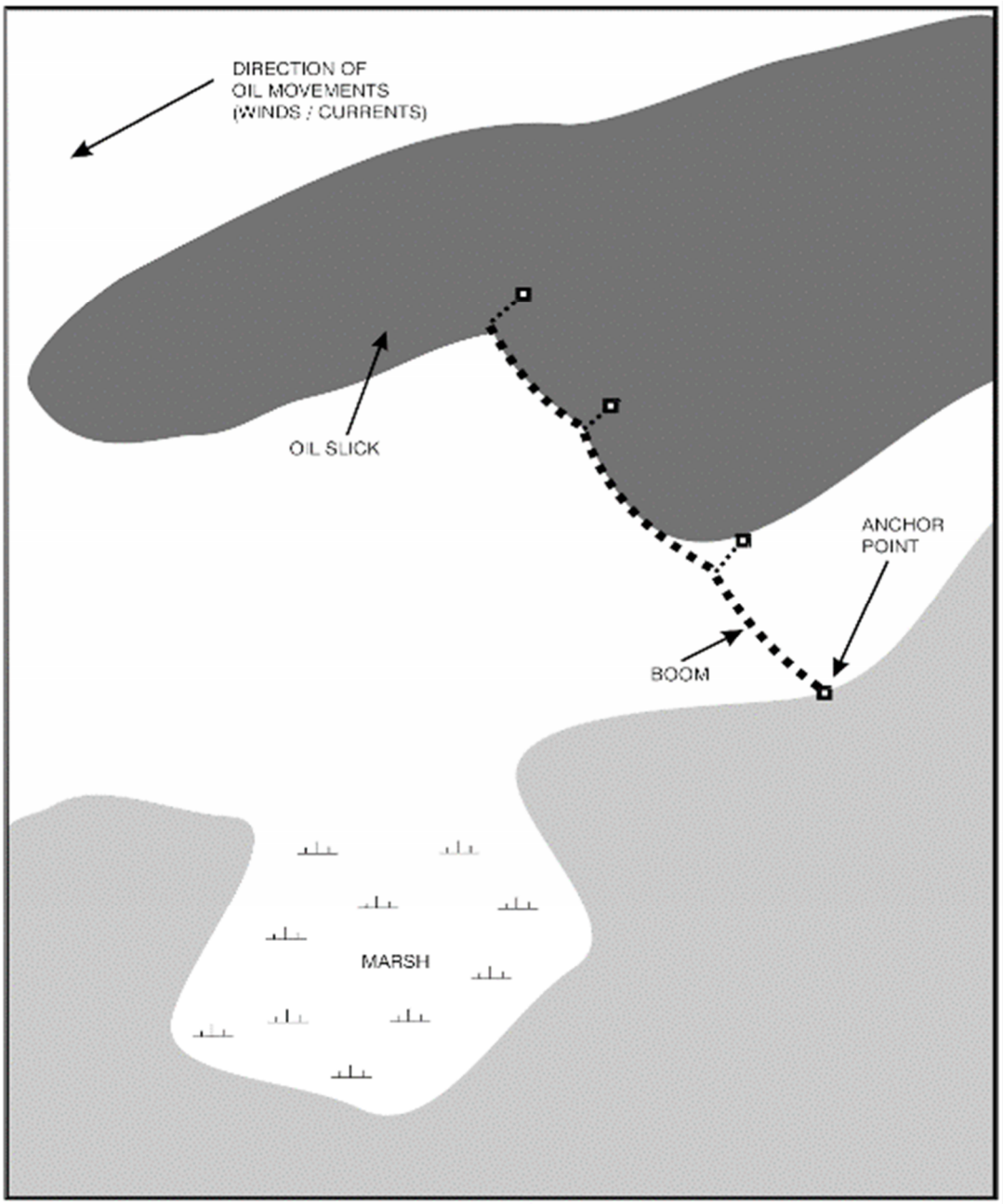


Figure C.6
Deflection Booming away from a Marsh

Near shore Protection Techniques	Primary Use	Technique Description	Primary Logistical Considerations	Limitations
Containment Booming (Distillates)	Used in near shore waters with swells less than 2m to surround and contain portions of an approaching oil slick.	Boom is deployed in a "U" shape in front of the oncoming slick. The ends of the boom are anchored by work boats or droques. The oil is contained within the "U" and prevented from reaching the shore.	For 150m diameter Slick: • 280m of boom • 2 boats and crew • boom tenders • tow lines, drogues, connectors, etc.	• high winds • swells > 2m • breaking waves > 50 cm • currents > 1m/s
Exclusion Booming (Distillates & Gasolines)	Used across small bays, harbour entrances, inlets rivers, or creek mouths where currents are less than 0.5m/s and breaking waves are less than 50cm in height	Boom is deployed across or around sensitive areas and anchored in place. Approaching oil is deflected or contained by boom.	Per 300m of boom: • 1 boat and crew • 3 boom tenders • anchors, anchor line, buoys, etc.	• current > 0.5m/s • breaking waves > 50cm • water depth > 20m
Deflection Booming (Distillates & Gasolines)	Used to deflect oil away from relatively small sensitive areas where alongshore currents exceed 0.5m/s, breaking waves are less than 50cm, or available boom is insufficient to exclude oil from the area.	Boom is deployed from the shoreline away from the approaching slick and anchored or held in place with a work boat. Oil is deflected away from the shoreline.	Single Boom, 1.5m/s current • 60m boom • 1 boat and crew • 3 additional personnel • 3 anchors, line, buoys, recovery unit	• currents > 1m/s • breaking waves > 50cm
Diversion Booming (Distillates)	Used across small bays, harbour entrances, inlets, river, or creek mouths where currents exceed 0.5m/s and breaking waves are less than 50cm, and on straight coastline areas to protect specific sites, where breaking waves are less than 50cm.	Boom is deployed from the shoreline at an angle towards the approaching slick and anchored or held in place with a work boat. Oil is diverted toward the shoreline for recovery.	Single boom, 0.75m/s • 60m boo m • 1 boat and crew • 3 additional personnel • 3 anchors, line, buoys, recovery unit	• currents > 1m/s • breaking waves > 50cm

Figure C.7

Summary of near shore Protection Techniques

C.5 SHORELINE CLEANUP ASSESSMENT TEAM (SCAT)

The Shoreline Cleanup Assessment Team (SCAT) program is a systematic, orderly and comprehensive approach that can be used following an oil spill to provide a real time evaluation of shoreline oil conditions and to provide data and advice to the spill response organization and cleanup operations personnel. The SCAT process could be to identify sensitive shoreline resources which are potentially threatened and to develop appropriate near shore protection plans as outlined in the preceding section. The specific goals of the SCAT process are to:

- identify the shoreline areas that may be oiled as a result of the spill through aerial surveys,
- conduct ground surveys of these areas if necessary to establish clean-up locations and priorities,
- determine the most environmentally-suitable methods of clean-up based on shoreline type and characteristics, and
- conduct and monitor shoreline clean-up operations.

D VESSEL RESPONSE TEAM (VRT) ORGANIZATION

D.1 VESSEL RESPONSE TEAM (VRT)

The Vessel Response Team (VRT) is made up of the officers and crew of the *Towing Vessel and the Bargeman. Figure C.1 below*. The **Master** is automatically designated as the **VRT Leader**. The **Mate** is the designated alternate if the Master is unable to perform his duties.

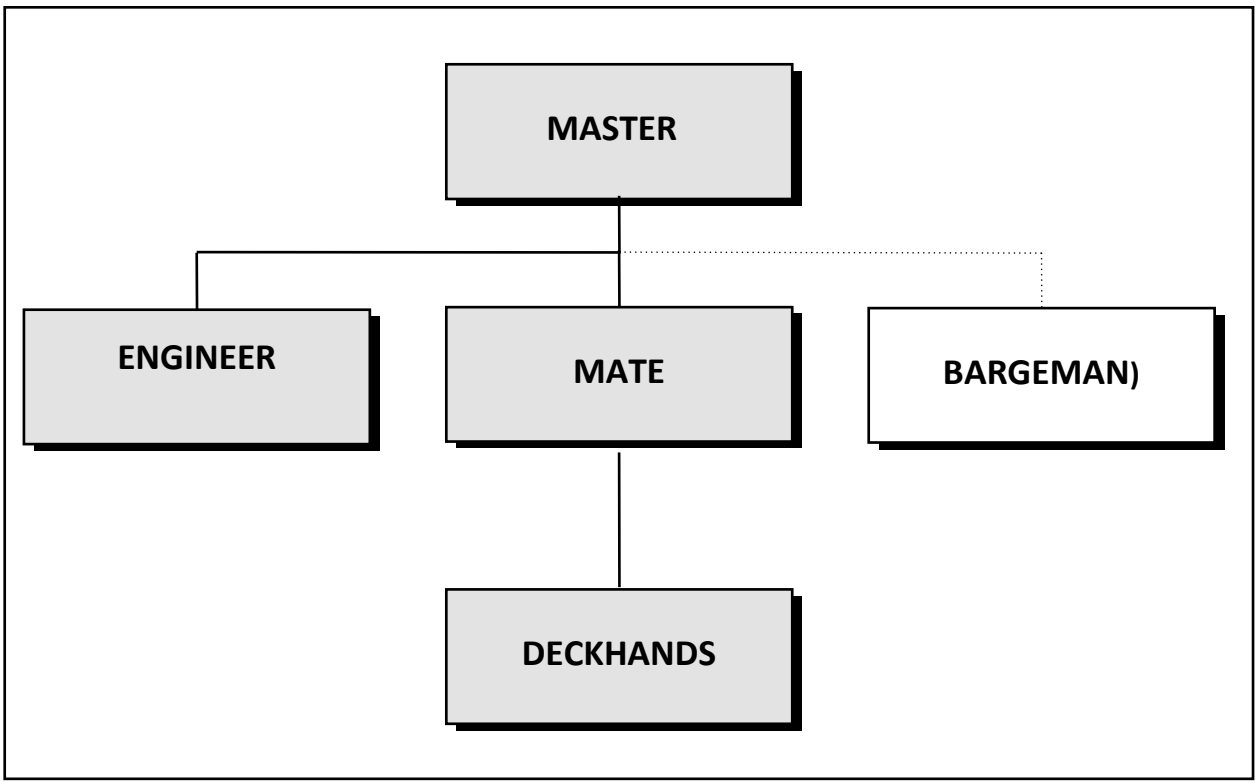


Figure D.1
Vessel Response Team (VRT) Organization

D.2 VRT EMERGENCY PRIORITIES

The VRT's immediate priorities are to:

- ➔ **Eliminate all safety hazards to the crew and public (e.g., risk of fire or explosion, issue safety equipment)**
- ➔ **Stop the flow / contain and control the spill if possible to do so SAFELY**
- ➔ **Stabilize the vessel to assess damage, undertake repairs, or proceed to nearest safe haven**
- ➔ **Notify / alert the proper authorities and the Response Management Team (RMT) to secure immediate assistance for vessel casualty and /or oil spill response**

D.3 VRT SHIPBOARD EMERGENCY DUTIES

The overall roles and duties of all crew members is described in *Figure C.2* on the following page.

D.4 RESPONSE MANAGEMENT TEAM (RMT) ORGANIZATION

The RMT provides vital support and assistance to the VRT throughout the response effort (see *Section 4.3 - Responsibility of the Response management Team*). The RMT organizational structure is outlined in the *Shipboard Oil Pollution Emergency Plan*. The roles and responsibilities of the Incident Commander and other key RMT positions are also described in detail.

D.5 VRT SHIPBOARD EMERGENCY DUTIES

The role descriptions provided below describe the overall roles and duties of shipboard personnel during an emergency response and do not limit the Master's or Person-In-Charge's authority to take whatever action he deems necessary to protect the crew and vessel. Specific tasks and priorities will be determined by the circumstances of each incident.

MASTER (VRT LEADER)	
Role:	In charge of the overall incident response. Responsible for the safety of the crew and vessel at all times.
Key Duties:	• Informs terminal authorities of incident / spill. • Alerts the Corporate Emergency Response Team (ERT) and activates emergency plan. • Notifies US Coast Guard as necessary and, if required, other government authorities/regulatory agencies. • Calls for necessary resources, personnel and assistance. • Assesses the situation and updates head office. • Consults with officers, RMT, Lead Agency senior representative (i.e., USCG) and emergency responders on matters pertaining to crew/vessel safety. • May offer assistance to terminal responders once vessel is secure.

MATE	
Role:	Responsible for all operations and response activities on deck including personnel safety.
Key Duties:	• Replaces Master as VRT Leader if Master is unable to perform his duties. • Ensures all personnel are present and accounted for (head count). • Responsible for towing equipment and operation (e.g., towline recovery, emergency repairs). • Initiates emergency actions to control incident and prevent worsening on deck. • Conducts hull and below decks damage assessment as necessary - vessel casualty. • Keeps Master regularly updated on status and progress of response actions taken. • Works with other response personnel from terminal or emergency agencies.

ENGINEER	
Role:	Responsible for all below-deck response activities including personnel safety.
Key Duties:	• Conducts hull and below decks damage assessment - vessel casualty. • Terminates and secures bunkering operations – operational spills. • Initiates emergency actions to control incident and prevent worsening. • Prepares for firefighting operations as required by the situation. • Ensures towboat is able to maneuver properly as required by the situation. • Keeps Master regularly updated on status and progress of response actions taken.

COOK - DECKHAND / BARGEMAN	
Role:	Implements appropriate emergency actions as directed by licensed officers.
Key Duties:	• Executes officer's directions quickly, and SAFELY. • Deploys and operate response equipment as instructed. • Observes all necessary safety precautions.

Figure D.2 - Continued
Vessel Response Team Shipboard Emergency Duties

E TRAINING AND EXERCISE PROGRAM

E.1 TRAINING AND EXERCISE POLICY

All vessel, management, and administrative employees will receive the training necessary to perform their assigned duties during an emergency incident SAFELY and EFFECTIVELY.

Emergency response training will be reinforced by a program of regular emergency response exercises or drills, both on the vessels and ashore in addition to standard shipboard drills (e.g., fire, boat drills).

E.2 TYPES OF RESPONSE TRAINING

Emergency Response training is broken down into three basic types:

Contingency Plan Familiarization

All employees will receive basic training to familiarize them with the goals, policies, and procedures contained in this *Shipboard Oil Pollution Emergency Plan* as well as other plans and emergency response documentation (e.g., *Vessel Standing Orders*), including how to use the Plan and to find information in it quickly.

Operational Emergency Training

All vessel and select shore operating personnel will receive hands-on training in various skills and tasks to protect themselves, and the vessel and to initiate effective oil spill control and containment measures.

Response Management Training

Supervisory and management personnel will be trained in the skills necessary to lead, manage and direct a marine emergency response effort.

Figure E.1 outlines the specific response skills that training should address for employees by position and according to their likely duties during an emergency.

	EMPLOYEES BY POSITION		
RESPONSE SKILLS	**Management**	**Masters, Mates, Engineers**	**Deckhands, Cooks, Bargemen**
Contingency Plan Familiarization			
• Reporting	**X**	**X**	**X**
• Vessel Casualty Procedures	**X**	**X**	**X**
• Operational Spill Procedures	**X**	**X**	**X**
• Safety	**X**	**X**	**X**
Operational Training			
• Use of PPE / SCBA		**X**	**X**
• TDG / WHMIS		**X**	**X**
• Basic Firefighting		**X**	**X**
• First Aid (MED)		**X**	**X**
• Basics of Oil Spill Response	**X**	**X**	**X**
Response Management Training			
• Situation Assessment	**X**	**X**	
• Strategy Development	**X**	**X**	
• Advanced Oil Spill Training	**X**		

Figure E.1
Response Training Matrix

E.3 PLANNING AND FREQUENCY OF EXERCISES

The company's approach to response exercises is to participate in, support, and promote any of the US Coast Guard's *National Marine Spill Response Exercise Program (NEP)* for vessel owners and operators when available and able.

The **Operations Manager** is responsible for planning and coordinating response training and exercising.

Masters are responsible for ensuring that appropriate training and exercises are conducted aboard the vessels as per company and regulatory standards.

Figure E.2 shows a copy of the *Shipboard Oil Pollution Exercise Log* that will be used to record response exercises conducted aboard or involving vessels.

Date	Type of Oil Pollution Drill	Location	Remarks Master's Signature

Figure E.2
Shipboard Oil Pollution Exercise Log

F FORMS APPENDIX

INTITIAL INCIDENT REPORT FORM (Page 1)

HS	Harmful Substances Report (in bulk)		/HS//
AA	Ship Identity - vessel name, official number, call sign, flag, towing vessel name (if applicable), details of tow (if applicable).	AA/	**Other Info:**_____/
BB	Date and time of event	BB/	_____ _____Z//
CC	Position (latitude / longitude) or	CC/	_____N/S/ _____E/W//
DD	Position (bearing & distance from landmark)	DD/	//
EE	True course	EE/	_____//
FF	Speed in knots and tenths of knots	FF/	_____//
LL	Route information (intended track)	LL/	//
MM	Radio communication (station(s) guarded)	MM/	//
NN	Next report (date, time of next report)	NN/	//
PP	Type & quantity of cargo / bunkers on board	PP/	//
QQ	Brief details of defect, damage, deficiency, other limitations	QQ/	//
RR	Description of pollution, including estimate of quantity lost	RR/	//
SS	Weather and sea conditions	SS/	//
TT	Contact details of ship's owner / operator / agent	TT/	//
UU	Ship size and type	UU/	Length: Breadth: Draught: Type:
XX	Remarks: Brief details of incident Current condition of the vessel Need for outside assistance Actions being taken Number of crew and details of any injuries Details of P&I Club and local representative Others	XX/	//

If no outside assistance is required, this should be clearly stated.

INTITIAL INCIDENT REPORT FORM (Page 2)

Additional information to be sent to the Emergency Response Team and/or other agencies at the same time as Page 1 of the *Initial Incident Report Form* or as soon as possible afterward (See *Section 2.2*).

Revision Request Form

FROM	DEPARTMENT	DATE

MANUAL NAME

REVISION TYPE: ADDITION ☐ DELETION ☐ CORRECTION ☐

REVISION TO: SECTION _____ SUBJECT _____
(ATTACH SEPARATE SHEET IF NECESSARY)

TEXT OF CHANGE: _____

REASON FOR CHANGE: _____

Reviewed by _____ Date _____

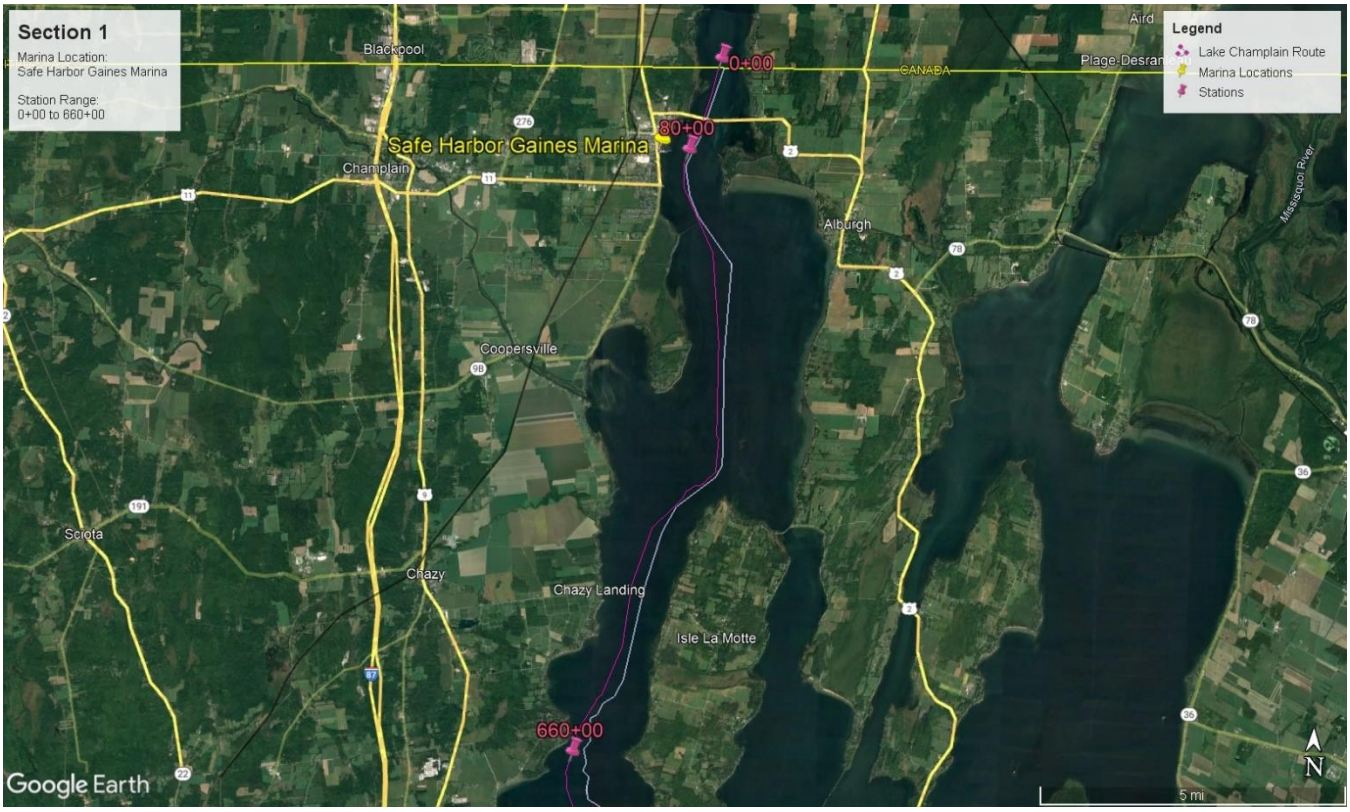
ACTION ISSUE AS REVISION ☐ DEFER ☐ REJECT ☐

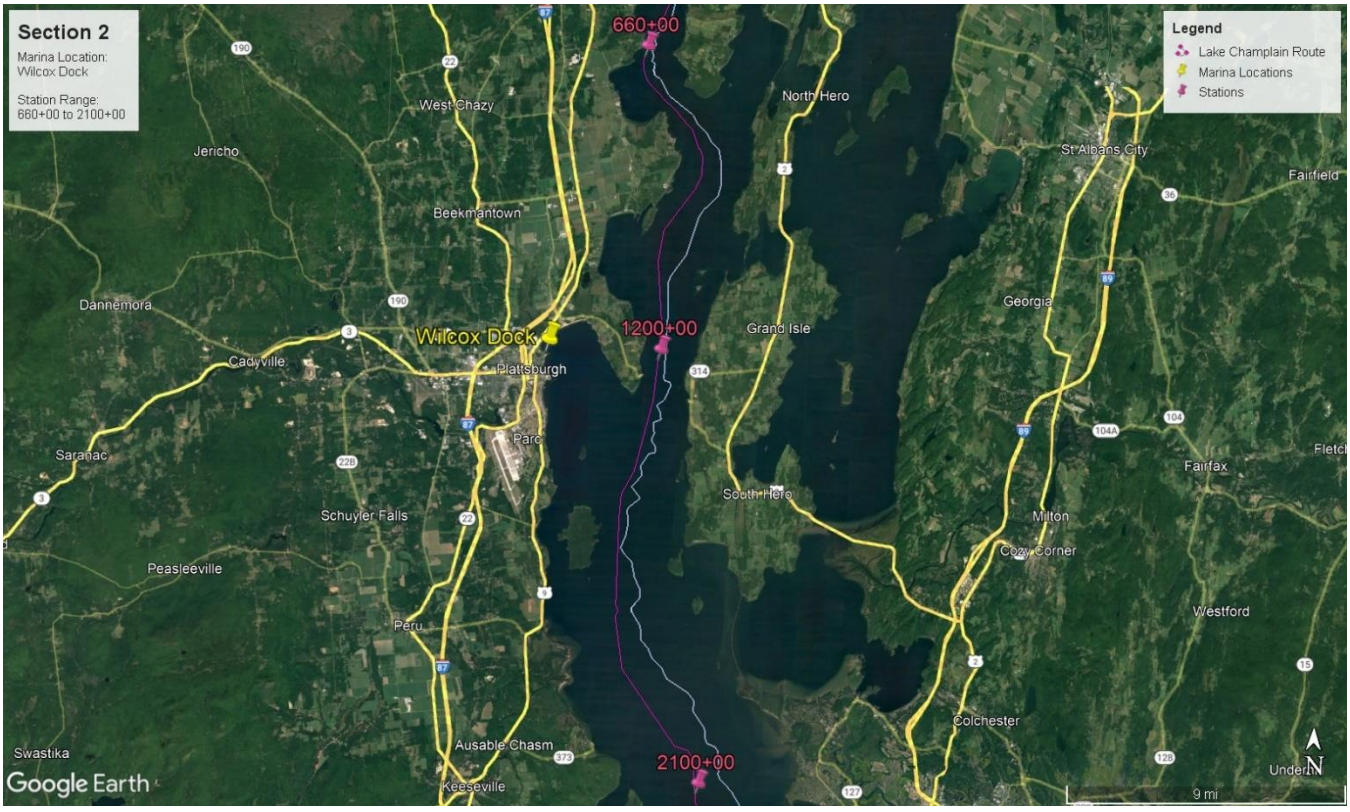
SIGNATURE OF AUTHORIZATION

Appendix 5 - List of Marinas in Lake Champlain

List of Marinas

Marina Location	Address	Section No.	Job Emergency Action Plan
Safe Harbor Gaines Marina	141 Lake St Rouses Point, NY 12979	1	Follow location specific Job EAP
Wilcox Dock	90 Cumberland Ave Plattsburgh, NY 12901	2	Follow location specific Job EAP
Essex Marina	2272 Lake Shore Rd Essex, NY 12936	3	Follow location specific Job EAP
Bridgeview Harbor Marina	54 Harbour Ln Port Henry, NY 12974	4	Follow location specific Job EAP
Monitor Bay Marina	17 Monitor Bay #1 Crown Point, NY 12928	5	Follow location specific Job EAP
Chipman Point Marina	68 Chipman Point Rd Orwell, VT 05760	6	Follow location specific Job EAP


Section 1
Marina Location:
Safe Harbor Gaines Marina
Station Range:
0+00 to 660+00
Legend
Lake Champlain Route
Marina Locations
Stations
0+00
80+00
Safe Harbor Gaines Marina
660+00
Blackpool
Champlain
Coopersville
Alburgh
Isle La Motte
Chazy Landing
Chazy
Sciota
Massisquoi River
Google Earth
5 mi
N


Section 2
Marina Location:
Wilcox Dock
Station Range:
660+00 to 2100+00
Legend
Lake Champlain Route
Marina Locations
Stations
660+00
1200+00
2100+00
Wilcox Dock
West Chazy
Jericho
Beekmantown
Dannemora
Cadyville
Plattsburgh
Peasleeville
Schuyler Falls
Ausable Chasm
Keeseville
Swastika
North Hero
Grand Isle
South Hero
St Albans City
Georgia
Fairfield
Fairfax
Milton
Cozy Corner
Westford
Colchester
Google Earth
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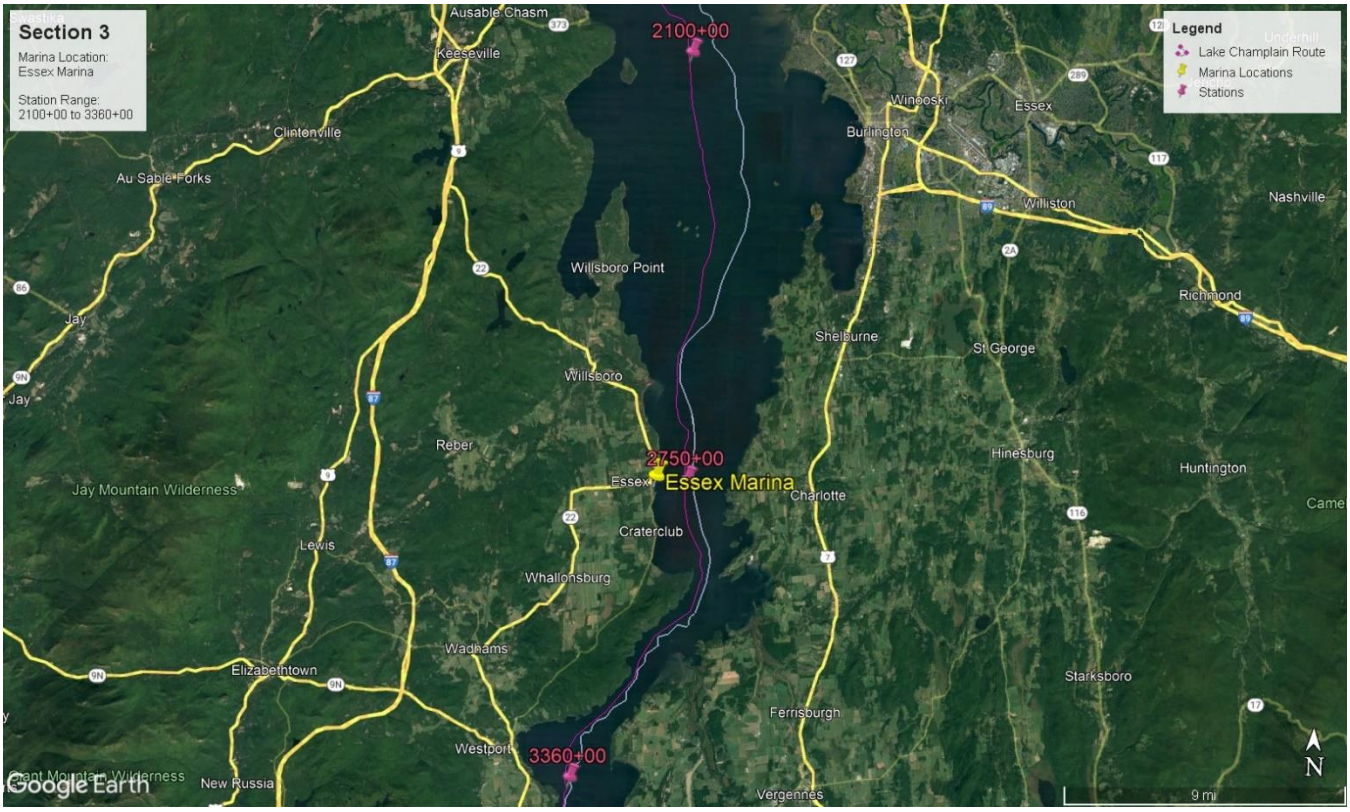
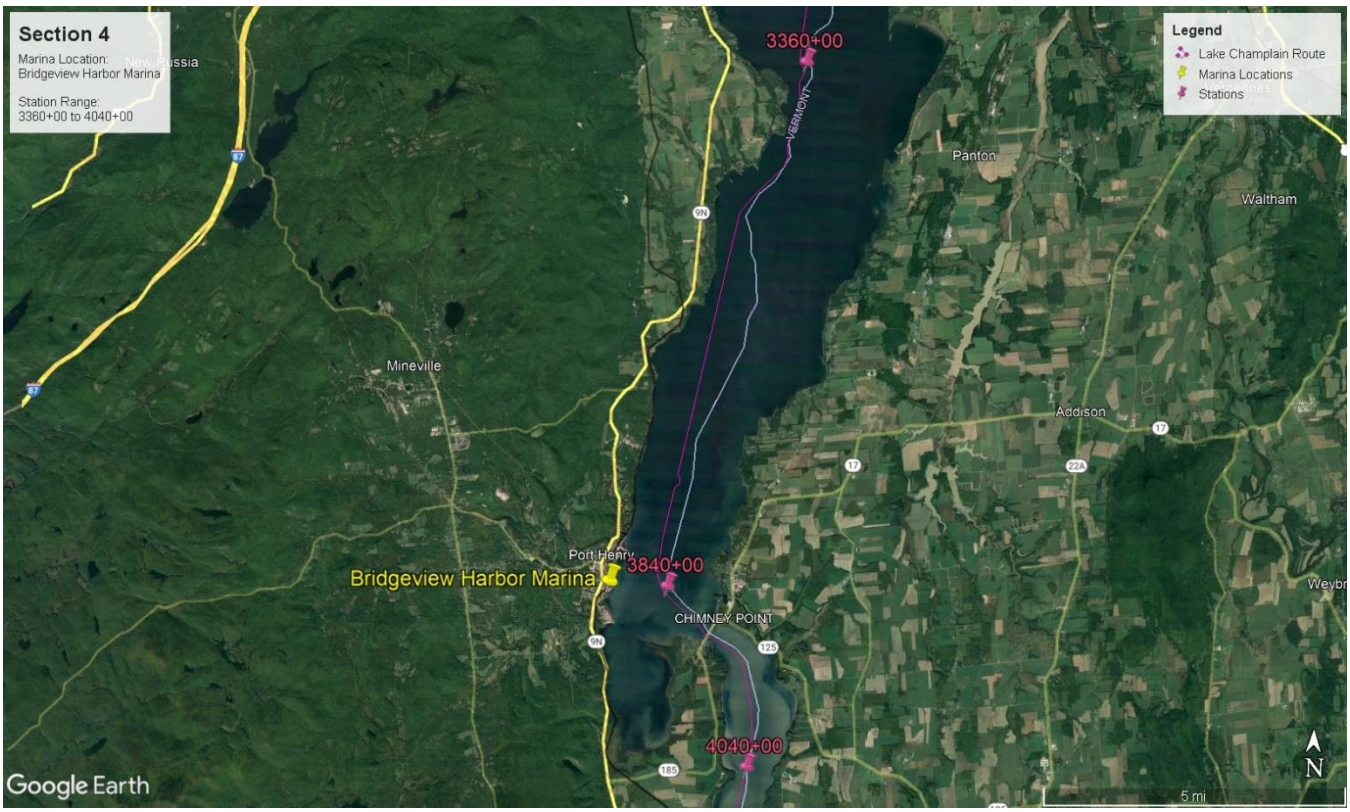
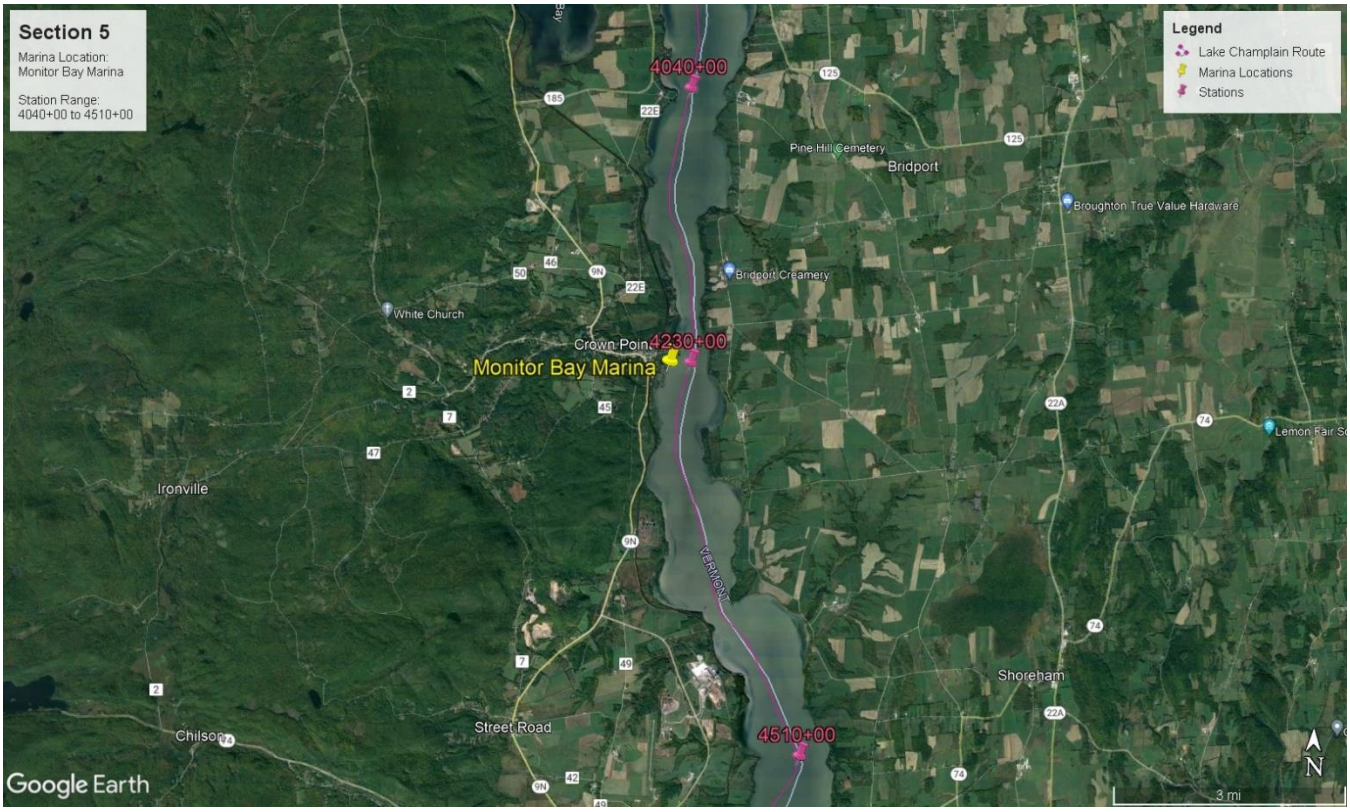
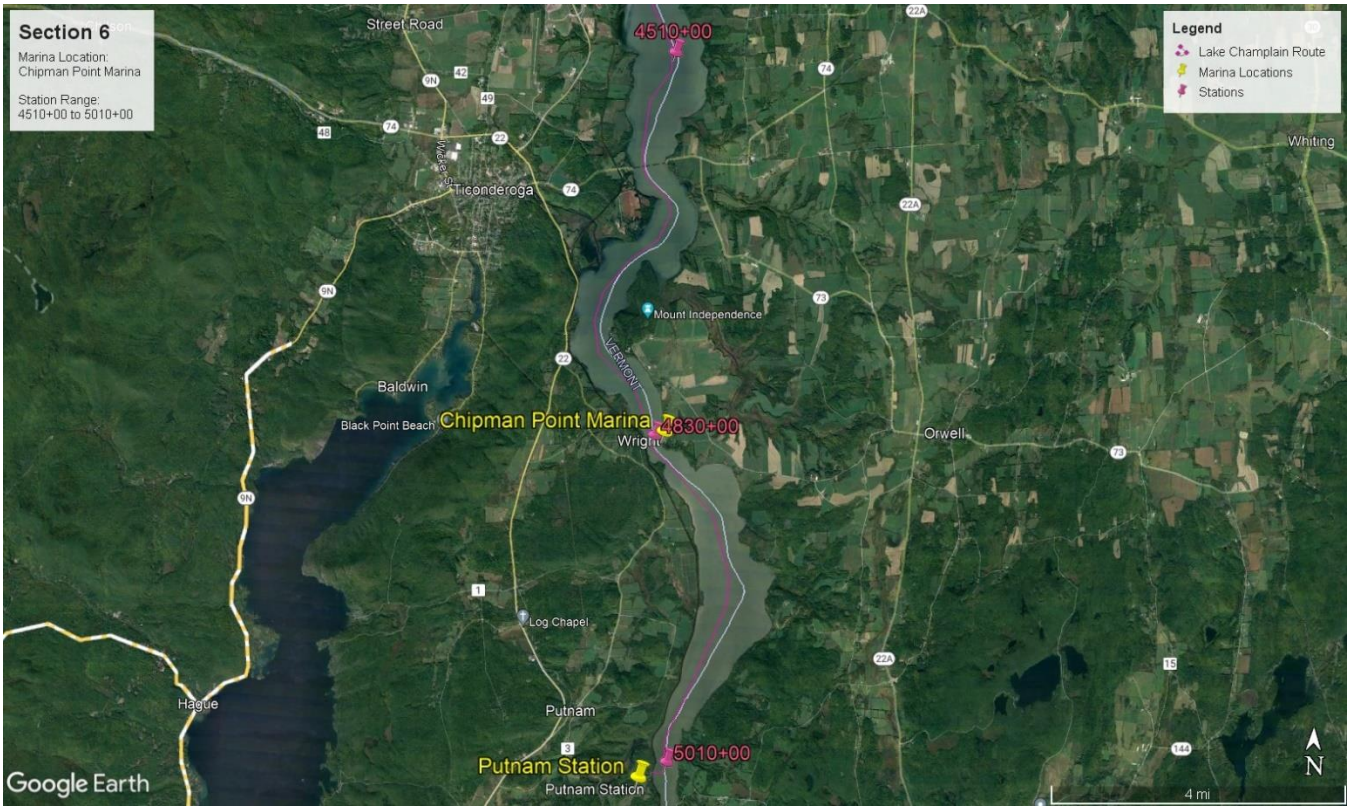

Section 3
Marina Location:
Essex Marina
Station Range:
2100+00 to 3360+00
Legend
Lake Champlain Route
Marina Locations
Stations
2100+00
2750+00
Essex Marina
3360+00
Ausable Chasm
Keeseville
Clintonville
Au Sable Forks
Willsboro Point
Jay
Willsboro
Reber
Jay Mountain Wilderness
Lewis
Whallonsburg
Wadhams
Elizabethtown
Westport
New Russia
Vergennes
Ferrisburgh
Starksboro
Charlotte
Craterclub
Essex
Shelburne
Burlington
Winooski
Essex
Williston
Nashville
Richmond
St George
Hinesburg
Huntington
Google Earth
9 mi
N


Section 4
Marina Location:
Bridgeview Harbor Marina
Station Range:
3360+00 to 4040+00
Legend
Lake Champlain Route
Marina Locations
Stations
3360+00
3840+00
4040+00
Bridgeview Harbor Marina
Port Henry
CHIMNEY POINT
VERMONT
Mineville
Panton
Waltham
Addison
Google Earth
5 mi
N


Section 5
Marina Location:
Monitor Bay Marina
Station Range:
4040+00 to 4510+00
Legend
Lake Champlain Route
Marina Locations
Stations
4040+00
Pine Hill Cemetery
Bridport
Broughton True Value Hardware
Bridport Creamery
White Church
Crown Point
4230+00
Monitor Bay Marina
Ironville
VERMONT
Shoreham
Chilson
Street Road
4510+00
Google Earth
3 mi
N


Section 6
Marina Location:
Chipman Point Marina
Station Range:
4510+00 to 5010+00
Legend
Lake Champlain Route
Marina Locations
Stations
Street Road
4510+00
Whiting
Ticonderoga
Mount Independence
VERMONT
Baldwin
Black Point Beach
Chipman Point Marina
4830+00
Wright
Orwell
Log Chapel
Hague
Putnam
Putnam Station
5010+00
Google Earth
4 mi
N

Appendix 6 - Aquatic Invasive Species Management Plan

Caldwell
Marine International
a JAG Company

PROCEDURAL STATEMENT

AQUATIC INVASIVE SPECIES MANAGEMENT PLAN

SUBMITTED TO:

NKT HV CABLES AB.

SUBMITTED BY:

CALDWELL MARINE INTERNATIONAL

1333 CAMPUS PARKWAY, WALL TOWNSHIP, NJ 07753

732-557-6100

CALDWELL MARINE INTERNATIONAL LLC. 1333 Campus Parkway, Wall Township, New Jersey 07753 **PROJECT QUALITY ASSURANCE**	**Type:** Procedural Statement **Prepared By:** Tom Ulisse **Document #:** AIS Management Plan – Rev 0 – 2023-01-10 **Date**: 1/10/23 **Revision No: 0**

DOCUMENT TITLE: Procedural Statement – Aquatic Invasive Species Management Plan

APPROVALS:

Thomas Ulisse_____
Project Executive - Caldwell Marine International LLC.

_____
NKT HV Cables AB

Rev	Description	Date	Approval
0	Initial issue	1/11/23	TU

Table of Contents

1 INTRODUCTION

Champlain Hudson Power Express, Inc. and CHPE Properties, Inc. (collectively, "CHPE") plan to construct, operate, and maintain a new 1,250 megawatt ("MW") high-voltage direct current ("HVDC") underwater/underground electric transmission facility ("HVDC Transmission System"). The HVDC Transmission System will interconnect with the transmission system of Hydro Quebec and will provide power to the City of New York.

The CHPE route has been carefully designed to minimize its impact on the environment. CHPE cables will be buried throughout the extent of the route. This will keep them out of public view and protect them from extreme weather and external aggression. Two five-inch-diameter power cables and one smaller fiber optic cable will be placed underwater or underground and run 339 miles from the U.S.-Canadian border, south through Lake Champlain, along and under the Hudson River, and eventually ending at a converter station that will be built in Astoria, Queens, New York.

NKT HV Cables AB (NKT) have been selected as the cable supplier for the CHPE Project and has subcontracted the following Project tasks to Caldwell Marine International LLC. (CMI):

1. **CIVIL INFRASTRUCTURE:** -Land-to-Water duct installation for:
    a. Lake Champlain Segment (southern landing only)
    b. Upper Hudson River Segment (northern & southern landings)
    c. Lower Hudson River Segment (northern landing)
    d. Harlem River Segment (southern landing)

    NOTE: HDD operations required for the installation of Land-to-Water cable landing ducts will be performed by CMI's sister company Huxted Trenchless LLC.
2. **SUBMARINE CABLE INSTALLATION:** -
    a. Lake Champlain Segment
    b. Harlem River Segment

    NOTE: The CHPE Project will require the installation of two additional submarine cable segments, namely (1) Upper Hudson River, & (2) Lower Hudson River. NKT has retained responsibility for the cable installation tasks for these two segments
3. **UTILITY CROSSING PROTECTION:** -
    a. Lake Champlain Segment
    b. Upper Hudson River Segment
    c. Lower Hudson River Segment
    d. Harlem River Segment

As part of the permit stipulations from the various state and federal agencies the project contractors must ensure to prohibit the transport of Aquatic Invasive Species (AIS) from waters outside of Lake Champlain on vessels used on the project into the waters of Lake Champlain. To this end an AIS Management Plan (AISMP) has been developed. The AISMP contains various protocols and procedures that contractors must adhere to when transporting marine vessels from other waterways into Lake Champlain. The AISMP is extracted from the Article VII BMP Document (2012 BMPs Section 21.4 and attached as **Appendix 1.** That document contains a description of the various construction methodologies to be employed on the project as well as the protocols to be observed prior to vessels entering the Lake.

2 TRAINING

Before any work begins in Lake Champlain an in-person training session provided by a third-party Environmental inspector will be held at site to review precautionary measures to ensure AIS are not introduced into the Lake and to familiarize staff with the State guidelines to identify and prevent the spread of AIS.

3 MOBILIZATION – Large Vessels

Sectional float barges will be mobilized to Lake Champlain. The barges will be trucked to Willcox Dock in Plattsburgh, NY. The sectional barges will arrive cleaned by the supplier and ready for use. The sectional barges will be utilized to set up the cable lay barge with nominal dimensions:

- Sectional Cable Lay Barge (1 EA) 300’ x 90’ x 7’

Purpose built cable transport barges will be utilized to transit submarine cable through the Hudson River and the Champlain Canal into Lake Champlain. The barges are of new construction and not likely to contain marine growth. The barges will be ballasted prior to the voyage up through the Canal to the Lake. Ballast water shall not be discharged into open waters and will properly disposed of. The barges will be inspected per the practices listed in the attached plan.

- Cable Transport Barge (6 EA) 185’ x 43.42’ x 12’

Mattress crane barge and mattress feeder barges will be utilized to install and transport articulating concrete mattresses in Lake Champlain respectively. These barges will be inspected per the practices listed in the attached plan.

- Mattress Crane Barge (1 EA) 165’ x 43.5’ x 12’
- Mattress Feeder Barge (1 EA) 165’ x 43.5’ x 12’

Pre-lay grapnel runs will be performed in the planed burial sections of the Lake Champlain cable route. The purpose of this task is to remove shallow buried and surficial debris which might potentially impede the safe progress of the plow installation vehicle.

- Pre-lay Grapnel Barge Barge of opportunity

Further crewboat(s) and other support vessels shall be operated in conformance with this AISMP.

Large vessels on the project will be in constant operation once they leave port, further reducing the potential risk of AIS species attaching to these vessels.

Charter tugs utilized on the project are to conform to this AISMP.

4 PRECAUTIONARY MEASURES – Large Vessels

The precautionary protocol measures referenced in the AISMP were conducted as follows:

- Sectional float barges will be inspected upon delivery to the site.

- All vessel compartments will be inspected to ensure that they have been drained and cleaned as per the protocol in the AISMP.
- At no point will ballast water from a larger vessel be released directly into Lake Champlain.

5 MOBILIZATION – Small Vessels

All small vessels associated with the works will be inspected and cleaned prior to mobilization on the project. The small vessels intended for this operation are as follows:

- Little Johnny (or similar) 24' Work boat
- Carolina Skiff(s) 24' Skiff
- Tugboat "Austin" (or similar) 26' Push tug
- Tugboat "Gavin" (or similar) 26' Push tug
- Subcontracted vessels will be advised of this AISMP and are to conform with the requirements of the permits.

6 PRECAUTIONARY MEASURES – Small Vessels

The precautionary protocol measures referenced in the AISMP for small vessels will be conducted as follows:

- All small vessels shall be hauled out onto the docks, inspected and cleaned as per guidelines provided by New York State DEC and respective agencies.
- Bilges shall be drained, cleaned and washed as per the protocol in the AISMP.
- Boat trailers are to be inspected and cleaned as per the AISMP.

7 SUMMARY

This AISMP is a living document and subject to updates as the project progresses.

8 REFERENCES

Protect Your Waters from Aquatic Invasive Species - NYS Dept. of Environmental Conservation
https://www.dec.ny.gov/animals/48221.html

NOAA-Decon-Watercraft.pdf (invasivemusselcollaborative.net)
https://invasivemusselcollaborative.net/wp-content/uploads/2018/11/NOAA-Decon-Watercraft

Protect Your Waters (ny.gov)
https://www.dec.ny.gov/docs/lands_forests_pdf/aispreventionflyer.pdf

9 APPENDIX 1 – ARTICLE VII BMP SECTION 21.4

j) Revegetation of disturbed areas will utilize seed and other plant materials that have been checked and certified as noxious-weed-free.

21.2 INVASIVE INSECT CONTROL

The Asian Longhorned Beetle (*Anoplophora glabripennis*) and the Emerald Ash Borer (*Agrilus planipennis*) are two insects that the NYSDEC has identified as a potential problem to native trees and vegetation. If, during construction, these insects are found, they will be reported to the NYSDEC regional forester. In addition, prior to construction, training will be conducted to teach Facility contractor(s) and subcontractor(s) to identify invasive insect species and the Facility-wide protocol for reporting to the NYSDEC regional forester. Unmerchantable timber will be provided as firewood to interested parties pursuant to the substantive requirements of NYSDEC's firewood restrictions to protect forests from invasive species found in 6 NYCRR Part 192.5.

21.3 AQUATIC INVASIVE SPECIES CONTROL PROCEDURES

An aquatic invasive species is defined in the National Aquatic Nuisance Prevention and Control Act (NANPCA) of 1990 as: A nonindigenous species that threatens the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, aquacultural, or recreational activities dependent upon such waters. For the purposes of this Facility, the term "aquatic" is intended to include freshwater, marine, estuarine, and wetland species (NYSDEC 2010). During cable installation, the Certificate Holders, will comply with all federal, state and local ordinances for *Invasive Species Best Management Practices*. This includes, but is not limited to, boat decontamination and/or washing and ballast water provisions.

The cable route traverses a range of aquatic environments, including deep and shallow limnetic habitats, freshwater wetlands and riverine habitats, freshwater tidal riverine habitats, estuarine, and marine conditions. Within these environments, a wide range of invasive, non-native plant and animal species proliferate. Within the Lake Champlain basin, twelve (12) invasive mollusks and six (6) invasive crustaceans have been identified, and the Hudson River and Estuary has experienced considerable invasion, with over one hundred (100) non-indigenous species established since colonial times (Mills et. al. 1996).

Cable installation activities will utilize available BMPs to prevent or minimize the spread of invasive plants and animals within Lake Champlain and the Hudson, Harlem and East Rivers. In general, these BMPs entail careful inspection of construction equipment prior to movement of equipment from one water body to another (e.g., trailering of small vessels). Vessel hulls, decks, propellers, lower units on outboard motors, and mooring lines will be washed and inspected carefully to remove aquatic plants, attached mussels and crustaceans, etc., prior to relocation of the vessels/equipment to another portion of the cable route or another waterbody.

On a Facility-wide basis, the Certificate Holders will perform the following measures to prevent or control the transport of aquatic invasive species in accordance with applicable regulations and guidance from NYSDEC and the New York Invasive Species Council:

a) Train and educate Facility contractor(s) and subcontractor(s) to identify aquatic invasive species and site-specific prescriptions for preventing or controlling their transport throughout or off of the Facility site;

b) Require that vessels, equipment, and materials be inspected for, and cleaned of, any visible vegetation, algae, organisms and debris before bringing them to the Facility area;

c) Train Facility contractor(s) and subcontractor(s) on the various cleaning or decontamination methods to be used on a site-by-site basis for the Facility;

d) Require that vessels, equipment, and materials be inspected for, and cleaned of, any visible vegetation, algae, organisms and debris before leaving the waterbody for another; and

e) Where the NYSDEC has identified the presence of Rock Snot or Didymo *(Didymosphenia geminata)*, any footwear used in streams or waterbodies will be soaked in a one (1) percent solution of Virkon® Aquatic for ten (10) minutes before leaving the area adjacent to the affected waterbody.

f) No vessel discharges of ballast water or sanitary waste will be allowed within the Facility area.

21.4 FRESHWATER

The freshwater environments along the cable route include the shallow and deep water habitats within Lake Champlain, fringing lacustrine wetlands within embayments of Lake Champlain, and riverine and wetland habitats in the upper Hudson River. A variety of non-indigenous, invasive species have been documented from Lake Champlain, and the Upper Hudson River; notable species include:

Zebra mussel

The invasive non-native zebra mussel (*Dreissena polymorpha*) arrived in Lake Champlain in the early 1990s and has since colonized the entire basin system. Zebra mussels are filter feeders that consume large quantities of plankton. The result has been increased water clarity and subsequent aquatic plant growth in shallow areas of the lake which has dramatically altered the lake's native benthic community. The zebra mussel has also colonized the tidal freshwater portion of the Hudson River Estuary but is excluded from the lower Estuary and the marine portion of the cable route by the species' intolerance of saline water. Zebra mussels readily attach to hard surfaces by mean of byssal threads, and are transported throughout a waterbody, or from one waterbody to another on vessel hulls, floating docks, pontoon, and other submerged or floating construction equipment.

The Certificate Holders will perform the following measures to prevent or control the transport of zebra mussels:

a) All construction equipment will be carefully inspected and washed-down to remove attached mussels (and other epiphytes) from hulls, decks, and mooring lines.

Spiny Water Flea (*Bythotrephes cederstroemi*)

This invasive zooplankter is widely distributed throughout the Great Lakes and the St. Lawrence Seaway. It has recently been documented in Sacandaga Lake, which connects to Lake Champlain and the Hudson River via the Sacandaga River and Lake Champlain Canal. To date, no spiny water fleas have been collected within Lake Champlain or the upper Hudson River; however, it is anticipated that it will make its way into these waterbodies in the near future. Spiny water fleas are difficult to detect by virtue of their small body size and transparent appearance, and they readily attach to vessel mooring lines and other submerged structures.

The following measures will be performed to prevent or control the transport of spiny water fleas:

a) All construction vessels and equipment (including mooring lines) will be washed and inspected prior to leaving a waterbody for another.

Rusty Crayfish

A variety of crayfish species are present in the Hudson River and Lake Champlain drainages, many of which are non-native to the region. However, the rusty crayfish (*Orconectes rusticus)* has in recent years rapidly expanded within the Hudson drainage and nearby waters, where it has competitively displaced other native and non-indigenous crayfish species.

Although it is unlikely that rusty crayfish would be encountered in the deeper waters where the majority of cable installation activity is likely to take place, the following measures will be employed to prevent transportation of rusty crayfish (or other macrocrustaceans) from one waterbody to another:

a) Equipment used in shallow waters and stream crossings will be inspected for and cleaned of rusty crayfish (or other macrocrustaceans) prior to leaving a waterbody for another.

Eurasian Water-Milfoil

Several species of non-indigenous submerged aquatic plants occur in the Lake Champlain and Hudson River drainages. Of these, the most aggressive invader is Eurasian water-milfoil (*Myriophylum spicatum*). Eurasian water-milfoil is widespread in Lake Champlain, particularly the southern end of the lake, in the Champlain Canal, and also in the Hudson River, where it is abundant in shallow areas throughout the tidal freshwater portion of the estuary and into the brackish estuary as far south at Piermont, New York. Eurasian water-milfoil continues to occupy an extensive range throughout the lake. New infestations of Eurasian water-milfoil are discovered nearly every year. Fragments attached to trailered boats are the likely cause of these overland introductions.

The Certificate Holders will perform the following measures to prevent or control the transport of Eurasian water-milfoil:

a) Existing submerged plant beds will be avoided where possible. For the majority of the cable route in the lake, water depths exceed those that support submerged plant beds; it is only in the narrow southern end of the lake that cable installation activity is likely to occur in proximity to these habitats;

b) Construction in infested areas will take place only during non-germination periods; and

c) Vessel hulls, decks, mooring lines and submerged construction equipment will be carefully inspected and cleaned prior to deployment to another location.

Water Chestnut

Water chestnut, an annual aquatic plant native of Europe, Asia, and Africa, was first documented in Lake Champlain in the early 1940s in shallow bays in the southern end on both the Vermont and New York shores. It is generally assumed that water chestnut seeds entered Lake Champlain on boats traveling through the Champlain Canal from the Mohawk or Hudson River, where it had initially become established in the 1870s. Water chestnut displaces other aquatic plant species, is of little food value to wildlife, and forms dense mats that alter habitat and interfere with recreational activities. Currently, extensive growth of water chestnut in southern Lake Champlain restricts boat traffic and other recreational uses.

Prevention and minimization of the transport of water chestnut from one portion of the cable route to another, especially from the lower end of Lake Champlain to more northern reaches, is similar to that for other aquatic vegetation species. The following measures will be performed to prevent or control the transport of water chestnut:

a) Existing submerged plant beds will be avoided where possible. For the majority of the cable route in the lake, water depths exceed those that support water chestnut beds; it is only in the narrow southern end of the lake that cable installation activity is likely to occur in proximity to these habitats;

b) Construction in infested areas will take place only during non-germination periods; and

c) Vessel hulls, decks, mooring lines and submerged construction equipment will be carefully inspected and cleaned prior to deployment to another location.

Invasive Wetland Plants (e.g., Common Reed, Purple Loosestrife)

In the event that cable installation or activities will entail construction or transport of equipment through freshwater wetlands in the vicinity of Lake Champlain or of the upper Hudson River), care will be taken to avoid the spread of invasive wetland plant species, notably common reed (*Phragmites australis*) and purple loosestrife (*Lythrum salicaria*). In wetland areas, where these invasive species are known to occur, the following measures will be implemented:

a) Construction equipment and field gear (including waders or rubber boots) will be inspected and washed to remove stems, root or rhizome structures and marsh sediments which could contain seeds of these species.

21.5 ESTUARINE

The estuarine environments along the cable route include the shallow and deep water habitats within the lower Hudson, Harlem and East Rivers, and fringing tidal wetlands within the freshwater tidal and brackish portions of the lower Hudson River. A variety of non-indigenous, invasive species have been documented from the lower Hudson River and nearby coastal waters. Notable species include:

Atlantic Rangia

Native to the United States Gulf coast, the Atlantic rangia (*Rangia cuneata*) bivalve was first introduced in the lower Hudson River Estuary in 1988 and is now abundant in the Tappan Zee and Haverstraw Bay. Potential vectors of introduction to East Coast waters include ship ballast water and oyster restoration programs (using Gulf Coast shells or live oysters). The long-term ecological significance of the Atlantic rangia's introduction to the Hudson River is poorly understood; however, the potential effects of a successful benthic suspension feeder on trophic dynamics, native bivalves, and plankton communities in the lower Hudson River may be significant.

Unlike zebra mussels, Atlantic rangia are not able to attach to hard surfaces, and remain partially buried in the substrate. Thus, they are not able to "hitchhike" from one waterbody to another by attaching to vessel hulls or construction equipment. Nonetheless, care will be taken during construction or trenching activities in the lower Hudson to be sure that sediment containing Atlantic rangia is not transported to other coastal waters.

The following measures will be performed to prevent or control the transport of Atlantic rangia:

a) Vessel decks, hulls, and construction equipment will be carefully inspected and washed prior to moving to a new waterbody.

Invasive Estuarine Crustaceans

Three invasive crustaceans may be encountered among rocky shoreline habitats or man-made structures (e.g. bulkheads, cribbing, piers) in the marine portion of the cable route (Hudson River and Harlem/East Rivers). The Asian shore crab (*Hemigrapsus sanguineus*), native to the western Pacific, began to aggressively spread along the United States East coast in the 1990s and is now abundant in many shoreline areas, particularly in the vicinity of jetties or rock revetments as well as in natural rocky intertidal areas. The Asian shore crab is an aggressive omnivore and may out-compete native crustaceans such as blue crabs (*Callinectes sapidus*) and American lobster (*Homarus americanus*) for nursery and foraging habitat. The European green crab (*Carcinus maenus*) is native to the northeast Atlantic and Baltic seas but has colonized coastal areas and estuaries worldwide, mainly via introduction of early life stages present in ballast water and in

association with bivalve shells transported for aquaculture. Green crabs out-compete native crustaceans for food resource and habitat and they are aggressive predators on small bivalves, posing a serious threat to commercial shellfish and aquaculture industries in areas where this species has colonized. Both green crabs and Asian shore crabs are already widely distributed within shallow coastal environments in the northeast and mid-Atlantic United States.

Recently, another invasive crustacean has appeared in the Hudson River Estuary - the Chinese mitten crab (*Eriocheir sinensis*). Native to eastern Asia, the Chinese mitten crab is an important food in its native waters and supports a large aquaculture industry. The Chinese mitten crab is highly prolific and omnivorous, competing aggressively with native macrocrustacean populations where it has become established. Burrowing activity by Chinese mitten crabs resulted in extensive damage to shoreline infrastructure in western European rivers during the latter part of the 20th Century. Currently, the Hudson River population is being monitored. While observation/collections have increased within the past several two to three years, mitten crabs have not yet been implicated in population or ecosystem impacts such as competitive displacement of the native Hudson River blue crab.

Vessel hulls, props, lower units, and any sampling equipment of field gear used in the lower Hudson Estuary or East River portion of the cable route will be inspected to prevent the transport of adult green crabs, Asians shore crabs, or mitten crabs to other coastal waterbodies; however, the early life stages of these crabs are planktonic, and would be difficult, if not impossible to detect if they were to be attached to submerged construction equipment or mooring lines. As such, it will be necessary to wash all equipment with freshwater to remove species at this life stage.

In accordance with BMPs for other invasive species, the following measures will be performed to prevent or control the transport of invasive crustaceans:

a) All vessel hulls, submerged construction equipment, and mooring lines used in the lower Hudson Estuary or East River will be carefully inspected and washed with freshwater prior to moving to a different waterbody.

References - Section 21.0

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10 REFERENCES

NEW YORK
STATE OF
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Department of
Environmental
Conservation

New York State

AQUATIC INVASIVE SPECIES MANAGEMENT PLAN

July 2015

www.dec.ny.gov

Cover photos (clockwise from upper-left):

Round goby, Eric Engbretson, US Fish and Wildlife Service, Bugwood.org

Dreissenid mussel veliger, Fred Henson, NYSDEC

Northern snakehead, Jim Gilmore, NYSDEC

Round gobies and Dressenid mussels, Geof Eckerlin, NYSDEC

Floating primrose willow removal, Chart Guthrie, NYSDEC

I. EXECUTIVE SUMMARY

In 1994 the Aquatic Nuisance Species Task Force, a multi-agency federal body co-chaired by the US Fish and Wildlife Service and the National Oceanic and Atmospheric Administration, approved New York's *Nonindigenous Aquatic Species Comprehensive Management Plan*. That plan identified goals and supporting actions aimed at reducing the potential for the introduction and spread of nonindigenous aquatic species, hereafter referred to as aquatic invasive species (AIS) into New York waters, minimizing harmful impacts from those organisms, and educating the public on the importance of preventing future introductions. In addition, that plan recommended creation of a Nonindigenous Aquatic Species Prevention and Control Unit to implement selected actions identified in the plan. While some elements of the 1994 plan have been enacted, it was not possible to implement all of them, and the introduction and spread of AIS continue to be serious concerns. Thus, an updated plan has been developed to further address the AIS issue, with a focus on the state's fresh waters and recommend actions.

New York is a water-rich state with an abundance of lakes, ponds, rivers, and marine waters. The construction of numerous canals created artificial waterway connections which increased the opportunity for AIS to be transported into and from New York. Historically, AIS of particular concern included zebra and quagga mussels, sea lamprey, Eurasian watermilfoil, water chestnut, and hydrilla. More recently, extensive efforts are underway to prevent the spread of one or more species of Asian carp from the Mississippi River watershed to the Great Lakes Basin.

There is no single law or regulation that can be broadly used to prevent AIS from entering waters in New York or from being spread once present. New York State enacted two pieces of legislation and adopted regulations in 2014 intended to prevent the spread of AIS through recreational watercraft use. Environmental Conservation Law (ECL) was amended to add a new ECL § 9-1710 that requires operators of watercraft launching in a public waterbody to take "reasonable precautions" to prevent the spread of AIS. NYSDEC is drafting regulations prescribing a suite of reasonable precautions that may be taken. Article 3 of Navigation Law was amended to add a new § 35-d requiring NYSDEC to develop a universal, downloadable AIS spread-prevention sign and requiring all owners of public boat launches to conspicuously display the sign. In 2014, NYSDEC adopted regulations requiring watercraft launched at or retrieved from its access sites to be drained, and the watercraft, trailer, and associated equipment to be free of visible plant or animal matter (6 NYCRR §§ 59.4 & 190.24). The New York State Office of Parks, Recreation, & Historic Preservation adopted a similar regulation at its sites, recorded in New York Codes Rules and Regulations (9 NYCRR § 377.1 (i)).

In 2013, NYSDEC adopted regulations intended to slow the spread of invasive species through commerce by establishing the state's first lists of prohibited and regulated species (6 NYCRR § 575). Other NYSDEC regulations that help prevent the spread of AIS require authorization via permit for fish to be stocked into waters of the state (ECL § 11-0507), and for such fish to be free of specified fish pathogens. NYSDEC also regulates the use of baitfish (6 NYCRR § 19.2) and requires that they be certified as pathogen free (6 NYCRR §§ 188.1 & 188.2).

The updated *AIS Plan* was initially drafted by staff from DEC before being provided to outside reviewers for additional input. It is focused on the state's fresh waters although, if implemented, the plan has elements that will aid efforts to limit the proliferation of AIS in marine and coastal portions of the state. To support the overall goal of stopping the introduction and spread of AIS into and within New York State's waters, four objectives were identified: Prevention, Detection, Response, and Capacity. For the first three objectives, strategies incorporating actions to foster attainment were further categorized as Education and Outreach, Leadership and Coordination, Research and Information, and Regulatory and Legislative. The Capacity objective was focused solely on securing adequate funding and resources to support AIS programs in New York; thus, it did not lend itself to the categories described above.

A suite of more than 50 actions needed to fully implement the plan was identified, and these actions are summarized in an implementation table. Recognizing the challenge in implementing all of the plan's recommendations within the five-year span of this plan, ten high-priority actions were identified and briefly described below. All are considered to be very important; thus, they do not appear in priority order. The codes preceding each action link to the Implementation Table (pp. 37) and the text of this plan.

- **1A1**. Expand the boat launch steward program and ensure consistency of these programs statewide
- **3B1**. Develop an AIS response framework to guide decision making when AIS are detected, and communicate the reasoning for the response selected
- **4X1**. Within available resources, NYSDEC will implement and maintain a statewide, coordinated AIS management program.
- **1A2**. Implement an AIS public awareness campaign and evaluate its effectiveness in reaching target audiences
- **1B1**. Provide Department of Environmental Conservation (Department) leadership for the AIS program to achieve productive and coordinated actions
- **3D1**. Identify legal, regulatory, and institutional barriers that could impede a rapid response to an AIS introduction
- **1A3**. Expand the use of AIS disposal stations at waterway access sites
- **3B2**. Create regional "first responder" AIS teams to incorporate local expertise in planning and implementing appropriate responses to AIS

- **1B2**. Continue to coordinate NYSDEC activities within the New York Invasive Species Council
- **1C1**. Identify and evaluate risks associated with pathways for AIS introduction to and movement within New York

Annual evaluation and monitoring will be used to gauge progress toward meeting the objectives of the plan. Pending the outcome of efforts to secure adequate resources to implement elements of the plan, progress will be measured and reported by either the *AIS Plan* team or by personnel assigned to work on the overall AIS management program.

CONTENTS

II. INTRODUCTION

Aquatic invasive species (AIS) are organisms that are not native to our aquatic ecosystems and can threaten New York State's aquatic ecology, economy, and even human health. New York State's legal definition of invasive species is consistent with the federal definition and is "*a species that is nonnative to the ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health. …the harm must significantly outweigh any benefits*" (ECL § 9-1703).

The introduction and spread of aquatic invasive species are major problems in the United States. New York State is particularly vulnerable to AIS introduction given its abundant marine and fresh water resources, major commercial ports, and the easy access that ocean-going vessels have to the Great Lakes via the St. Lawrence Seaway and the state's canal system. These connections also allow for the rapid spread of AIS once introduced to the Great Lakes or other interconnected waterways. AIS such as water chestnut (*Trapa natans*) and Eurasian watermilfoil (*Myriophyllum spicatum*) were first introduced to the country more than 70 years ago and were allowed to spread largely unchecked because, at the time the introductions occurred, the AIS issue was not widely recognized. It was not until the zebra mussel (*Dreissena polymorpha*) was introduced to North America in the 1980s and had impacts on water quality and the recreational and commercial use of many high-profile waters that the importance of AIS was widely recognized.

Economic losses associated with invasive species are enormous and have been calculated at nearly $120 billion per year in the United States (Pimentel, et al. 2005). Maintenance costs at water intakes due to dreissenid mussels (zebra mussel and quagga mussel, *D. bugensis*) alone are an estimated $267 million in North America (Pimentel, 2005). Commercial and recreational fishing are severely impacted by invasive species. In New York State canals and the Hudson River system, an estimated $500 million in economic losses occur each year from at least 154 non-native species; 80% of that loss is in commercial and sport fishing.

AIS usually arrive without the predators and diseases that control their numbers in their native range. The resulting unchecked potential for rapid population growth can disrupt aquatic ecosystems. Northern snakehead (*Channa argus*), sea lamprey (*Petromyzon marinus*), round goby (*Neogobius melanostomus*), hydrilla (*Hydrilla verticillata*), and the New Zealand mudsnail (*Potamopyrgus antipodarum*), all present in some New York State waters, can prey upon or displace native species, alter habitat, or otherwise harm native species. Aquatic invasive species can also negatively impact human health. For example, Chinese mitten crabs (*Eriocheir sinensis*) are carriers of Asian lung fluke (*Paragonimus spp.*). Dreissenid mussels selectively graze on green algae, reducing competition for blue-green algae, which can, in turn, pose risks to human health by affecting the taste and quality of drinking water and cause harmful toxic algal blooms.

Invasive species are almost entirely spread by humans, and global trade and

travel have greatly increased the rate of invasion. AIS arrive by many pathways, including direct introduction, live animal trade, the nursery and landscape trade, recreational boating, cargo transport, and shipping ballast. Approximately 67% of the invasive species found in the Great Lakes and St. Lawrence River were reportedly introduced in ship ballast water (Grigorovich, et al. 2003).

Aquatic invasive species are pervasive throughout New York State. The largest waterbodies possess many AIS. As of 2012, more than 180 nonnative and invasive aquatic species have been verified in the Great Lakes (National Oceanographic and Atmospheric Administration, [NOAA] 2014); 122 have been found in the Hudson River; 87 have been documented in the St. Lawrence River; and 49 have been reported in Lake Champlain (Lake Champlain Basin Program, [LCBP] 2012). Inland waterbodies have not been spared, although it is likely that smaller waterbodies do not have as many AIS as these larger, mostly international border waterways. AIS plants have been found in close to 500 waterbodies in New York State, with Eurasian watermilfoil found in about 2/3^{rds} of these, in nearly every county in the state. Dreissenid mussels have been found in at least 60 waterbodies (New York Natural Heritage Program [NHP] iMapInvasives© 2014). It is likely that the actual frequency of AIS occurrences in the state is substantially larger because AIS surveillance has not been conducted on the majority of the nearly 20,000 lakes, ponds, and reservoirs (NYSDEC, unpublished data) and 87,000 miles of rivers and streams (NYSDEC, 2012). By 2013, in what is probably the least invaded but most extensively surveyed portion of the state, the Adirondack Park Invasive Plant Program (APIPP) surveyed 311 lakes since the program's inception (ca. 2000), and 94 (30%) of those are known to harbor AIS. More importantly, more than 200 lakes widely distributed throughout the park are reportedly still free of AIS (H. Smith, APIPP, personal communication).

It is important to note, however, that not all nonnative species are invasive. Some introduced nonnative aquatic species don’t survive, and others that do may integrate into New York State ecosystems without causing significant harm to natural aquatic resources, the economy, or human health. Examples include brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*). In addition, some waters that have been widely colonized by nonnative species, including AIS, still support aquatic ecosystem functions and are capable of sustaining economically important recreational activities such as sport fishing. For example, Lake Ontario has an abundance of AIS and is New York State’s most heavily fished body of water, with angler expenditures exceeding $155M per year (Connelly and Brown, 2009).

Ecological conditions and processes dictating the potential for the introduction and establishment of AIS are inextricably linked to the climate and, therefore, climate change. Volatile weather patterns, altered water levels and overall climate shifts will favor the introduction and ultimate success of certain invaders, while reducing or eliminating threats from others. Similarly, food webs and energy flows within existing aquatic ecosystems will no doubt be altered. Ranges of specific AIS (and native species) will shift, and overwintering potential will increase as thermal barriers are removed (Pagnucco, et al. 2015). These consequences add to the importance of reviewing and adapting an effective aquatic invasive species management program

(Bierwagen, et al. 2008)—in our case, at least every five years.

While it is clearly important to take active measures to limit the introduction and spread of AIS, it is also important to do so without unduly affecting the use and enjoyment of New York State waters. In 1991, the Aquatic Nuisance Species Task Force (ANSTF) was established to help focus attention and action on issues relating to AIS. One of the specific tasks of the ANSTF was to foster the development of AIS management plans by states and provide some funding for implementation by states with approved plans. New York State prepared a plan to address aquatic nuisance species in 1993, and that plan was approved by the ANSTF in 1994 and implemented to varying degrees in the intervening years. In the more than 20 years since New York State's first plan was developed, new populations of AIS have been discovered, a comprehensive framework to address all taxa of invasive species has been implemented, and stakeholder interest and demand for action by the state have increased dramatically.

This plan updates and revises New York State's prior plan and is intended to guide AIS prevention and control efforts over the next five years. It describes an AIS management program (AISMP), including our goals, objectives, and actions to prevent, detect, and respond to AIS using a comprehensive approach to protect New York State aquatic resources from the adverse impacts of AIS. The focus of the plan is directed at the state's fresh waters, although many of the strategies called for in the plan will be beneficial in addressing this issue for marine and coastal portions of the state as well. The plan emphasizes pathways or the means by which AIS are spread, rather than focusing on specific invasive species. This approach recognizes that many different species can be spread by a single pathway. Applying effective management to address a particular pathway will slow the spread of all AIS transported through that pathway.

III. DEFINING THE PROBLEM IN NEW YORK STATE

Geographic Applicability

As a major point of entry for travelers, cargo, and mail entering the United States, New York State is highly vulnerable to introduction of AIS. The state has a total of 27 ports, including a very large deepwater seaport in New York City and smaller ports on Lake Erie, Lake Ontario, the St. Lawrence River, the Hudson River and Long Island Sound. Global trade in live nonnative species for the pet, food, and landscape and nursery trades, and organisms transported in ship ballast arrive through these ports, presenting a risk of AIS introduction. Abundant water resources ranging from the Great Lakes to tidal rivers to mountain ponds support diverse recreational boating, from cruise ships to white water rafting to wilderness travel in kayaks and canoes. Each activity poses some level of risk of introducing or spreading AIS.

New York State occupies an important position regionally, and its aquatic resources can be broken down into 17 major drainage basins (Figure 1). This plan is applicable to waters of the state as defined in ECL § 17-0105. As a member of the Great Lakes community, New York State can be impacted by any AIS introductions in the Great Lakes region. Conversely, the Great Lakes are vulnerable to AIS introductions that might originate in New York State, as demonstrated by the alewife *(Alosa pseudoharengus)* and sea lamprey. Rivers originating in or flowing into the state also provide multiple aquatic connections. The Susquehanna River is the headwater for the Chesapeake Bay watershed. The Chemung River also drains into the Susquehanna. In western New York State, Chautauqua Lake and the Allegheny River link New York State to the Mississippi watershed. The Delaware River watershed is another major multi-state, regional watershed that, like the Susquehanna, has its origin in New York State. However, many of these have significant barriers that impact the upstream migration of AIS into New York State. New York State shares the Lake Champlain watershed with Vermont and Canada, and there are several smaller waterbodies connecting New York State to Pennsylvania, New Jersey, Connecticut, Massachusetts, and Vermont. Finally, New York State is coastal. The marine waters of Long Island Sound share shoreline with Connecticut, Rhode Island, and Massachusetts, and New York Harbor is bordered both by New York State and New Jersey. All of these waters represent portals to AIS introductions.

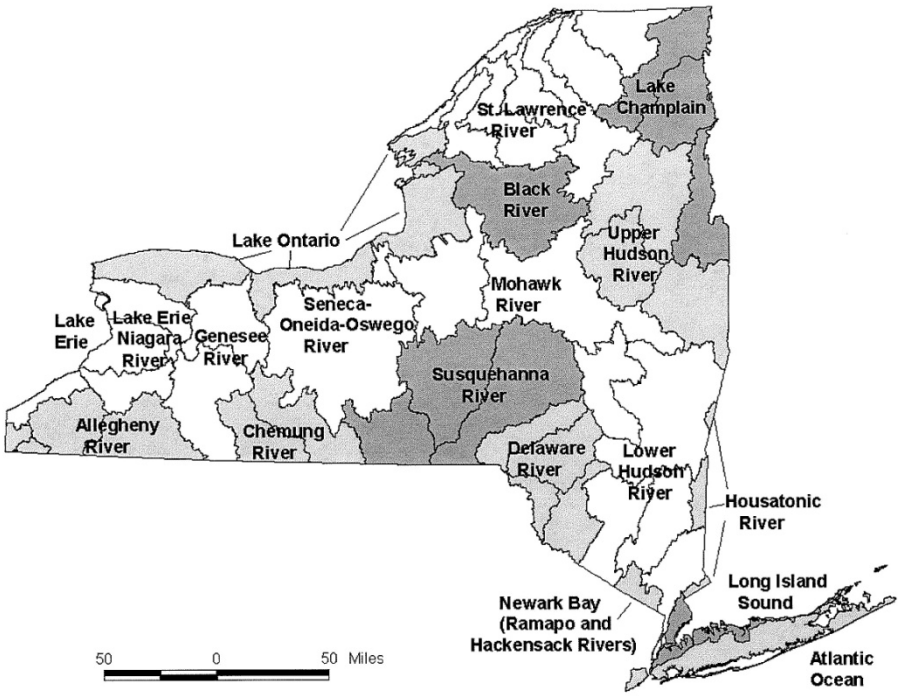

Figure 1. Major watersheds of New York State. From *Inland Fishes of New York State*

The problem of AIS in New York State has been exacerbated by the presence of numerous canals, both historical as well as those still in current use because they artificially connect watersheds. The current New York State Canal System consists of four canals: Erie, Champlain, Oswego, and Seneca-Cayuga. The Erie Canal was opened in 1825 and remains in use today. It links the Hudson and Mohawk rivers to the Great Lakes as well as to many other inland waters. The Champlain Canal links the Hudson River to Lake Champlain. The Oswego Canal links the Erie Canal to Lake Ontario near Syracuse. Finally, the Seneca-Cayuga Canal links the Erie Canal to Seneca Lake and Cayuga Lake, two of the Finger Lakes in central New York State. Historically, the Chenango Canal linked the Erie Canal system to the Susquehanna and Chenango rivers from 1838 to 1878, and the Black River Canal connected the Erie Canal system to Lake Ontario via the Black River from 1840 to 1926. The Allegheny River was also connected briefly (1856 to 1878) to the Erie Canal by the Genesee Valley Canal. The Delaware Hudson Canal was a privately funded canal that linked the Hudson and Delaware rivers from the 1840s until 1913. A good discussion of the canals of New York State and their possible influence on fish distribution can be found in Smith (1985). Canals served an important role in the economic development of New York State and westward migration. However, they also made many New York State watersheds highly vulnerable to AIS colonization. Dreissenid mussels spread more rapidly into the Finger Lakes and Oneida Lake through the canals than by the eastward flow of water through the Great Lakes and the St. Lawrence River. The Erie Canal may also have opened the door for invasive species that originated in marine water, such as

sea lamprey[1] and alewife, allowing them to penetrate not only into New York State inland waters, but into the Great Lakes as well. Highly invasive Asian carp, especially bighead carp (*Hypophthalmichthys nobilis*) and silver carp (*Hypophthalmichthys molitrix*), both present in the Mississippi River Basin, are of particular concern. Spread of these species from the Mississippi River Basin into the Great Lakes through interconnected waters and throughout much of New York via the canal system and Hudson River would severely disrupt aquatic ecosystems and threaten recreational fishing and other water-based recreation. Further, silver carp often leap out of the water at the vibrations of boat engines, potentially harming people.

[1]Disagreement exists as to whether or not the sea lamprey was native to Lake Ontario, or whether it gained access through the opening of the Erie Canal (Smith, 1985). There is clear agreement that the sea lamprey gained access to Lake Erie and the other Great Lakes in the 1920s through the Welland Canal, which bypasses the Niagara River and allows direct access to Lake Erie from Lake Ontario.

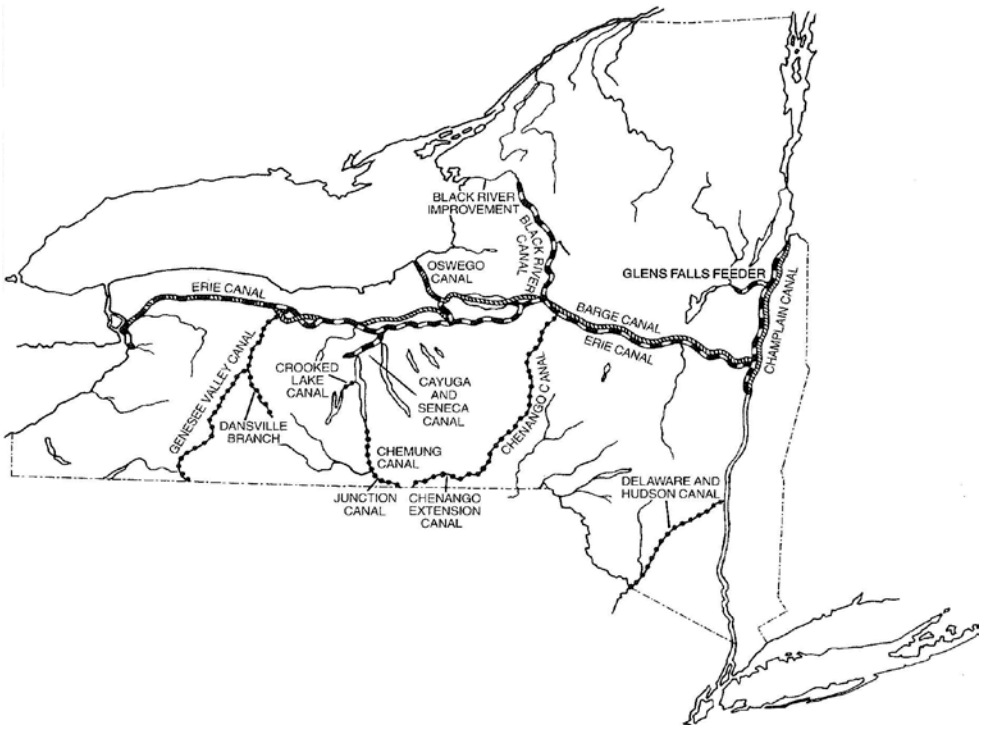

Figure 2. Past and present canals in New York State. From *Inland Fishes of New York State*

Because of New York State's geographic position and hydrological connection to the Great Lakes watershed, the Delaware and Chesapeake watersheds, and the Mississippi watershed via the Allegheny River, New York State's AIS programs and policies have the potential to impact many other states throughout the Northeast, the Midwest, the Mid-Atlantic, and even the Central Plains. Likewise, AIS introductions, activities, and plans in these other regions have the potential to affect New York State. The extensive use of New York State ports in Lake Erie, Lake Ontario, the St. Lawrence Seaway, the Hudson River, the Atlantic Ocean, and Long Island Sound makes New York State waterways particularly vulnerable to AIS introductions. Internet trade and increasing global commerce, bringing goods to New York State from locales around the world, create additional vulnerability.

New York State lies within the bounds of three ANSTF regional panels established by the National ANS Task Force: the Northeast ANS Panel (MA, ME, NH, NY, RI, VT), the Great Lakes ANS Panel (IN, MI, MN, NY, PA, OH, WI), and the Mid-Atlantic Regional AIS Panel (DC, MD, NC, NJ, NY, PA, VA, WV). Regular communication and cooperation among the states is facilitated through these panels.

New York State shares waters and watersheds with adjoining states and Canadian provinces. Such overlaps include Great Lakes Erie and Ontario and Lake

Champlain. Interstate communications and cooperation are essential to successful AIS management. One example is the LCBP, a partnership established in federal statute to restore and protect Lake Champlain and its watershed, and supported by New York, Vermont, Quebec, and the US Environmental Protection Agency (USEPA). The LCBP has an ANSTF-approved AIS management plan jointly coordinated by NYSDEC and the Vermont Department of Environmental Conservation. Adjoining states with ANSTF-approved AIS management plans are Pennsylvania, Massachusetts, and Connecticut. The Authors reviewed these states' plans as well as others during the writing of this plan. New York participated in scoping the Great Lakes and Mississippi River Interbasin Study by the US Army Corps of Engineers. This study investigated the linkages between the Great Lakes and Mississippi River basins, and the risk of movement of AIS between the basins, and presents a range of options and technologies to prevent aquatic nuisance species (ANS—an outdated synonym to AIS) movement between the basins through aquatic connections.

Pathways

There are numerous potential pathways of introduction for AIS into and throughout New York State. Not all introductions of AIS to the state or individual waterbodies from existing in-state AIS can be attributed to a specific pathway. However, there is strong evidence that each of the vectors identified below represent a potential pathway for moving AIS into the waters of New York State, and these vectors must be addressed to reduce continuing and future movement of these species into and within the state.

- **Commercial shipping vessels:** It is highly probable that many of the animal AIS introduced in recent years, such as dreissenid mussels, round goby, ruffe (*Gymnocephalus cernuus*) and fishhook waterfleas (*Cercopagis pengoi*), were brought into the United States in the ballast water of transoceanic ships. This pathway is less likely to be implicated in the movement of AIS within the state, given the inability of these larger vessels to travel outside boundary waters of the state. However, once introduced to the Great Lakes system, these species may spread by other pathways to inland waterbodies.

- **Recreational watercraft:** Recreational watercraft, both powered and not, can contribute significantly to movement of AIS from sources outside the state and between waterbodies within the state. This process has occurred for as long as powered and trailered boats have been commonplace in New York State waterways, but has likely accelerated with the construction of the New York State Thruway in 1954 and the Adirondack Northway in 1962. Recreational watercraft can move aquatic plants and animals as hitchhikers on boat propellers, trailers, hulls, sailboat keels, centerboard and dagger-board trunks, and rudders, and fishing and anchor lines, as well as within motors, live wells, and bilge water. It is likely that many of the aquatic invasive plants and small-bodied organisms moving within the state have been transported by recreational watercraft.

- **Interconnected waterways:** As noted above, canals effectively move watercraft and any hitchhiking AIS throughout the state by connecting Lake Champlain to the Hudson-Mohawk watershed, to the Great Lakes and the Finger Lakes drainage basins by the Erie and Champlain canal systems. AIS can also move easily from upstream to downstream through outlets of infested waterbodies to inlets of uninfested sites, whether as fragments of plants or larval forms of animals.

- **Aquaria releases:** Numerous aquatic invasive plant and animal species such as Brazilian elodea (*Egeria densa*) and Asian clam (*Corbicula fluminea*) have been sold in pet stores, through the aquaria trade, or via the Internet. The regulation of this practice is challenging, given the historic lack of regulatory and enforcement authority. In addition, these species can be difficult to distinguish from native species. The release of aquatic species from aquaria often occurs because the owner does not want them anymore, but does not want to kill them either.

- **Intentional introductions:** New York State requires a permit and a fish health inspection for the intentional introduction or release of fish or fish eggs into waters of the state. The public might not be fully aware of these requirements even for those species that have been evaluated and approved for biocontrol, such as triploid grass carp. Occasionally, stories circulate in the media that certain species are effective biocontrols of AIS, and the public can be easily misled into releasing what they perceive to be a biocontrol species. Any biocontrol species approved by the US Department of Agriculture's Animal and Plant Health Inspection Service for release in the US must be further evaluated for use in New York State before it is released, and such an intentional introduction can only occur with a state permit.

  Anglers may also release fish caught in one part of the state into a water body in another part of the state, possibly to establish what they perceive as a desirable fishery closer to home. Even if the introduced fish is native to New York State, it might be nonindigenous to the new region, watershed, or water body, and it can become an AIS. In the Adirondacks, many ponds are fragile ecosystems inhabited by unique original Adirondack strains of brook trout (*Salvelinus fontinalis*). If a locally nonindigenous fish species is introduced, it can out-compete the native brook trout and possibly lead to the extinction of a unique genetic strain. Fish should not be released, intentionally or unintentionally, in waters from which they did not originate, except under NYSDEC permit.

- **Nursery plantings:** The water garden trade can unintentionally move AIS species into and within the state, either through the sale and transport of mislabeled or misidentified AIS commonly mistaken for desirable aquatic plants, or as contaminants attached to the transported plants or in the planting material, including soils or water. The pioneering introduction of monoecious hydrilla in California has been attributed to contamination of a (legal) water lily stock

supplied from Maryland (California Department of Food and Agriculture, 2001).

- **Cultural:** Several AIS serve as important symbols for some ethnic populations living in New York State. The northern snakehead is native to China, Russia, North Korea, and South Korea. This fish is a common part of the Asian food market, although the United States Fish and Wildlife Service (USFWS) has prohibited its importation and interstate transport under the Lacey Act (18 US Code § 42). Certain cultures believe the fish has healing and medicinal powers. Large-scale ceremonial releases of live snakehead are thought by some ethnic groups to be a prayer to deities (Severinghaus and Chi, 1999). Other species may also be released as part of a religious ceremony.

- **Live food trade:** Markets offering live food represent an important source of fresh food for many New York State residents but are particularly important for immigrant cultures seeking foods that form a core cuisine from their native lands. AIS fish that are sold in these markets represent a significant threat to New York State waterways, such as the Asian swamp eel (*Monopterus albus*). Other species that commonly occurred in ethnic food markets, such as the Chinese mitten crab, bighead carp (*Hypophthalmichthys nobilis*) and northern snakehead, have already been prohibited from importation. It is believed that some of these species have been intentionally stocked to provide a continuing food source for these markets. Asian clam is popular with certain ethnic groups and may have been introduced in an effort to develop a food supply in certain New York State waters.

- **Bait:** Bait buckets may also serve as a source of aquatic invaders. The rusty crayfish (*Orconectes rusticus*) has spread to New York State from the central and midwestern US, most likely through bait buckets. The size and aggressive behavior of rusty crayfish allow it to out-compete native crayfish and minimize predation from other fish. Rusty crayfish can also alter aquatic plant habitat and prey on fish eggs, further impacting native crayfish and fish populations (Horns and Magnuson, 1981). The bait bucket water may also contain AIS such as larval dreissenid mussels (veligers), invasive macroinvertebrates like waterfleas, fish, bacterial and viral pathogens, or other parasites.

- **Waterfowl:** Plant parts can also attach to fur, feathers, or feet and can also be spread by animals in undigested feces. The movement of AIS, such as water chestnut, may be associated with waterfowl migration, because many infested waterbodies have no public access, no private recreational use, and are isolated from other infested waterbodies. However, each of these waterbodies, and those in neighboring states, are regularly visited by or are in the flight path of migratory waterfowl.

- **Unknown pathways:** The actual transport vector for AIS introductions may be difficult to determine, even if only a subset of the potential pathways is relevant for that AIS species, and even if the “parent” population within a specific

waterbody can be surmised from its size and location. For example, the source of the Asian clam infestation in Lake George cannot be explicitly linked to any of the pathways described above, even if the pioneering location could be definitively identified and dated. This is consistent with the challenges in implicating a pathway for most invaders.

Historical AIS problems

New York State has experienced numerous AIS problems, some going back hundreds of years. As such, a brief synopsis is presented in this document. Because the presence of sea lamprey in Lake Ontario was not noted until 1831, several years after the opening of the Erie Canal (Smith, 1985), it has been speculated that the opening of the Erie Canal allowed them into Lake Ontario, where they ultimately gained access to the upper Great Lakes and devastated indigenous lake trout (*Salvelinus namaycush*) populations.

The alewife is a migratory fish, historically known to spawn in the Hudson River, which is believed to have gained access to Lake Ontario through the Erie Canal (Smith, 1985)[2]. Smith (1985) suggests that the alewife entered Lake Ontario in the early 1800s but did not become abundant until the populations of large predators such as walleye (*Sander vitreus*), sauger (*Sander canadensis*), and lake trout were drastically reduced through overfishing. With the loss of large predators that would otherwise have kept it in check, alewives eventually out-competed other forage species and caused aesthetic and human health problems when massive die-offs occurred, filling beaches and harbors with tons of dead, decaying fish.

AIS plant introductions can be documented from as far back as the 1880s, when water chestnut seeds brought from Europe were planted in Sanders Pond (now Collins Lake) in Scotia in eastern New York State, leading to extensive populations in the lake by 1884. Subsequent flooding of the neighboring Mohawk River (via locks and dams on the New York State Barge Canal) spread the plant and spawned widespread growth by the 1920s. Water chestnuts were reported in the Hudson River by 1930, reaching nuisance levels in the 1950s, and probably spread west through the Erie Barge Canal system, reaching Oneida Lake and the Finger Lakes region by the turn of the 21st century. The plants spread north into Lake Champlain through the Hudson-Champlain Canal. It was first reported in Maryland in the late 1910s and reached the Potomac River during the early 1920s, developing widespread populations in the 1940s (Kishbaugh, 2009).

[2] Some ichthyologists believe that like the sea lamprey, the alewife may have entered Lake Ontario through the St. Lawrence River, and they consider it a native species. Also like the sea lamprey, the alewife undoubtedly gained access to the upper Great Lakes through the Welland Canal.

Recent AIS problems

Herein we describe a selection of recent AIS issues pertinent to New York State, which by no means represent a complete nor real-time representation of our most-recent invasions. In the 1980s, zebra mussels entered the state through Lake Erie. A near-simultaneous introduction appears to have occurred in the Hudson River, either from recreational boating or a ballast water release. They rapidly spread eastward through the Erie Canal into the Finger Lakes region of central New York State. Quagga mussels were first reported in North America in 1988 and the Erie Canal in 1989 (May and Marsden, 1992) but were found in the Mohawk River in Crescent by 1995. Quagga mussels now dominate Lake Ontario substrates, where zebra mussels once did (Mills, et al. 1999), perhaps due to the species' preference for deeper, cooler waters as compared to zebra mussels (Mills, et al. 1996).

Round goby followed dreissenid mussels into Lake Ontario from Lake Erie, where they quickly became established. In localized areas, they can rapidly become the most abundant fish species present. Round goby can out-compete and replace native species such as the mottled sculpin (*Cottus bairdi* (Jude 1996) and prey upon the eggs of native species (Chotkowski and Marsden, 1999). Round goby have also been implicated as reservoirs of both avian botulism (Getchell, et al. 2006) and viral hemorrhagic septicemia virus (Eckerlin, et al. 2011) in Lake Ontario and the St. Lawrence River.

Both the spiny waterflea (*Bythotrephes cederstroemi*) and the fishhook waterflea have become established in Lake Ontario. In addition, the fishhook waterflea has colonized the Finger Lakes, and the spiny waterflea has recently been detected in several eastern Adirondack lakes, including Lake George, Great Sacandaga Lake, the Glens Falls feeder canal and Lake Champlain. Both species have been found to disrupt the zooplankton community and the associated fish communities where they've invaded (USEPA, 2008).

Northern snakehead populations were discovered in two NYSDEC regions in New York State in recent years. One population was found in two connected ponds in Flushing Meadows, Queens and another at a pond within the defunct Flushing Airport, but both were deemed to have little potential for spread due to salinity barriers. The capture of an individual northern snakehead from Harlem Meer in Central Park has prompted surveillance sampling which has recovered only one other individual in four years. Another population was found in Ridgebury Lake and Catlin Creek (Orange County), where the potential for spread to the Hudson River was deemed great. NYSDEC staff depopulated Ridgebury Lake and Catlin Creek using a fish toxicant in August 2008 and eradicated at least 220 northern snakehead. Following a second treatment in 2009, NYSDEC staff detected no surviving northern snakehead. Currently, the restored fishery is recovering.

The Chinese mitten crab, discovered in the Hudson River in 2009 (Benson and Fuller, 2014), is a migratory species that has the potential to impact both fresh and

marine waters of the Hudson River estuary. The species became established in the San Francisco Bay and freshwater rivers and canals that feed the bay in the early 1990s and impacted the ecosystem through competition with native crayfish species (California Department of Fish and Wildlife, 1998). Chinese mitten crabs have been illegally imported live into New York City, because the species is considered a delicacy in Asian markets.

New Zealand mud snail (*Potamopyrgus antipodarum)* is a small freshwater snail that was probably brought to this country by ballast water. It was introduced initially in the western part of the country, but in 1991, a small population was detected in Lake Ontario near Wilson, New York (Zaranko, et al. 1997). A more recent study found New Zealand mud snails in Fish Creek (Niagara County), approximately 25 miles east of the original site (Levri, et al. 2012). The snails have also been collected from the Welland Canal and northeastern Lake Ontario, Ontario, Canada. This species can survive passage through the digestive tract of fish, colonizes at high densities, and is salt-tolerant, all of which increase the potential for spread and effectiveness as a competitor and biofouler.

Hydrilla was first documented in 2008 in a small pond in Orange County, but has since been discovered in more than a dozen waterbodies throughout the state, including Lake Ronkonkoma, the inlet to Cayuga Lake, and the Erie Canal just outside Buffalo. The monoecious variety of hydrilla found north of the Potomac River does not appear to exhibit the dense canopies found with the dioecious genotype more commonly found in the southern US. However, monoecious hydrilla grows laterally along the bottom of the waterbody, and then expands upward, creating thick stands within the waterbody. Both biotypes can result in significant ecological and economic impacts.

Adverse Economic Effects Associated with AIS

It is difficult to put a cost on the full range of adverse impacts of AIS infestations to date in New York State. Many plant AIS are aesthetically undesirable and interfere with aquatic recreational activities, including swimming, boating, and fishing, and can significantly reduce property values. Lakefront property owners invest significant amounts of money in vegetation harvesting or repeated aquatic herbicide treatments. The power industry and municipalities have invested large sums of money and effort to keep water intakes free of dreissenid mussels. Data presented by O'Neill (1997) indicated the estimated dreissenid mussel-related expenditures by water-use facilities in New York State between 1989 and 1995 was a little more than $9 million. Rate payers, municipalities, tax payers, and consumers shoulder this cost.

Commercial and recreational fishing are severely impacted by invasive species. In the New York State canals and Hudson River system, an estimated $500 million in economic losses occur each year from at least 154 non-native species; 80% of that loss is in commercial and sport fishing (Pimentel, et al. 2005).

More than $5 million was spent to control Eurasian watermilfoil in Lake George

between 1985 and 2012, as part of an expenditure of more than $8 million for all AIS-related activities (Lake George Park Commission, [LGPC] 2013). In just a four-year period, New York State issued nearly $1.3 million in “eradication grants,” and Boylen (C.Boylen, Rensellaer Polytechnic Institute, unpublished data) estimated between $1.2 and $2.2 million was spent each year from 2007 to 2010 by lake residents and local government at just 35 lakes (besides Lake George) in managing invasive plants. It is likely that this represents a significant underestimate of all expenses, particularly labor costs associated with hand harvesting and benthic matting, the most common techniques used. It is estimated that costs for the first year of controlling hydrilla from Cayuga Inlet exceeded $500,000. Asian clam control costs in Lake George exceeded $1.5 million over a two-year period (LGPC, 2013).

The potential return in terms of reduced adverse ecological, economic, and societal impacts on a state investment to implement an AIS program could be considerable. Often the significant benefits that can be realized from such an investment go unnoticed. The benefits accrued from an AIS prevention program are usually stated in terms of expenditures not made, as opposed to actual savings, although real economic benefits can sometimes be accurately determined. For example, businesses involved in aquatic recreation activities can realize increased profits after a successful aquatic vegetation control program. It must be acknowledged that no AIS program or effort implemented by the state could have prevented the spread of dreissenid mussels into New York State waters from western Lake Erie. However, a more aggressive control and mitigation program might have prevented the spread into waters not directly connected to the Great Lakes.

The complete scope of AIS problems in New York State is not fully understood. The number and extent of AIS invaders have not been fully documented, the relative importance of specific AIS pathways is not always known, and the ecological and socio-economic problems derived from AIS infestations have not been quantified. However, the impact of AIS is apparent to lake residents, recreational users, businesses, and those that rely on the ecological integrity of the waterbodies in New York State. The objectives and actions outlined in this plan have been proposed to detect and better document the extent and coverage of these AIS species, prevent their spread into and within the state, and respond to existing and future invasions.

IV. GOAL

Prevent the Introduction and Spread of Aquatic Invasive Species in New York State

This single goal encompasses the full scope of what the AISMP is intended to accomplish. Objectives (1. Prevention, 2. Detection, 3. Response, and 4. Capacity), as described and discussed in detail below, have been developed to serve as milestones for achievement of the goal. Actions designed to foster attainment of the objectives were organized into one of four strategies:

A. Education and Outreach
B. Leadership and Coordination
C. Research and Information
D. Regulatory and Legislative

The authors used this framework to structure recommended actions tailored to specific objectives in a transparent manner, but recognize alternative frameworks could also be used. Only by accomplishing the tasks and actions associated with the objectives can the plan's overarching goal be achieved. Recommended actions are identified and classified as either "immediate actions" or "additional actions." The ten highest priority actions were selected from the "immediate actions" and considered the highest priority without further ranking in their relative importance due to their all being critical to effective AIS management. Immediate actions are high-priority actions that should be implemented as soon as resources and capacity allow. "Additional actions" are medium priority actions. The plan authors did not identify "low priority" actions.

V. EXISTING AUTHORITIES AND PROGRAMS

NYSDEC acknowledges the existence of a relatively long history and the participation of *many* partners involved in efforts to address AIS issues in New York State. For the sake of brevity, only the pertinent state and federal entities are included. They are described in APPENDIX A.

VI. OBJECTIVES, STRATEGIES, and ACTIONS

Prevention Objective: **Stop the introduction of AIS into and spread within New York State**

Issue statement:

A key purpose of the AISMP is to prescribe how to stop AIS before they are introduced to the state, an ecological region, or waters of concern. AIS are difficult to detect and are often already established and distributed throughout a waterbody, and perhaps beyond, by the time they are discovered. An effective prevention strategy will be multi-faceted and will include education and outreach components as well as regulatory and voluntary tools. Prevention requires vigilance *and* an informed citizenry willing to act. Most AIS introductions are detected and reported by concerned citizens; therefore, a knowledgeable public is a critical element toward stopping the spread of invasive species. Public buy-in of prevention measures will prove elusive without heightened public awareness, which in turn encourages user groups to become stewards of resources important to their activities. The most effective educational efforts are crafted and delivered to target audiences and user groups that engage in specific activities such as boating, water gardening, and angling. Avid participants in such activities will generally act responsibly to prevent AIS spread if they believe AIS are a significant risk to their favorite activities. Some may naturally view risk to the environment, economy, and human health as secondary to risk to their favorite activities; thus, an effective AISMP must educate these stakeholders to the impact of AIS on issues of importance to them.

Education and outreach are delivered by various means, including multiple media and personal contact such as on-site signs, presentations, boat launch stewards, brochures, identification cards, stickers, websites, public service announcements, and social media. The Department delivers education and outreach using several of these means. It has also delivered education and outreach indirectly by coordinating the formation and funding of eight Partnerships for Regional Invasive Species Management (PRISMs, Figure 3) which deliver a full complement of invasive species management, including education and outreach, a statewide education and outreach framework, and an online clearinghouse for invasive species information in New York State. One example of a concerted education and outreach effort is the first New York State Invasive Species Awareness Week in July 2014, during which over 100 various public education events were held statewide. Most events were hosted by PRISMs. National outreach campaigns include “Stop Aquatic Hitchikers,” aimed at recreational boaters and anglers, and “Habitatitude,” for educating owners of non-native pet species.

Many different AIS can invade through any single pathway, such as trade in live organisms or recreational boating. Effective prevention strategies and actions focus on primary pathways and specific vectors (such as recreational watercraft, trailers, anglers, retailers, landscapers, and water gardeners). Species that pose the greatest risks to our environment, economy, or human health should be identified for particular vigilance and

assessed for any specific spread-prevention measures required. Prevention requires a broad range of actions, including detecting and removing AIS "hitchhikers," stemming commercial sales and intentional introductions of live AIS, stopping initial introductions through our many ports of entry, and halting the movement of existing AIS within the state. Activities in and around waterbodies conducted by private and public employees can spread AIS; employees need to take measures to avoid such introductions. This will require creating or updating existing standard operating procedures (SOPs) to guide field activities such as fish stocking, sampling activities, construction, and maintenance, that can be shared with other agencies working on New York State waters.

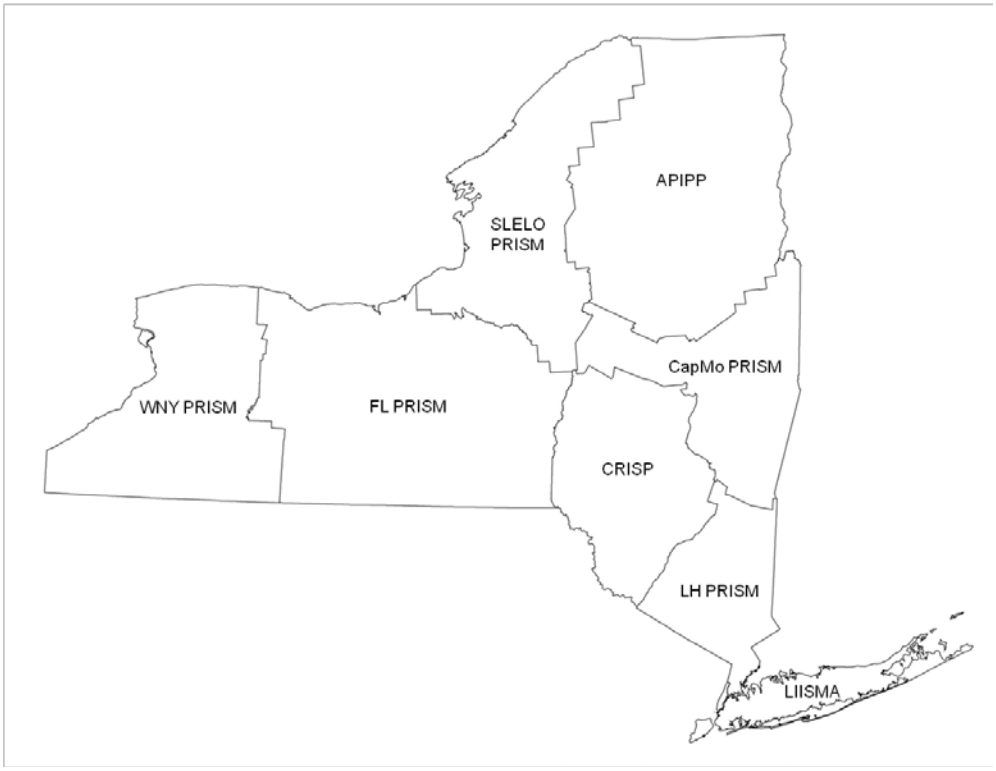

Figure 3. Partnership for Regional Invasive Species Management (PRISM) boundaries as of 2014. These PRISMs are: Western NY PRISM (WNY PRISM); Finger Lakes PRISM (FL PRISM); St. Lawrence – Eastern Lake Ontario PRISM (SLELO PRISM); Adirondack Park Invasive Plant Program (APIPP); Capital Mohawk PRISM (CapMo PRISM); Catskills Regional Invasive Species Partnership (CRISP); Lower Hudson PRISM (LH PRISM); and Long Island Invasive Species Management Area (LIISMA).

Effective spread prevention also requires current research; however, current research needs are not being met. The Department has very limited capacity to conduct invasive species research. The former Invasive Species Task Force (ISTF) recommended that the state establish a regional center for research to coordinate and collaborate with the New York Invasive Species Council (NYISC), New York Invasive Species Advisory Committee (ISAC) and partners. The New York Invasive Species

Research Institute (NYISRI), established in 2009 under contract with Cornell University and coordinated by the Invasive Species Coordination Unit (ISCU), conducts some research on potential biological control agents and provides coordination and guidance, including species white papers, identification of existing research efforts, identification of best providers for research services, assistance with identifying research priorities, and investigation of efficacy of treatments.

Historically, New York State laws and regulations regarding AIS have not been well organized or consistently effective. New York State has passed laws and adopted regulations to reduce the negative impacts of invasive species. Some environmental regulatory programs designed to protect against harm done by herbicides, physical disturbance, and other activities have posed a challenge to efforts to conduct treatment activities intended to prevent the spread of invasive species. Permitting and fiscal processes can significantly delay treatment. A patchwork of local laws has developed in recent years, as several municipalities in the Adirondacks and a few counties in the Adirondacks and Finger Lakes regions have enacted laws prohibiting the transport of AIS on recreational watercraft and trailers. The effectiveness of such laws may be reduced if the boating public, for example, must comply with regulations that vary widely among bodies of water and jurisdictions.

New York has addressed two priority pathways – the sale of invasive species and the transport of AIS by recreational boating activities. New York State enacted two pieces of legislation and adopted regulations in 2014 intended to prevent the spread of AIS through recreational watercraft use. Environmental Conservation Law (ECL) was amended to add a new ECL § 9-1710 that requires operators of watercraft launching in a public waterbody to take “reasonable precautions” to prevent the spread of AIS. NYSDEC is drafting regulations prescribing a suite of reasonable precautions that may be taken. Article 3 of Navigation Law was amended to add a new § 35-d requiring NYSDEC to develop a universal, downloadable AIS spread-prevention sign and requiring all owners of public boat launches to conspicuously display the sign. In 2014, NYSDEC adopted regulations requiring watercraft launched at or retrieved from its access sites to be drained and the watercraft, trailer, and associated equipment to be free of visible plant or animal matter (6 NYCRR §§ 59.4 & 190.24). New York State Office of Parks, Recreation, and Historic Preservation (OPRHP) adopted a similar regulation at its sites, recorded in New York Codes Rules and Regulations (9 NYCRR § 377.1 (i)). In 2014, NYSDEC adopted regulations intended to slow the spread of invasive species through commerce, that established the state’s first lists of prohibited and regulated species (6 NYCRR § 575).

Efforts are underway to streamline regulatory reviews and permit issuance for hand harvesting, suction harvesting, benthic mats to control select AIS in protected streams, protected freshwater wetlands, navigable waters, or designated Wild, Scenic, and Recreational Rivers.

Education and Outreach Strategy

Immediate actions

- **1A1**. Expand boat launch steward programs for public and private boat access sites, and ensure consistency of boat launch steward programs.
- **1A2**. Implement an effective AIS public awareness campaign that will target those likely to introduce AIS or be impacted by AIS introductions. Regularly evaluate these efforts to ensure their effectiveness in preventing the introduction and spread of AIS in New York State. Potential components of this campaign may include:
    - Seasonal contributions to *Conservationist* magazine, published by the Department
    - Public service announcements
    - Educational modules for summer campers
    - Tip strips
    - Watch cards
    - Kiosks at boat launch and other public access sites
    - Signs
    - Self-certification
    - Outreach through angling and hunting guides, boating directory, press releases
    - “Stop Aquatic Hitchikers”
    - “Habitatitude”
- **1A3**. Expand the use of invasive species disposal stations.
- **1A4**. Identify, describe, and promote voluntary approaches to address prevention of AIS spread to and within New York State.

Additional actions

- Develop an education/outreach program for public/elected officials and state agency partners.
- Identify specific target audiences for prevention activities.
- Periodically survey target audiences and the public to gauge the success of AIS prevention activities, and revise activities as appropriate.

Leadership and Coordination Strategy

Immediate actions

- **1B1**. NYSDEC will provide leadership for the AISMP by establishing an AIS manager or supervisor charged with implementing the AIS plan.
- **1B2**. Coordinate Department activities with the New York State Invasive Species Council.
- **1B3**. Develop and implement statewide standard procedures (e.g., Hazard Analysis and Critical Control Point [HACCP]) to ensure state agency field activities do not transport AIS, and share guidance and protocols with others.
- **1B4**. Develop a close working relationship with NYISRI to ensure research needs are met.
- **1B5**. Participate in regional AIS panels, including the Northeast Aquatic Nuisance Species Panel (NEANS), Great Lakes, and Mid-Atlantic.

Additional actions

- Develop MOUs with other agencies to accomplish mutual/overlapping AIS prevention objectives.
- As appropriate technologies are developed, create and implement protocols for the treatment of contaminated cargo, packaging, hulls, and ballast water to eradicate AIS.

Research and Information Strategy

Immediate actions

- **1C1**. Identify and evaluate risks associated with pathways for AIS introduction into and movement within New York State.
- **1C2**. Identify AIS species most likely to be moved to and within New York State.
- **1C3**. Identify and evaluate mechanisms for preventing transport to and within New York State, including boat wash stations, and implement effective options.
- **1C4**. Identify and use additional providers to conduct AIS-related research.
- **1C5**. Incorporate potential impacts of climate change on AIS introductions to New York State over various time horizons.
- **1C6**. Research efficacy, safety, and utility of practical materials, equipment, and techniques for preventing AIS transport.
- **1C7**. Develop a means of identifying waters that are/are not high risk for AIS invasion and adverse impacts.
- **1C8**. Survey AIS prevention methods used by other states and provinces.

Additional actions

- Organize and conduct an annual professional conference to discuss AIS issues

with various stakeholders and/or constituents (AFS, NALMS/FOLA, NEAPMS, etc.).
- Research invasion forecasting techniques and technology.

Regulatory and Legislative Strategy

Immediate actions

- **1D1**. Conduct a review of existing laws and regulations that may be impediments to AIS prevention, and develop and propose consolidated, coordinated replacements.
- **1D2**. Promulgate state regulations at state launch sites (NYSDEC and OPRHP) aimed at AIS prevention.

Additional actions

- Develop and propose appropriate regulatory or legislative actions needed to address prevention of AIS migration to and within New York State to include, but not be limited to:
    - Drafting regulations pursuant to new 2014 state AIS transport law that requires operators of watercraft launching in a public waterbody to take “reasonable precautions” to prevent the spread of AIS
    - Assisting, as appropriate, in assessing non-native plant and animal species and in developing lists of non-native plant and animal invasive species, consistent with accepted protocols, that are classified as Prohibited or Regulated (ECL § 9-1709)
    - Bait regulations pertaining to allowable bait, disease-free certification, and disposal considerations
    - Regulations prohibiting the sale of live AIS for consumption
    - Technical guidance for potential implementation of an AIS Water Quality Standard

Detection Objective: Conduct and promote surveillance and monitoring activities to identify new invaders, and document the distribution and impacts of AIS throughout the state

Issue statement

Surveillance to detect new AIS plays a critical role in enabling a response to aquatic invasive species before they become established and lead to adverse impacts. Rapid response strategies conducted subsequent to early detections are much more likely to be technically feasible, logistically manageable, more likely to result in eradication or control, and will likely be less expensive. Surveillance activities are also important for identifying the geographic extent of waterbodies where AIS have been detected, providing an important context for developing a response plan and identifying waterbodies susceptible to invasion.

The extent of an infestation within a waterbody is documented and delineated through *monitoring*, an important element of a response plan. Monitoring results can be important in both choosing appropriate response strategies and determining the appropriate timing for the application of these strategies. Monitoring is also critical for documenting the success of AIS response efforts and for refining site-specific response plans. In addition, monitoring data within waterbodies and documenting the coverage and abundance of AIS are critical for identifying ecological, recreational, and economic impacts.

With over 17,000 lakes, ponds, and reservoirs, more than 70,000 miles of rivers and streams, and multiple ports of entry, the opportunities for AIS introduction and spread are plentiful, and the difficulties in assessing these waterbodies are extreme. These challenges are further compounded by the shortage of proficient monitoring staff, limited coordination of AIS monitoring activities ongoing in the state, and the need for remote technology to enhance surveillance and monitoring.

New York State does not have a sufficient number of trained personnel to conduct AIS surveillance activities. More complete surveillance to find AIS and more extensive monitoring to document the extent of infestations over time will need to rely heavily on the use of volunteers. Many AIS of concern in New York State are strong candidates for volunteer surveillance programs focusing on detecting new AIS infestations. They have unique characteristics that distinguish them from native plants and animals, although other AIS are not so easily distinguished and warrant training and expert verification. These surveillance programs, and less formal surveillance activities, require informative, consistent materials and a focus on specific high-priority AIS to better direct volunteer efforts.

Some areas of the state, particularly those for which a PRISM has implemented a volunteer monitoring program or another regionally directed framework, have stronger surveillance and monitoring programs than others. Opportunities should be pursued to promote coordination, data sharing, and site selection, including a focus on specific

susceptible waterbodies, to institute:

- Early detection of AIS;
- Explicit coordination of regional surveillance or waterbody-specific monitoring;
- Linking of surveillance findings to a regional rapid response framework.

Additional easy-to-use tools are needed for monitoring and surveillance of plant and animal AIS and to evaluate impacts associated with them. Existing surveillance and monitoring largely consists of visual observation, netting, electroshocking, sampling with two-sided rakes, and deploying divers for early AIS detection in what is akin to searching for a needle in a haystack. In fact, many initial AIS findings are accidental, "stumbled" upon by those fortunate enough to know what they have found. Finding these AIS with the existing crude surveillance tools is not efficient. Better tools are needed to systematically survey larger areas, on site and remotely, and to significantly reduce the labor costs associated with regular monitoring of existing infestations.

Regulatory, legislative, and logistical obstacles exist which could limit the ability to conduct surveillance and collect monitoring data and other information needed to evaluate AIS impacts and response actions. These include the following:

- Delays or prohibitions to securing access to AIS sites through private property or collection permits at waterbodies owned by local or county government
- The need for genetic tests to verify some AIS
- Rapid procurement processes to recruit and fund PRISM monitoring teams
- Limited staff and expertise for conducting AIS surveillance and field identification of AIS

AIS surveillance and monitoring are not routinely performed by NYSDEC. Fiscal obstacles also exist. For example, monitoring costs were explicitly excluded from a prior grant program (Invasive Species Eradication Grant) that limited expenditures to response strategies. With only limited resources available for AIS response, monitoring to document the effectiveness of an AIS response action is often neglected. Without a monitoring requirement, AIS response projects cannot be well evaluated.

Education and Outreach Strategy

Immediate actions

- **2A1**. Develop generic and specific AIS early detection content—simple identification keys, tip sheets, image galleries—for agency staff, professionals, volunteers, PRISMs, and the public, including web content for AIS surveyors.
- **2A2**. Recruit and train volunteers from organizations such as lake associations and environmental, conservation and fishing organizations for AIS surveillance and monitoring activities.
- **2A3**. Conduct invasive species ID workshops for interested stakeholders to promote citizen science-related activities, using and expanding the APIPP model.

- **2A4**. Use the iMapInvasives tools to establish a primary source location for AIS occurrence records to establish and maintain databases of primary source locations (and within lake distributions) of priority invasive and “watch” species, and to facilitate intrastate sharing of invasive species sightings/presence data.
- **2A5**. Use the New York State invasive species ranking assessment system described in *A Regulatory System for Non-native Species* (NYISC, 2010) as the basis for the selection of priority species.
- **2A6**. Distribute educational information targeted at specific groups who are especially affected by introductions of AIS.

Additional actions

- Identify appropriate roles for the public to conduct early detection surveillance and develop a surveillance module to recruit and use the public in this capacity.
- Link AIS surveillance to intra- and inter-agency “outreach” programs.

Leadership and Coordination Strategy

Immediate actions

In coordination with PRISM coordinators:

- **2B1**. Develop AIS and AIS-specific surveillance programs.
- **2B2**. Develop standardized monitoring protocol for conducting AIS surveillance and delineating AIS infestations.
- **2B3**. Recruit surveillance and monitoring coordinators to oversee AIS-related activities on the ground.
- **2B4**. Identify AIS species and waterbodies that would be good candidates for targeted surveillance.
- **2B5**. Establish PRISM-level AIS monitoring teams to delineate new AIS infestations found through surveillance programs.

Additional actions

- Identify and coordinate existing AIS surveillance and monitoring programs conducted by both agency and non-agency staff.
- Encourage PRISMs to host AIS training workshops.
- Incorporate AIS surveillance into field activities and existing (non-AIS) monitoring programs.
- Encourage private landowners and organizations to assist early detection efforts on private lands.
- Recruit professional monitors for sustained monitoring efforts associated with AIS eradication/response projects.

Research and Information Strategy

Immediate actions

- **2C1**. Identify a common set of monitoring "metrics" to be used in AIS impact assessments addressing ecological, health, water quality, recreational, economic, and public perception.
- **2C2**. Conduct AIS impact assessments.
- **2C3**. Support long-term monitoring of AIS response project waterbodies.

Additional actions

- Conduct studies that evaluate ecological impacts of AIS, including both introduction and removal.
- Investigate any human health or ecosystem perturbations resulting from AIS.
- Develop and improve approaches and technology to aid in the detection of AIS.
- Develop and conduct a questionnaire that surveys both individuals and businesses regarding the impact of specific invasive species (lakefront property owners, marinas, industries with water intakes, municipalities).
- Identify and seek technology for identification of invasive species, including environmental DNA (eDNA) and remote sensing.
- Evaluate better procedures to mark AIS infestations in the field and report the location.

Regulatory and Legislative Strategy

Immediate actions

- **2D1**. Identify and correct regulatory, logistical, and legislative hurdles to early detection.

Additional actions

- Require monitoring as part of New York State AIS grants and permits.

Response Objective: **Identify and implement the appropriate response to aquatic invasive species introductions**

Issue statement

Numerous AIS introductions have already occurred in New York State waters, and despite the best efforts at prevention, more AIS introductions will occur. An effective management program for addressing the impacts of AIS introductions requires appropriate and timely responses. In addition to responding to new AIS introductions, it is important to evaluate the effectiveness of responding to introductions that have already occurred. The range of responses can include (but are not limited to):

- Eradication - total destruction and removal of the infestation
- Control - active measures to suppress AIS
- Containment - specific actions taken to prevent AIS from leaving the waterbody
- Monitoring – observation of AIS, its spread, and the occurrence of adverse impacts resulting from the introduction
- Mitigation – actions taken to minimize or offset the adverse impacts caused by AIS infestation
- Restoration – returning environmental conditions to what existed before AIS infestation occurred, e.g., replanting native wetland vegetation after removing a *Phragmites* infestation
- No action –response limited to education and outreach rather than implementing specific activities directly against the AIS

To be effective and efficient, a process is needed to guide the selection of AIS responses. The process needs to provide for the systematic, comprehensive, and centralized assessment of an AIS introduction and the resources available to formulate an effective response. Otherwise, response actions could be ineffective and resources wasted. Response efforts also will be more effective by including both agency personnel and local stakeholders that reflect local knowledge and considerations.

Adaptive management is critical in a response program, because how effective a given response will be is often unknown. An internal and external communication plan about the desired action and its selection is also important so that partners and stakeholders are well informed. A procedure to provide feedback to the AIS Program after the response is undertaken will help to identify any problems encountered and document significant successes so that they can be integrated into future responses.

Because an AIS could be completely new to North America, information on the biology and effective controls for a new AIS might be limited or absent. How a new species responds to a new habitat is unpredictable. An introduction could be benign in one region/waterbody and extremely problematic in another. The effectiveness of different control treatments could be unknown. If not carefully documented and shared, the success or failure of past actions could be lost and mistakes repeated.

Environmental regulations have been developed for the purpose of minimizing adverse environmental impacts. However, experience in different states has shown that implementing a timely, effective response to a new AIS introduction can be impeded by regulations that put limits on the range and extent of some potential response actions. This is particularly true when a response must happen immediately to prevent the spread of a new AIS. Such regulations were promulgated for a specific purpose, so a means must be determined not to *circumvent* laws, regulations, and administrative procedures, but to work *through* regulatory and statutory requirements in an expedited fashion to achieve the goal of the regulation while still allowing for a timely response. Laws and regulations that serve as the basis for AIS response actions are generally scattered throughout different ECL articles and sections and were developed for specific purposes besides a broad-based AISMP. Finally, the laws and regulations to provide the necessary authority to support/justify a particular response action might be lacking, and new laws or regulations need to be proposed. For example, 6 NYCRR § 327.6(c) only allows the aquatic herbicide 2,4-D to be used for the control of *emergent* plants having a large part of their leafy growth projecting above or lying flat on the water surface. That regulation would prevent the use of 2,4-D to control a *submerged* aquatic invasive species, even if it was the most efficacious herbicide available. This and similar regulations should be revised or repealed.

An effective suite of responses to AIS introductions must be carefully planned, timely, knowledge based, and consistent. Detailed assessments of response efforts should be made, and good records must be maintained, so that other response actions can be initiated against a background of knowing what worked and what did not. That knowledge can also be gleaned from response actions undertaken by other AIS management entities, such as other state, federal, multi-state, regional, or watershed-based AIS programs. Communication is a major component of any AIS response. The public needs to be informed about the introduction, the possible adverse impacts and what they can do to help in managing the introduction.

Responses must be developed not only for new, or relatively new AIS problems, but for AIS problems that have persisted for decades as well. For example, aquatic plant species such as water chestnut, Eurasian watermilfoil, and curly-leaf pondweed have caused significant adverse impacts to both the ecology and recreational enjoyment of New York State waterbodies for over 50 years. Despite the widespread and persistent nature of these AIS infestations, they should not be disregarded. AIS management strategies should be developed for containing the spread of these persistent problems and rolling them back when possible. There may be times, however, when no action is appropriate because past efforts have proved to be ineffective and costly.

Education and outreach strategy

Immediate actions

- **3A1**. Develop a series of fact sheets explaining the advantages and disadvantages of different response actions, such as eradication, control, no action, etc., that could be used to guide the decision-making process by outlining procedures and expectations associated with each.
- **3A2**. Develop and implement specific communication plans for outreach associated with response actions to inform and educate the public, stakeholders, and elected officials.

Additional actions

- Train volunteers to hand harvest aquatic invasive plants.
- Develop a reporting protocol for responders to document lessons learned from response actions in a consistent, timely, and uniform manner.
- Train stakeholders in the use of the HACCP process to identify risks, structured decision-making tools (SDM) and incident command system (ICS) principles to facilitate effective response.

Leadership and Coordination Strategy

Immediate actions

- **3B1**. Develop an (or adopt a pre-existing) AIS response framework.
- **3B2**. Create regional AIS response teams that serve as “first responders” for AIS introductions within a NYSDEC region. These teams would: develop specific operational AIS response plans using SDM, conduct training exercises to test abilities and identify problems, and review response plans and identify obstacles to implementation.

Additional actions

- Develop and foster cooperative relationships with stakeholders and partners.
- Develop a systematic process for evaluating response actions as implemented.
- Conduct training and AIS drills that use the ICS and integrate HACCP procedures.

Research and Information Strategy

Immediate actions

- **3C1**. Assemble a web-based catalog of ongoing research pertaining to AIS being conducted in New York State (and elsewhere), including points of contact.

Additional actions

- Conduct risk assessments of the potential for specific AIS to be introduced into New York State waterbodies and similarly, assess the potential for specific waterbodies, watersheds, or waterbody types to experience damaging AIS introductions. Identify knowledge gaps with respect to potential AIS response actions.
- Characterize the extent to which adverse ecological, economic, and social impacts are likely to be experienced by specific waterbodies and watersheds from various potential AIS introductions.
- Evaluate past actions in New York State and other states to set appropriate timetables and expectations for proposed projects.
- Explore innovative control strategies, including biological control and integrated pest management.
- Investigate potential beneficial uses for harvested AIS.
- Develop and implement restoration plans for aquatic ecosystems to provide conditions more suitable for native species.

Regulatory and Legislative Strategy

Immediate actions

- **3D1**. Identify legal, regulatory, and institutional barriers that could impede a rapid response to an AIS introduction.
- **3D2**. Develop general permits to control certain invasive species by employing specified techniques, including hand harvesting, suction harvesting, benthic matting, and pesticides.
- **3D3**. Implement corrective measures to minimize impacts of such barriers to specific response options.
- **3D4**. Develop specific regulations to enable rapid response actions (declaration of AIS emergency) to new introductions of specific AIS into either New York State or to uninfested waterbodies.

Additional actions

- Identify and establish long-term regulatory frameworks for high-priority eradication projects.
- Streamline statewide regulatory processes for management in state regulated wetlands and streams by developing a general permit for invasive species control.

Capacity Objective: Secure adequate long-term funding for AIS programs in New York State.

Issue statement

AIS management is a full-time program, and staff and resources for a new program effort are not currently available. Existing staff lack the available time to undertake a new responsibility such as the AISMP. Staff required for such a program would need specialized training and expertise to conduct all prevention, detection, and response actions laid out in this plan. Our proposed organization builds upon the existing Invasive Species Coordination Unit, but adds leadership and implementation elements as well. An effective AIS program could be very resource intensive. There are limited federal funds available for states with approved ANS plans. New York received $20,000 in 2014. To help build an effective AISMP, the following actions are recommended:

Immediate actions

- **4X1**. Within available resources, NYSDEC will implement and maintain a statewide, coordinated AISMP.
- **4X2**. Develop budgets for new AISMP and request additional state and federal funding to support these programs.
- **4X3**. Identify staff in each region that would constitute regional response teams.
- **4X4**. Develop expert capacity for timely AIS verification.
- **4X5**. Procure a standby service contract (or other mechanism) for rapid response actions for newly discovered infestations of AIS.
- **4x6**. Provide resources to support research toward approaches and technology to aid in the detection of AIS.

Additional actions

- Institute an invasive species prevention grant/cost-sharing program.

VII. PRIORITIES FOR ACTION

The actions associated with the four objectives described in Section VI are all essential to achievement of each individual objective, as well as the overall goal of preventing the introduction and spread of Aquatic Invasive Species in New York State. However, several actions should be recognized as having a higher priority. These high-priority actions are foundational; that is, accomplishing them is necessary to move on to other actions. Another rationale for prioritizing actions is that they have already been initiated and demonstrated significant success in preventing AIS introductions. The list of high-priority actions includes:

- **1A1. Expand boat launch steward programs for public and private boat launch sites, and ensure consistency of boat launch steward programs.** This is an important program that has already demonstrated public acceptance and success in reducing the movement of AIS into and out of boat launch sites. It has only been implemented so far at a limited number of boat launch sites and needs to be expanded.

- **3B1. Develop an (or adopt a pre-existing) AIS response framework.** To achieve an effective AIS management program and maximize the use of limited resources, a systematic process for evaluating AIS introductions and formulating appropriate responses consistently is required. AIS response frameworks have been developed by other entities that could be adopted and/or modified for use in New York State without having to create an entirely new framework.

- **4X1. Within available resources, NYSDEC will implement and maintain a statewide, coordinated AISMP.** A viable AIS management program requires a commitment of staff and resources.

- **1A2. Implement an effective AIS public awareness campaign that will target those likely to introduce AIS or be impacted by AIS introductions. Regularly evaluate these efforts to ensure their effectiveness in preventing the introduction and spread of AIS in New York State.** AIS cannot be managed solely by a state agency. An informed, involved citizenry is required.

- **1B1. Provide Department of Environmental Conservation (Department) leadership for the AIS program to achieve productive and coordinated actions.** Numerous government and non-governmental organizations (NGOs) have expressed interest and concern in the AIS problem. Focused, coordinated actions are needed for an effective program. Leadership is needed to achieve productive, coordinated actions. Establishing an AIS program would be a first step in providing such leadership.

- **3D1. Identify legal, regulatory, and institutional barriers that could impede a rapid response to an AIS introduction.** Before an effective rapid response program can be established, the barriers to rapid implementation must be identified and planned for.

- **1A3. Expand the use of invasive species disposal stations.** Disposal stations at boat launch sites provide both a dedicated location for disposal of AIS and also serve as a billboard promoting the cleaning and draining of boats. Deployment of these tools has been limited and should be rapidly expanded at public boat launches, particularly those at waters known to harbor AIS.

- **3B2. Create regional AIS response teams that serve as "first responders" for AIS introductions within a NYSDEC region. These teams would: develop specific operational AIS response plans using SDM, conduct training exercises to test abilities and identify problems, and review response plans and identify obstacles to implementation.** A new introduction requires local expertise to plan and implement the appropriate response.

- **1B2. Coordinate Department activities with the New York State Invasive Species Council and the Invasive Species Advisory Committee.** The Invasive Species Council represents AIS stakeholders that have been empowered by legislation to set the direction for addressing AIS problems across the state. Continued coordination with the council and advisory committee is essential for achieving an effective AIS management program.

- **1C1. Identify and evaluate risks associated with all pathways for aquatic invasive species introduction into and movement within New York State.** In AIS management, it is frequently easy to focus on organisms and lose track of the pathways that move organisms into and throughout the state. For a successful prevention program, it is essential to keep the focus on pathways.

VIII. IMPLEMENTATION TABLE 2015-2020

This table describes by whom and when specific immediate actions are planned to be implemented. Full-time-equivalent staff (FTE) are calculated for each of the five years of the life of this plan (Yr1, Yr2, etc.).

ID#	Objective	Category	Actions	Participants	Internal NYSDEC Responsibility	FTE				
						Yr1	Yr2	Yr3	Yr4	Yr5
1A1	Prevention	Education and Outreach	Expand boat launch steward programs for public and private boat access sites, and ensure consistency of boat launch steward programs.	NYSDEC, ISCU, OPRHP, NYSCC, NYSG	DFWMR, DOW, ISC	0.15	0.15	0.15	0.15	0.15
1A2	Prevention	Education and Outreach	Implement an effective AIS public awareness campaign that will target those likely to introduce AIS or be impacted by AIS introductions. Regularly evaluate these efforts to ensure their effectiveness in preventing the introduction and spread of AIS in New York State.	NYSDEC, OPRHP, ISC, PRISMs, Education - outreach implementa-tion contract (Cornell)	OCS, DFWMR, DOW, ISC	0.3	0.3	0.3	0.3	0.3
1A3	Prevention	Education and Outreach	Expand the use of invasive species disposal stations.	NYSDEC, OPRHP, Canal Corp, county/local gov't.	DFWMR, Operations	0.25	0.2	0.05		

ID#	Objective	Category	Actions	Participants	Internal NYSDEC Responsibility	FTE				
						Yr1	Yr2	Yr3	Yr4	Yr5
1A4	Prevention	Education and Outreach	Identify, describe, and promote voluntary approaches to address prevention of AIS spread to and within New York State.	NYSDEC, ISC, OPRHP, PRISMs, NYSDMV	DFWMR, DOW, ISC, DL&F, DOPS	0.25	0.50	0.50	0.35	0.25
1B1	Prevention	Leadership and Coordination	NYSDEC will provide leadership for the AISMP by establishing an AIS manager or supervisor charged with implementing the AIS plan.	NYSDEC	ISCU, DFWMR, Executive, AISMP	0.50	0.50	0.50	0.50	0.75
1B2	Prevention	Leadership and Coordination	Coordinate Department activities with the New York State Invasive Species Council.	NYSDEC, ISC	ISCU, AISMP	0.10	0.10	0.10	0.10	0.10
1B3	Prevention	Leadership and Coordination	Develop and implement statewide standard procedures HACCP to ensure state agency field activities do not transport AIS, and share guidance and protocols with others.	NYSDEC, NYSDOT, other agencies; ISC	DFWMR, DOW, ISC	0.25	0.15			
1B4	Prevention	Leadership and Coordination	Develop a close working relationship with NYISRI to ensure research needs are met.	NYSDEC, NYISRI	ISCU, AISMP	0.05	0.05	0.05	0.05	0.05
1B5	Prevention	Leadership and Coordination	Participate in regional panels (NEANS, Great Lakes, Mid-Atlantic).	NYSDEC	AISMP	0.05	0.05	0.05	0.05	0.05

ID#	Objective	Category	Actions	Participants	Internal NYSDEC Responsibility	FTE				
						Yr1	Yr2	Yr3	Yr4	Yr5
1C1	Prevention	Research and Information	Identify and evaluate risks associated with pathways for AIS introduction into and movement within New York State.	NYSDEC , ISC, ANSTF	DFMWR, DOW, ISC,	0.25	0.25			
1C2	Prevention	Research and Information	Identify AIS species most likely to be moved to and within New York State.	NYSDEC, TNC, NHP, Regional Panels	DFMWR, DOW, ISC,	0.25	0.25			
1C3	Prevention	Research and Information	Identify and evaluate mechanisms for preventing transport to and within New York State, including boat wash stations, and implement effective options.	NYSDEC, ISC, Federal ANSTF	DFMWR, DOW, ISC,	0.50	0.50	0.25		
1C4	Prevention	Research and Information	Identify and use additional providers to conduct AIS-related research.	NYSDEC, NYISRI	AISMP, ISCU	0.10	0.25	0.25	0.25	0.25
1C5	Prevention	Research and Information	Incorporate potential impacts of climate change on AIS introductions to New York State over various time horizons.	Cornell/ academic, consultant	AISMP, Executive (Climate Change Unit)	0.02	0.02	0.02	0.02	0.02
1C6	Prevention	Research and Information	Research efficacy, safety, and utility of practical materials, equipment, and techniques for preventing AIS transport.	NYSDEC, LGPC, ISC, consultant	AISMP	0.10	0.25	0.25	0.30	0.30
1C7	Prevention	Research and Information	Develop a means of identifying waters that are/are not high risk for AIS invasion and adverse impacts.	NYSDEC, ISC, consultant	AISMP	0.25	0.25	0.25	0.25	0.25

ID#	Objective	Category	Actions	Participants	Internal NYSDEC Responsibility	FTE				
						Yr1	Yr2	Yr3	Yr4	Yr5
1C8	Prevention	Research and Information	Survey AIS prevention methods used by other states and provinces.	NYSDEC	AISMP	0.20				
1D1	Prevention	Regulatory and Legislative	Conduct a review of existing laws and regulations that may be impediments to AIS prevention, and develop and propose consolidated, coordinated replacements.	NYSDEC, ISC	Legal, Executive, DFWMR, DOW, ISCU	0.25	0.25	0.15	0.25	
1D2	Prevention	Regulatory and Legislative	Promulgate state regulations at state launch sites (NYSDEC and OPRHP) aimed at AIS prevention.	NYSDEC, OPRHP	AISMP	0.50				
2A1	Detection	Education and Outreach	Develop generic and specific AIS early detection content—simple identification keys, tip sheets, image galleries—for agency staff, professionals, volunteers, PRISMs, and the public, including Web content for AIS surveyors.	NYSDEC, PRISMs, NHP, Cornell C'house	DFWMR, DOW, ISCU, DPAE, AISMP	0.50	0.50	0.75	0.50	0.50
2A2	Detection	Education and Outreach	Recruit and train volunteers from lake associations and environmental, conservation, and fishing organizations for AIS surveillance and monitoring activities.	PRISMs, FOLA, NYSDEC	DOW, ISCU, DFWMR	0.50	0.25	0.50	0.25	0.25

ID#	Objective	Category	Actions	Participants	Internal NYSDEC Responsibility	FTE				
						Yr1	Yr2	Yr3	Yr4	Yr5
2A3	Detection	Education and Outreach	Conduct invasive species ID workshops for interested stakeholders to promote citizen science-related activities, using and expanding the APIPP model.	PRISMs, NYSDEC, ISC, FOLA, NHP, Ed/Outreach contracts (Cornell)	ISCU, AISMP		0.15	0.15	0.15	0.15
2A4	Detection	Education and Outreach	Use the iMapInvasives tools to establish a primary source location for AIS occurrence records, to establish and maintain databases of primary source locations (and within lake distributions) of priority invasive and "watch" species and to facilitate intrastate sharing of invasive species sightings/presence data	NHP, NYSDEC	ISCU	0.05	0.05	0.05	0.05	0.05
2A5	Detection	Education and Outreach	Use the New York State environmental invasive species ranking assessment system described in *A Regulatory System for Non-native Species* (NY Invasive Species Council, 2010) as the basis for the selection of priority species.	NYSDEC, TNC, NHP, Regional Panels	AISMP, ISCU	0.05	0.05	0.05	0.05	0.05
2A6	Detection	Education and Outreach	Distribute educational information targeted at specific groups who are especially affected by introductions of AIS.	NYSDEC, ISC, PRISMs	AISMP		0.15	0.15	0.15	0.15
2B1	Detection	Leadership	Develop AIS and AIS-specific	NYSDEC,	AISMP, ISCU		0.15	0.15	0.15	0.15

ID#	Objective	Category	Actions	Participants	Internal NYSDEC Responsibility	FTE				
						Yr1	Yr2	Yr3	Yr4	Yr5
		and Coordination	surveillance programs.	PRISMs						
2B2	Detection	Leadership and Coordination	Develop standardized monitoring protocol for conducting AIS surveillance and delineating AIS infestations.	NYSDEC, PRISMs	DFWMR, DFW, ISC	0.05	0.05	0.05	0.05	0.05
2B3	Detection	Leadership and Coordination	Recruit surveillance and monitoring coordinators to oversee AIS-related activities on the ground.	PRISMs	ISCU		0.15	0.15	0.15	0.15
2B4	Detection	Leadership and Coordination	Identify AIS species and waterbodies that would be good candidates for targeted surveillance.	NYSDEC, ISC, PRISMs, academics	DFWMR, DOW, ISC		0.15	0.15	0.15	
2B5	Detection	Leadership and Coordination	Establish PRISM-level AIS monitoring teams to delineate new AIS infestations found through surveillance programs.	PRISMs	ISCU		0.15	0.15	0.15	0.15

ID#	Objective	Category	Actions	Participants	Internal NYSDEC Responsibility	FTE				
						Yr1	Yr2	Yr3	Yr4	Yr5
2C1	Detection	Research and Information	Identify a common set of monitoring "metrics" to be used in AIS impact assessments assessing ecological, health, water quality, recreational, economic, and public perception.	NYSDEC, academic, ISC	AISMP, ISCU, NYISRI			0.15	0.15	0.15
2C2	Detection	Research and Information	Conduct AIS impact assessments.	PRISMs, NYSDEC, academic, ISC	AISMP, DFWMR, DOW, ISCU		0.15	0.15	0.15	0.15
2C3	Detection	Research and Information	Support long-term monitoring of AIS response project waterbodies.	NYSDEC	AISMP	0.05	0.05	0.05	0.05	0.05
2D1	Detection	Regulatory and Legislative	Identify and correct regulatory, logistical, and legislative hurdles to early detection.	NYSDEC, ISC	DFWMR, DOW, ISCU, Executive, Legal	0.10	0.10	0.10	0.10	0.10
3A1	Response	Education and Outreach	Develop a series of fact sheets explaining the advantages and disadvantages of different response actions, such as eradication, control, no action, etc., which could be used to guide the decision-making process by outlining procedures and expectations associated with each.	NYSDEC, ISC, PRISMs, Education - outreach implementa-tion contract (Cornell)	ISCU, DFWMR, DPAE			0.15	0.15	0.15

ID#	Objective	Category	Actions	Participants	Internal NYSDEC Responsibility	FTE				
						Yr1	Yr2	Yr3	Yr4	Yr5
3A2	Response	Education and Outreach	Develop and implement specific communication plans for outreach associated with response actions to inform and educate the public, stakeholders, and elected officials.	NYSDEC, ISC, PRISMs	DPAE, ISCU	0.10	0.05	0.05	0.05	0.05
3B1	Response	Leadership and Coordination	Develop an (or adopt a pre-existing) AIS response framework.	NYSDEC, ISC	Executive, AISMP, ISCU	0.10				0.10
3B2	Response	Leadership and Coordination	Create regional AIS response teams that serve as "first responders" for AIS introductions within a NYSDEC region. These teams would: develop specific operational AIS response plans using SDM, conduct training exercises to test abilities and identify problems, and review response plans and identify obstacles to implementation.	NYSDEC, PRISMs	Regional directors, ISCU, DFWMR, DOW	0.25	0.10	0.10	0.10	0.10
3C1	Response	Research and Information	Assemble a catalog of ongoing research pertaining to AIS being conducted in New York State (and elsewhere), including points of contact.	ISC, NYSDEC, NYISRI	AISMP	0.05	0.05	0.05	0.05	0.10

ID#	Objective	Category	Actions	Participants	Internal NYSDEC Responsibility	FTE				
						Yr1	Yr2	Yr3	Yr4	Yr5
3D1	Response	Regulatory and Legislative	Identify legal, regulatory, and institutional barriers that could impede a rapid response to an AIS introduction.	NYSDEC, ISC	ISCU, Legal, Executive, Legislative Affairs,		0.10	0.10	0.10	0.10
3D2	Response	Regulatory and Legislative	Develop general permits to control certain invasive species by employing specified techniques, including hand harvesting, suction harvesting, benthic matting and pesticides.	NYSDEC	AISMP, ISCU, DEP	0.05	0.05			
3D3	Response	Regulatory and Legislative	Implement corrective measures to minimize impacts of such barriers to specific response options.	NYSDEC, ISC	Executive, ISCU			0.10	0.15	0.15
3D4	Response	Regulatory and Legislative	Develop specific regulations to enable rapid response actions (declaration of AIS emergency) to new introductions of specific AIS into either New York State or to uninfested waterbodies.	NYSDEC, ISC, legislature	AISMP, Executive, ISCU, Legislative Affairs		0.10	0.10	0.10	0.10
4X1	Capacity		Within available resources, NYSDEC will implement and maintain a statewide, coordinated AISMP.	NYSDEC	Executive	0.05	0.05	0.05	0.35	0.50

ID#	Objective	Category	Actions	Participants	Internal NYSDEC Responsibility	FTE				
						Yr1	Yr2	Yr3	Yr4	Yr5
4X2	Capacity		Develop budgets for new AISMP, and request additional state and federal funding to support these programs.	NYSDEC	AISMP, Executive	0.25	0.05	0.05	0.05	0.05
4X3	Capacity		Identify staff in each region that would constitute regional response teams.	NYSDEC	NYSDEC, Regional Directors, DFWMR, DOW, DEP	0.15	0.05	0.05	0.05	0.05
4X4	Capacity		Develop expert capacity for timely AIS verification.	NYSDEC, PRISMs, academic	ISCU, DFWMR, DOW	0.15	0.15	0.15	0.15	0.15
4X5	Capacity		Procure a standby service contract (or other mechanism) for rapid response actions for newly discovered infestations of AIS.	NYSDEC	AISMP, DMBS, DFWMR, ISCU			0.15	0.15	0.15
4X6	Capacity		Provide resources to support research toward approaches and technology to aid in the detection of AIS.	ISC, academic	AISMP	0.05	0.05	0.05	0.25	0.25

IX. PROGRAM MONITORING AND EVALUATION

An extremely important component of any management plan is the mechanism by which progress attained towards completion of the listed objectives is to be measured. A close scrutiny of the successes and shortcomings of the AISMP will allow for any corrections necessary for steady and continual progress towards attainment of the plan objectives. Progress toward the completion of the actions necessary to achieve each objective will be measured annually by the team responsible for updating the New York State Plan (Team). This responsibility for implementing the plan will shift to the AIS coordinator, once that individual is hired.

The AIS coordinator will produce an annual report summarizing the progress attained towards accomplishment of each objective. This report will be posted on the NYSDEC website for the public to review the progress made towards the four plan objectives: prevention, detection, response, and capacity. In addition to describing the actual progress towards completion of each action, the plan evaluation will also describe additional staffing, funding, and other resources necessary for continued progress in the subsequent year.

X. ACRONYMS AND DEFINITIONS

AFS	American Fisheries Society
APA	Adirondack Park Agency
APHIS	Animal Plant Health Inspection Service
APIPP	Adirondack Park Invasive Plant Program
CSLAP	NY Citizens Statewide Lake Assessment Program
DEP	NYSDEC Division of Environmental Permits
DFWMR	NYSDEC Division of Fish, Wildlife and Marine Resources
DL&F	NYSDEC Division of Lands and Forests
DMBS	NYSDEC Division of Management and Budget Services
DOPS	NYSDEC Division of Operations
DOW	NYSDEC Division of Water
DPAE	NYSDEC Division of Public Affairs and Education
ECL	Environmental Conservation Law
FOLA	Federation of Lake Associations
GLRI	Great Lakes Restoration Initiative
LGPC	Lake George Park Commission
NALMS	North American Lake Management Society
NANPCA 1990	Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990
NEANS	Northeast Aquatic Nuisance Species Panel
NEAPMS	Northeast Aquatic Plant Management Society
NHP	Natural Heritage Program
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NYCDEP	New York City Department of Environmental Protection
NYCRR	New York Codes, Rules and Regulations
NYISRI	New York Invasive Species Research Institute
NYSCC	New York State Canal Corporation
NYSG	New York Sea Grant
NYSDAM	New York State Department of Agriculture and Markets
NYSDEC	New York State Department of Environmental Conservation
NYSDMV	New York State Department of Motor Vehicles
NYSDOT	New York State Department of Transportation
OCS	NYSDEC Office of Communication Services
OPRHP	Office of Parks, Recreation, and Historic Preservation
PRISM	Partnership for Regional Invasive Species Management
TNC	The Nature Conservancy
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

Definitions

AIS	Aquatic Invasive Species: An aquatic species that is nonnative to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health (ECL § 9-1703)
AISMP	Aquatic Invasive Species Management Program: The goal, objectives, and actions to prevent, detect, and respond to AIS using a comprehensive approach to protect New York State aquatic resources from the adverse impacts of AIS.
ANS	Aquatic Nuisance Species: A nonindigenous species that threatens the diversity or abundance of native species or the ecological stability of infested waters, or commercial, agricultural, aquacultural, or recreational activities dependent upon such waters (from NANPCA 1990). This is an earlier term that has been largely superseded by AIS.
ANSTF	Aquatic Nuisance Species Task Force: A federal task force created under the authority of NANPCA 1990 to coordinate and direct federal government activities related to the management of aquatic nuisance species.
Article 24	New York State laws that protect freshwater wetlands
Boat Launch Steward Program	A program in which volunteers and paid stewards are stationed at boat launches for teaching boaters how to look for, remove, and properly dispose of aquatic hitchhikers to help prevent the spread of aquatic invasive species
Dreissenid	Refers to mussels in the Genus *Dreissena,* specifically, the zebra mussel, *Dreissena polymorpha* and the quagga mussel, *Dreissena bugensis*.

eDNA	Environmental DNA: Genetic material shed by organisms into the environment through feces, mucus and urine. eDNA can be used to detect the presence of various aquatic organisms, including invasive species..
HACCP	Hazard Analysis and Critical Control Point: A management tool that provides a structured method to identify risks and focus procedures. It is being successfully used in natural resource pathway activities.
ICS	Incident Command System: Policies and procedures adopted by New York State for a common organizational structure designed to improve emergency response operations of all types and complexities
iMapInvasives	An online, GIS-based data management and mapping system to assist citizen scientists and natural resource managers working to protect natural resources from the threat of invasive species
ISAC	New York Invasive Species Advisory Committee: A committee established under the authority of ECL § 9-1707 to provide information, advice, and guidance to the Invasive Species Council
ISC	New York Invasive Species Council: A council established under the authority of ECL § 9-1705 for the purpose of assessing the nature, scope, and magnitude of the environmental, ecological, agricultural, economic, recreational, and social impacts caused by invasive species in the state
ISTF	New York State Invasive Species Task Force: A task force created under the authority of Chapter 324 Laws of New York, 2003, to explore the invasive species issue and to provide recommendations to the Governor and the Legislature by November 2005
ISCU	NYSDEC Invasive Species Coordination Unit: See OISC, below.
Monitoring	Activities related to the assessment of the distribution and/or abundance of AIS species

OISC	Office of Invasive Species Coordination: Staff originally established under the Office of Natural Resources in late 2007 to address the ever increasing threat of invasive species on New York State's environment. OISC serves as a single point of contact and ensures coordination for New York State on all invasive species matters in statewide, inter-state, national, and even international settings. In 2012, OISC was assigned to the Division of Lands and Forests and re-designated as the Invasive Species Coordination Unit.
Rapid Response	A series of actions conducted as soon as possible after the introduction of an invasive species occurs, usually aimed at eradication, containment, or control.
SDM	Strategic Decision Making: An ongoing process that involves creating strategies to achieve goals and altering strategies based on observed outcomes
Surveillance	Activities related to the detection (presence or absence) of AIS species

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APPENDIX A. Detailed Description of Existing Authorities and Programs

Existing Authorities

New York State Environmental Conservation Law – ECL § 3-0301 - required NYSDEC to develop an AIS management plan, as described in NANPCA. In 1994, the ANSTF approved New York State's AIS Management Plan, making it the first such state plan approved. Since its first grant in 1995, New York State has received $670,000 in funding from the ANS Task Force for implementing the ANS Management Plan.

Chapter 234, Laws of New York State, 2003 - required the formation of a task force to explore the invasive species issue in New York State and to provide recommendations to the Governor and the Legislature. The statute directed this Invasive Species Task Force (ISTF) to be co-led by the Department of Environmental Conservation (NYSDEC) and the Department of Agriculture and Markets (NYSDAM). The ISTF released its report "Final Report of the Invasive Species Task Force" in November 2005. This report can be downloaded at: *http://www.NYSDEC.ny.gov/docs/wildlife_pdf/istfreport1105.pdf*.

ECL § 9-1709 - established the New York Invasive Species Council (NYISC), a nine-member body co-led by NYSDEC and NYSDAM, and the New York Invasive Species Advisory Committee (ISAC). This law also called for NYSDEC to take specific actions, including: establishing, operating, and maintaining statewide invasive species databases and clearinghouses; coordinating state agency and public authority actions to phase out use of invasive species; expand use of native species; promote use of native species; prohibit and actively eliminate invasive species at sites funded or regulated by the state; and, in collaboration with NYISC, aid in the review and reform of regulatory processes to remove unnecessary impediments to the restoration of invaded ecosystems.

A law signed by the Governor in July 2012 revised **ECL § 9-1709** to require NYSDEC to, by September 1, 2013, jointly promulgate invasive species regulations with NYSDAM, in consultation with NYISC, that restrict the sale, purchase, possession, propagation, introduction, importation, transport, and disposal of invasive species. Draft regulatory lists of prohibited invasive species and regulated invasive species and permits for possessing prohibited species for disposal, control, research, and education were published in October 2013. In March 2014, NYSDEC adopted regulations intended to slow the spread of invasive species through commerce that established the state's first lists of prohibited and regulated species (**6 NYCRR § 575**).

A law signed by the Governor in September 2014 amended **ECL § 9-1710** intended to prevent the spread of AIS through recreational watercraft use. The new law requires that operators launching watercraft or floating docks must take "reasonable precautions" to prevent the spread of AIS, and requires NYSDEC to promulgate regulations describing demonstrable "reasonable precautions" to be taken prior to launch.

A law signed by the Governor in September 2014 amends **Article 3 of New York Navigation Law to add a new § 35-d** requiring NYSDEC to develop a universal, downloadable AIS spread prevention sign and requiring all owners of public boat launches to conspicuously display the sign, and specifies the minimum sign dimensions.

State of New York Codes, Rules and Regulations, 6 NYCRR §§ 59.4 & 190.24 - regulations adopted in 2014 requiring operators of watercraft at Department access sites be free of visible plant or animal matter and requiring draining water from watercraft, equipment and gear prior to launching and after retrieving boats.

State of New York Codes Rules and Regulations, Office of Parks, Recreation, and Historic Preservation 9 NYCRR § 377.1(i) - regulations adopted in 2014 requiring operations of watercraft at Department access sites be free of visible plant or animal matter and requiring draining water from watercraft, equipment and gear prior to launching and after retrieving boats.

6 NYCRR § 180.9 - Lists non-native fish that may not be imported, possessed, bought or sold except under permit issued by the Department. Species included are Asian carp (bighead, silver and black carp) and 27 different species of snakehead fish.

6 NYCRR §§ 188.1 & 188.2 - Requires fish being placed (stocked) into the waters of the state or bought, sold or transported for the same purpose to be certified free of 5-8 fish pathogens, depending upon species of fish. Collection of samples and certification must be conducted by qualified individuals.

State Programs

New York State Department of Environmental Conservation (NYSDEC)

NYSDEC has funded several large projects, including eradication of a northern snakehead population in southeastern New York State and multi-year control projects for hydrilla in Cayuga Inlet, and Eurasian watermilfoil and Asian clam control in Lake George. Other state-funded assistance is provided through education and outreach, such as the NY Invasive Species Clearinghouse, a statewide online AIS education and outreach program, and the NY Invasive Species Research Institute (NYISRI), both of which are partnerships with Cornell University. Additional assistance has been provided to partners by requesting New York State's share of AIS implementation grants, and requesting non-competitive Great Lakes Restoration Initiative (GLRI) implementation grants be directed to partners, and by coordinating partner projects during competitive rounds of federal grants.

Several divisions within NYSDEC have invasive species-related programs, including the Division of Lands and Forests, the Division of Water, and the Division of Fish, Wildlife and Marine Resources. The Invasive Species Coordination Unit is within this division.

Division of Lands and Forests - Invasive Species Coordination Unit (ISCU)

Formerly the Office of Invasive Species Coordination (OISC), this unit was renamed the Invasive Species Coordination Unit (ISCU) and transferred to the Division of Lands and Forests in 2012. The ISCU works with many stakeholders and partners and conducts technical, administrative, procurement, and other tasks associated with implementing the strategic and comprehensive framework envisioned by the ISTF and incorporated in statute. The ISCU led the regulatory list process on behalf of the NYISC. It has overseen the formation, funding, and administration of: PRISMs covering all of NY's geography (http://www.nyis.info/?action=prism_partners), statewide education and outreach, an online invasive species clearinghouse (http://www.nyis.info/), a GIS map-based invasive species database (http://www.nyimapinvasives.org/), the NY Invasive Species Research Institute, invasive species risk assessments, and invasive species control projects. The ISCU also regularly represents New York State on the Great Lakes and the Northeast regional Aquatic Nuisance (Invasive) Species panels established by the federal ANS Task Force and has occasionally participated on the Mid-Atlantic ANS Panel.

Division of Water (DOW)

The NYSDEC Division of Water is only peripherally involved in AIS-related activities, mostly related to surveillance and mostly associated with invasive plants. Sometime between development of the 1991 state ANS Plan and the 2003 draft plan, NYSDEC activities related to monitoring and management support have differentiated between aquatic plant actions conducted by DOW and aquatic animal actions conducted by DFWMR, with funding and contractual responsibility largely overseen by ISCU.

The two primary NYSDEC ambient lake monitoring programs both conduct some surveillance for AIS species as part of water quality survey work, but this is limited to the approximately 150 waterbodies (of over 17,000 lakes and ponds in New York State) sampled each year. AIS education, plant identification workshops, lake management manuals, and technical assistance for aquatic plant management are provided through outreach to lake associations actively participating in NYSDEC lake monitoring programs through technical support provided to the public, and as part of NYSDEC's role in responding to high profile AIS plant infestations overseen at the state level. DOW staff are also involved in NYSDEC and APA aquatic plant management permit review and AIS outreach at the regional level, particularly through the Lake Champlain Basin Program and the Adirondack Park Invasive Plant Program. However, there are no aquatic plant or lake managers at the NYSDEC regional staffing level, limiting support for local AIS actions to adjunct involvement through existing (mostly water quality-driven) programs.

Division of Fish, Wildlife, and Marine Resources (DFWMR)

NYSDEC oversees 398 boat launch facilities in New York State. Of these sites, 39 are located within Department campgrounds. Standard signage concerning AIS and

AIS spread-prevention techniques have been developed and are routinely posted at all sites. Many of the newer and larger Department sites also include kiosks with custom displays developed by the Division of Fish, Wildlife and Marine Resources. At least one of the panels in each kiosk is dedicated to the subject of AIS spread prevention. Invasive species disposal stations have also been installed at many NYSDEC boat launches, with the goal of having these stations installed at all sites on waters with AIS. These stations provide a dedicated location for disposal of AIS and also provide additional information on AIS spread prevention.

DFWMR also provides a variety of information about AIS on the NYSDEC website. Included in this information is AIS presence information for all waters that NYSDEC provides boating access to, AIS identification information, and specific advice on cleaning recreational watercraft and boating and fishing equipment is also provided. Links to this information are provided via the webpages the public uses to reserve campsites at NYSDEC water-based campgrounds. DFWMR has also produced two brochures: *Anglers and Boaters: Stop the Spread of Aquatic Invasive Species and Fish Diseases in New York State* and *A New York Boaters Guide to Cleaning, Draining, Drying and Disinfecting Boating Equipment*. The latter is available in PDF format via the NYSDEC website. DFWMR also provides AIS spread prevention in the *Freshwater Fishing Regulations Guide* and its *Directory of State Boat Launching Sites*. The *Freshwater Fishing Regulations Guide* is distributed to the over 950,000 individuals that buy a fishing license each year.

DFWMR reviews applications for biological control releases. Any release of an animal to the wild must be conducted under a permit. Triploid grass carp only are allowed for use as a biological control agent for aquatic plants and only under a special permit. Use of other biological control agents is allowed under special biological control permits. Species approved by the US Department of Agriculture for release in the US are not permitted for release until they have been evaluated in New York and can be legally released only under a biological control agent permit.

Other State Agencies, Councils and Committees

New York Invasive Species Council (NYISC)

The NY Invasive Species Council members are NYSDEC, NYSDAM, the Department of Transportation (NYSDOT), Department of Education, Department of State, Office of Parks, Recreation and Historic Preservation, New York State Canal Corporation (NYSCC), Adirondack Park Agency, and the Thruway Authority. Council roles include: assessing the impacts caused by invasive species in New York State, identifying actions taken by council members and others to address invasive species, developing a comprehensive plan for invasive species management, providing input on funding priorities, organizing and convening a biennial invasive species summit, encouraging industries and trade organizations to develop voluntary codes of conduct to prevent the spread of invasive species, supporting PRISMs, developing a recommended system for establishing lists of prohibited or regulated invasive species,

and developing recommendations on statutory actions.

Invasive Species Advisory Committee (ISAC)

The NY Invasive Species Advisory Committee comprises 25 non-governmental members whose membership is described in statute (**ECL §§ 9-1701 – 9-1710**) and includes academic institutions, conservation organizations, and industry and trade organizations.

New York State Department of Agriculture and Markets (NYSDAM)

Many activities that can serve as pathways for AIS fall under the jurisdiction of NYSDAM, including the seafood industry, nursery industry, and aquarium trade. NYSDAM also works with APHIS to protect against the introduction of terrestrial nuisance species such as the Asian long-horned beetle. Partnership with NYSDAM is important for developing AIS regulations and enforcement procedures for programs and activities outside the jurisdiction of NYSDEC.

Department of State (DOS)

New York State's Coastal Management Program is administered by the Division of Coastal Resources within New York's Department of State. This program was adopted in 1982 under the Waterfront Revitalization of Coastal Area and Inland Waterways. It is charged with advancing economic development opportunities in coastal areas, as well as protecting coastal natural resources.

Adirondack Park Agency (APA)

The Adirondack Park Agency is tasked with implementing the environmental protection afforded the Adirondack Park by the New York State Constitution. The APA has also participated in developing an innovative interagency Memorandum of Understanding (MOU) with NYSDEC Region 5, NYSDOT, The Nature Conservancy (TNC), and other participants to pool efforts to address AIS issues and enhance control over AIS plants in particular.

New York State Department of Transportation (NYSDOT)

Often roadways can be pathways for AIS introductions, particularly for wetland plants such as purple loosestrife and *phragmites*, which colonize drainage ditches along roadways and highways. NYSDOT manages and maintains state roadside areas, and could play an important role in both monitoring and controlling the movement of AIS along those routes. NYSDOT is an important partner with the APA in implementing the regional MOU for AIS control described above. NYSDOT also provides waterway access at selected locations.

Office of Parks, Recreation, and Historic Preservation (OPRHP)

OPRHP operates the system of state parks and regulates boat launches and aquatic habitats within those park areas. On waters that lie on state land and are under the jurisdiction of the OPRHP, lake managers can initiate AIS control efforts.

New York State Canal Corporation (NYSCC)

The New York State Canal Corporation has a vested interest in AIS management and important responsibilities as well. Many AIS are moved to uninfested waters through the canal system. NYSCC manages control of infestations of AIS plants that might block the movement of vessels through the canal. NYSCC also operates boat launches and recreation facilities.

New York City Department of Environmental Protection (NYCDEP)

The watershed of the New York City water supply, including 19 reservoirs up to 125 miles north of New York City, is managed by the NYCDEP. NYCDEP has developed AIS programs aimed at preventing and mitigating any impact from AIS to water quality or delivery. Recreational boating is also permitted at a number of NYSDEP reservoirs.

Federal Programs

US Fish and Wildlife Service (USFWS)

The mission of the US Fish and Wildlife Service is to work with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. Because of their responsibilities, the USFWS is very concerned about the impacts that invasive species are having across the US. They address invasive species issues through a variety of programs and partnerships. They also take proactive approaches to address intentional and unintentional introductions, combat the spread of existing invaders on and off USFWS lands, and serve as a leader in invasive species prevention and control.

Fisheries and Aquatic Conservation

The US Fish and Wildlife Service's Aquatic Invasive Species Program is housed within the Fisheries and Habitat Conservation Program's Division of Fisheries and Aquatic Conservation. The branch of Aquatic Invasive Species essentially houses three functions:

- The USFWS Aquatic Invasive Species Program – The AIS Program seeks to prevent the introduction and spread of AIS, rapidly respond to new invasions, monitor the distribution of and control established invaders, and foster responsible conservation behaviors through its national public awareness campaigns (Stop Aquatic Hitchhikers and Habitattitude).
- Administration of Aquatic Nuisance Species Task Force (ANSTF) – The branch

of USFWS builds capacity, coordinates, and implements AIS prevention and control activities authorized under the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA, as amended by the National Invasive Species Act [NISA] of 1996), including: co-chairing and administering the ANSTF, supporting regional panels, providing grants for state/interstate ANS management plans, and implementing a national AIS program.

- Injurious Wildlife Evaluations and Listings – The AIS Program supports the Injurious Wildlife Provisions of the Lacey Act through an ongoing process of evaluating species and possibly listing them as injurious through the rulemaking process.

The AIS Program has worked to prevent populations of invasive species from entering or spreading into the United States. Priority containment (boat inspection and decontamination), early detection, and rapid response (snakehead eradication and Chicago Sanitary Shipping Canal), inter-jurisdictional coordination and planning (Quagga/Zebra Mussel Action Plan and 100th Meridian), and regulatory (injurious wildlife listing of black and silver Asian carp) and non-regulatory actions (Stop Aquatic Hitchhikers!) have occurred across many jurisdictions. Through the actions of the AIS Program, a national AIS network has been built – including 42 states, 6 regional panels, over 1,000 participants in two national public awareness campaigns and many other partners – that has planned, directed, and accomplished significant regional and landscape-level invasive species prevention and management resource outcomes. The AIS Program serves as the nation's front line for prevention of new aquatic invasive species by regulating imports of injurious wildlife, facilitating behavioral change, and managing pathways to limit the introduction and spread of invasives (awareness campaigns and ballast water), and developing monitoring programs for invasion hotspots to facilitate early detection and rapid response.

National Wildlife Refuge System

The USFWS also manages more than 561 refuges, encompassing more than 150 million acres of wildlife habitat, within its National Wildlife Refuge System (NWRS). According to 2013 data, more than 2.4 million acres of the Refuge System are impacted by invasive plants. In addition, approximately 1,715 invasive animal populations reside on refuge lands.

There are 11 national wildlife refuges in New York, including: Amagansett, Conscience Point, Elizabeth A. Morton, Iroquois, Montezuma, Oyster Bay, Seatuck, Shawangunk Grasslands, Target Rock, and Wertheim, plus the Lido Beach Wildlife Management Area.

Endangered Species

The ultimate goal of the Endangered Species Act (ESA; **16 US Code § 1531**) is the recovery (and long-term sustainability) of endangered and threatened species and the ecosystems on which they depend. Recovery is the process by which the decline of

an endangered or threatened species is arrested or reversed, and threats removed or reduced so that the species' survival in the wild can be ensured. The goal of the ESA is the recovery of listed species to levels where protection under the ESA is no longer necessary.

In many instances, these threats may be caused by invasive species. They may either directly harm the species by causing mortality or may threaten a species by modifying or destroying the habitat or food source on which that species depends. A variety of methods and procedures is used to recover listed species, such as reduction of threats (including invasive species), protective measures to prevent extinction or further decline, consultation to avoid adverse impacts of federal activities, habitat acquisition, and restoration and other on-the-ground activities for managing and monitoring endangered and threatened species.

National Sea Grant College Program

The National Sea Grant College Program, through New York Sea Grant, provides funds for AIS basic and applied research. The former National Aquatic Invasive Species Database is now hosted by New York Sea Grant through the NY Invasive Species Clearinghouse. Sea Grant provides valuable AIS educational materials and technical assistance as well as outreach programs to the public on New York State's Atlantic, Long Island Sound, Hudson River Estuary, Great Lakes, and St. Lawrence River coasts.

US Army Corps of Engineers (USACE)

Within New York State, the USACE has responsibilities in managing wetlands, certain coastal and navigation areas, and reservoirs. Its Aquatic Plant Control Research Program (APCRP) is the nation's only federally authorized research program directed to develop technology for the management of AIS. USACE expertise in controlling hydrilla infestations has been highly valuable to New York State control efforts in Cayuga Inlet and the Erie Canal in Tonawanda. APCRP provides information on effective, economical and environmentally compatible methods for assessing and managing AIS.

US Environmental Protection Agency (USEPA)

Congress has appropriated funds to the US Environmental Protection Agency to be awarded as competitive grants through § 314(d) of the Federal Water Pollution Control Act (**33 US Code § 1324(d)**). One of the objectives of the program was to encourage development of improved methods for removing aquatic growth which impaired the quality of lakes ecosystems. Thus, under § 314(d), NYSDEC has access to USEPA funds if AIS impact or are likely to impact the water quality of New York State’s lakes. Congress has also appropriated funds to USEPA for grants to implement the GLRI for five focus areas, including invasive species in the Great Lakes watersheds. GLRI funds have been allocated to the USFWS to support implementation of Great Lake states’ AIS management plans through competitive and non-competitive grants. In

New York State, these grants have supported water chestnut and hydrilla control using herbicides, the development and implementation of boat steward programs, AIS monitoring and research, and an AIS response team in the Adirondacks.

Aquatic Nuisance Species Task Force (ANSTF)

Established in 1991, this group, co-chaired by the USFWS and NOAA, provides a national forum to discuss AIS issues and coordinate AIS activities. This task force coordinates the formation and activities of regional AIS panels and committees. The ANSTF has several AIS management committees that have developed species-specific AIS management plans, such as the River Ruffe Management Plan, Mitten Crab Management Plan, and the Bighead, Black, Grass and Silver Carp Management Plan.

The ANSTF reviews annual funding requests from states and interstate basins with approved AIS management plans and is the approving authority for state AIS management plans. There are 41 approved AIS management plans (38 state and 3 interstate). The ANSTF provides AIS plan development guidance to states, provides consistency to state and regional AIS programs, and ensures important aspects of AIS management are included in the plans.

US Coast Guard (USCG)/USEPA

The USCG was assigned certain AIS-related responsibilities under NANPCA in 1990. It was directed to assist in the prevention of AIS introductions by enforcing ballast water exchange through a program of inspections of Great Lakes shipping vessels and through general inspection of commercial and non-commercial watercraft. The USCG's responsibilities have broadened to developing a ballast water management program and standards for all the waters of the United States, not just the Great Lakes region. A new final rule, effective June 21, 2012, from the USCG established a numerical standard for living organisms in ship ballast water discharged into US waters. This discharge standard aligns with the International Maritime Organization's Ballast Water Management Convention adopted in 2004 and complements the USEPA Vessel General Permit implemented in 2012. The USCG has indicated it will revisit this standard as technologies and treatment improve to determine feasibility of application and enforcement. While New York State does not currently have regulations pertaining to the discharge of biological material in ballast water, the Department has provided a set of conditions that must be met by vessel operators via a Letter of Certification to the USEPA Vessel General Permit. These conditions, in part, require exchange and flushing in addition to ballast water treatment for ocean-going vessels operating in New York State waters.

National Oceanic and Atmospheric Administration (NOAA)
National Marine Fisheries Service (NMFS)

The National Oceanic and Atmospheric Administration and National Marine Fisheries Service of the US Department of Commerce inspect imported shellfish to

prevent the introduction of nonindigenous parasites and pathogens. These agencies could assist in preventing the introduction and spread of AIS through inspections at major ports such as New York City and through routine research activities at sea. NOAA is a co-chair of the Aquatic Nuisance Species Task Force with the USFWS.

US Department of Agriculture Animal and Plant Health Inspection Service (APHIS)

APHIS, under the USDA, has broad mandates related to the importation and interstate movement of exotic species under the Federal Plant Pest Act, the Plant Quarantine Act and several other related statues. The primary concern is species that pose a risk to agriculture. This agency restricts the movements of agricultural pests and pathogens into the country by inspecting, prohibiting or requiring permits for the entry of agricultural products, seeds, and live plants and animals. APHIS restricts interstate movements of agricultural plant pests and pathogens by imposing domestic quarantines and regulations and restricts interstate transport of noxious weeds under the Federal Noxious Weed Act.

US Department of Interior National Park Service (NPS)

"The National Park Service is the Federal agency responsible for managing the units of the National Park system for the enjoyment of current and future generations. The NPS manages 10 areas with surface water resources within the State of New York; collectively these areas include over 150 miles of perennial rivers and streams, over 150 acres of lakes and reservoirs and over 290 miles of ocean shoreline. The NPS is required by law to ensure that the resources it manages remain unimpaired for future generations. NPS regulations prohibit the introduction of non-native species to park area ecosystems and NPS policies indicate that exotic species should be managed up to and including eradication if prudent and feasible and where those species threaten park resources or interfere with park purposes."

Nonindigenous Aquatic Nuisance Prevention and Control Act

NANPCA (the Nonindigenous Aquatic Nuisance Prevention and Control Act, reauthorized as the National Invasive Species Act in 1996) was primarily created in response to the zebra mussel invasion of the Great Lakes, where ballast water introduction had caused serious ecological and socio-economic impacts. Although the zebra mussel invasion has played a central role in prompting passage of the federal legislation, NANPCA has been established to prevent the occurrence of all new ANS introductions and to limit the dispersal of all ANS already in US waters.

The act, established for the prevention and control of the unintentional introduction of nonindigenous aquatic nuisance species, is based on the following five objectives as listed in § 1002 of NANPCA:

- To prevent further unintentional introductions of nonindigenous aquatic nuisance species;

- To coordinate federally funded research, control efforts, and information dissemination;
- To develop and carry out environmentally sound control methods to prevent, monitor and control unintentional introductions;
- To understand and minimize economic and ecological damage; and
- To establish a program of research and technology development to assist state governments.

The primary components of the act are as follows:

- Required vessels entering ports on the Great Lakes to exchange ballast water and meet other requirements, with voluntary guidelines for similar actions on other waters of the US
- Authorized a number of studies and monitoring programs to assess the spread of AIS and develop methods for controlling them
- Required the development of Armed Services ballast water programs, as well as the establishment of the Ballast Water Management Demonstration Program
- Authorized the establishment of the Aquatic Nuisance Species Task Force
- Established a mechanism for regional collaboration and coordination through the establishment of the ANSTF regional panels
- Authorized the development of an AIS program to be housed within the U.S. Fish and Wildlife Service
- Established the State\Interstate ANS Management Plan Grant Program managed by the USFWS, through which states can develop and implement a comprehensive state management plan for the prevention and control of aquatic nuisance species.

NISA amended NANPCA “To provide for ballast water management to prevent the introduction and spread of nonindigenous species into the waters of the United States, and for other purposes.”

NISA authorized the following:
- The production of guidelines on how to guard against the introduction and dispersal of invasive species
- Regulations for vessel operations and crew safety and education/training programs to promote compliance
- Funding for research on environmentally sound methods to control the spread of invasive species
- Ecological surveys for certain environmentally sensitive regions of the country
- The establishment of the National Ballast Information Clearinghouse to provide data about ballasting practices and compliance with guidelines

International Agreements

New York State, Ontario, and Quebec share a mutual stake in limiting AIS introductions through transoceanic and intra-lake Great Lakes shipping ballast water. The Great Lakes Water Quality Agreement of 1978 between the United States and

Canada states that limiting the introduction of AIS via transoceanic shipping is the responsibility of both nations' coast guards. The US and Canadian St. Lawrence Seaway agencies enacted saltwater flushing requirements for no-ballast-on-board (NOBOB) vessels in 2008. In addition, "lakers" (intra-Great Lakes ships) must agree to comply with voluntary best management practices. The newly renegotiated Great Lakes Water Quality Agreement (GLWQA), signed by the US and Canada in September 2012, requires that the two federal governments work together to "establish and implement programs and measures that protect the Great Lakes Basin Ecosystem from the discharge of Aquatic Invasive Species in Ballast Water."

APPENDIX B - Aquatic Invasive Species Ranking Very Highly Invasive in New York State

Aquatic Invasive Species				
Scientific Name	**Common Name**	**Category**	**Present in New York**	**Regulatory Status**
Bellamya chinensis	Chinese mystery snail	invertebrate	yes	prohibited
Bythotrephes cederstroemi (*B. longimanus*)	spiny water flea	invertebrate	yes	prohibited
Carassius auratus	goldfish	fish	yes	regulated
Channa argus	northern snakehead	fish	yes	prohibited
Cyprinus carpio	common carp	fish	yes	regulated
Dreissena polymorpha	zebra mussel	invertebrate	yes	prohibited
Dreissena rostriformis bugensis	quagga mussel	invertebrate	yes	prohibited
Gambusia affinis	western mosquitofish	fish	yes	prohibited
Gambusia holbrooki	eastern mosquitofish	fish	yes	prohibited
Hemigrapsus sanguineus	Asian shore crab	invertebrate	yes	prohibited
Misgurnus anguillicaudatus	Oriental weatherfish	fish	yes	prohibited
Myocaster coypus	nutria	mammal	no	prohibited
Hydrilla verticillata	hydrilla, water thyme	plant	yes	prohibited
Hydrocharis morsus-ranae	frogbit	plant	yes	prohibited
Myriophyllum spicatum	Eurasian watermilfoil	plant	yes	prohibited
Trapa natans	water chestnut	plant	yes	prohibited

Rankings are the result of ecological assessments conducted using the New York State Ranking System for Evaluating Non-Native Plant Species for Invasiveness (Jordan, M.J, et al, 2012) and New York State Assessment Ranking forms for non-native animals (http://nyis.info/?action=israt_nn_animal accessed 4/3/15).

APPENDIX C – Responsiveness Summary for Public Comments

Responsiveness Summary

for

Public Comments Received

on the

New York State
Department of Environmental Conservation
Division of Fish, Wildlife and Marine Resources

DRAFT Aquatic Invasive Species Management Plan

DRAFT version 6.0
Dated June 1, 2014

Background:

In 1990, following the introduction of zebra mussels into North America, the federal government passed Public Law PL 101-646, the Federal Non-indigenous Aquatic Nuisance Prevention and Control Act (NANPCA) of 1990. This legislation established a cost-sharing program between the federal government and states with approved aquatic invasive species management plans to eliminate or reduce environmental, public health and safety risks associated with non-indigenous aquatic species.

In 1991, the New York State Legislature passed Chapter 456 of the Laws of 1991, which required the New York State Department of Environmental Conservation (NYSDEC, hereafter referred to as the Department) to develop an aquatic invasive species management plan that met the requirements described in NANPCA.

In 2007, the New York State Legislature passed legislation amending Environmental Conservation Law by adding Title 17 to Section 9, creating the Invasive Species Council. The council's membership includes nine New York State agencies and is co-led by the New York State Department of Environmental Conservation and Department of Agriculture and Markets. Its mission is to devise and implement a strategy for addressing invasive species concerns. This statute also created the Invasive Species Advisory Committee, whose membership is up to 25 non-governmental stakeholders, including trade, conservation and academic entities. In 2008, the Office of Invasive Species Coordination (OISC) was formed to facilitate and coordinate invasive species management actions. In 2012, the OISC was placed within the Department's Division of Lands and Forests as the Invasive Species Coordination Unit.

In 2013, Department executive staff determined that it was an appropriate time to revise the 1993 New York State Aquatic Invasive Species Management Plan. A work group was formed and given the task of revising the management plan so as to integrate the federal AIS management guidance with the invasive species infrastructure already established and functioning in New York State.

Introduction:

Draft version 6.0 of the *New York State Aquatic Invasive Species Management Plan*, dated June 1, 2014, was published for public review and comment in the *Environmental Notice Bulletin* (ENB) on October 29, 2014. The Department provided a 45-day comment period that ended on December 12, 2014. A list of the parties that commented on the draft document is included below. The NYSDEC Division of Fish, Wildlife and Marine Resources (DFWMR) prepared this responsiveness summary to address the comments that were received on the *Draft Aquatic Invasive Species Management Plan*.

The comments received were carefully reviewed and analyzed. Paraphrased comments are listed below followed by the response. The source of each comment is identified in parentheses following the comment. The responsiveness summary generally addresses

all comments received, with the exception of comments dealing with editorial or formatting changes. A copy of the ENB is included following the responses to comments.

General Comments

The majority of comments can be grouped into three general categories:

A. Resources and Funding

A large number of comments received expressed concern that adequate resources and staffing will be committed to the AIS Management Program. Resources for the program are obviously of paramount interest. Over the past decade, New York State has indicated that it is willing to invest significant resources for AIS Management. Funds were provided for both aquatic and terrestrial grant programs. Both funding and staffing were provided for creating the OISC and Invasive Species Council and implementing research and management activities.

One of the purposes of developing the *Aquatic Invasive Species Management Plan* is to identify, document, and prioritize actions that need to be accomplished to successfully address AIS infestations. Using the proposed actions described in the plan, the Department can allocate appropriate funds for a successful program. Identifying specific sources of revenue was beyond the charge given to the workgroup tasked with preparing the draft plan. While the Department appreciates the awareness by the public that a successful AIS management plan requires adequate funding and staffing, it is not feasible to respond in detail to the specific comments received regarding funding and staffing.

B. Enforcement

Enforcement of aspects of AIS management that have been promulgated in regulation was the basis for a number of comments, including concern about the magnitude of penalties. Procedures and penalties related to the enforcement of regulations is a matter for the Division of Law Enforcement (DLE). Every NYSDEC program with regulatory requirements works closely with DLE to ensure officers are trained and capable of understanding the regulations and enforcement needs and priorities. Penalties for violations are determined by statute or by the courts. DLE provides excellent support for Department regulatory programs, and the public should be assured that enforcement will be managed effectively.

C. Proposals for Detailed, Specific Actions

Many of the comments received provided proposals for additional actions that the AIS Management Plan could embrace. Often, these proposals were at a level of detail that is beyond the scope of this plan. The AIS Management Plan is strategic rather than technical. That is, it proposes broad, general actions and priorities. Each of those actions will eventually include many details that are not specifically described in the plan. The AIS Management Plan lays out the general direction for the staff that will be assigned to an AIS management program, but it will be up to them to determine specifics. The authors of the plan greatly appreciate the detailed suggestions received from the public. All such comments and suggestions will be saved, and that reservoir of ideas will be drawn upon when implementation of the plan begins.

List of Commenters

Three comments (comments 21, 22, and 23) were received via a mass mailing and were repeated 148 times. Individual commenters for that mailing are not listed here.

Name	Affiliation	Code to Comments
Amanda Lefton	The Nature Conservancy	A
Amy Hetherington	Cornell University	B
Bill Laffin	Keuka Lake Association	C
Cathy Pedler	Adirondack MT Club (ADK)	D
Claude Strife	Public	E
Joya Cohen	NYCDEP	F
Tarki Heath	Cortland-Onondaga Federation of Kettle Lake Associations	G
Darla Youngs	Otsego County Conservation Association	H
Dave Corr	Public	I
Dave Strayer	Cary Institute	J
Jennifer Dean	New York Natural Heritage Program	K
Paul Lord	Catskill Regional Invasive Species Partnership	L
Ed Dweck	Saratoga Lake Protection and Improvement district	M
Scott Croft	Hudson River Boat and Yacht Club Association	N
Hilary Lambert	Finger Lakes Regional Watershed Alliance	O
Dawn McReynolds	Bureau of Marine Resources	DM
James L. Flacke	Schenectady, NY 12305	P
Jane B Smith	President ESSLA-Schroon Lake and River	Q

Dave Kumlien	Trout Unlimited	R
Scott Proctor	Conesus Lake Steward Program	S
Linda Rohleder	Lower Hudson Partnership for Regional Invasive Species Management	T
Nicholas Rose	CAP-21	U
Jeff O'Handley	Otsego County Conservation Association	V
Rachel E. Schultz	SUNY Plattsburgh	W
Sally Howard	Public	X
Steve Laffer	Public	Y
Jon Vorhees	Indian Lake/Blue Mountain Lake Fish and Game Club	Z
Ed Griesmer	Adirondack Lakes Alliance	AA
James Balyszak	Hydrilla Task Force of the Cayuga Lake Watershed	BB
Janet Andersen	Three Lakes Council	CC
Guy Middleton	Upper Saranac Lake Foundation	DD
Nancy J. Mueller	NYS Federation of Lake Associations	EE
Paul Coppock	Indian Lake Association	FF
Rocci Aguirre	Adirondack Council	GG
Wayne France	Conesus Lake Association	HH
David J. Wilson	Piseco Lake Association	II
Chips Arend	Piseco Lake Association	JJ
Helene Marquis	Cornell Aquatic Animal Health Program	KK
Walt Keller	Public	LL
Eric Holmlund	Paul Smith’s College	MM
Steve Young	Long Island Invasive Species Management Area Coordinator	NN
Alan White	Catskill Center for Conservation and Development	OO

Comments and Responses

1. **Comment:** To implement this plan and mitigate potential threats to the economy and environment, The Nature Conservancy urges the state to increase the Environmental Protection Fund to $200 million, with $8 million for the Invasive Species line. A

   Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

2. **Comment:** In addition, a substantial investment should be made through the New York Works Program for needed infrastructure, such as boat washing stations, at launches throughout New York State. A

   Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

3. **Comment:** We acknowledge that the agency currently lacks the needed capacity to address aquatic invasive species on its own. We are hopeful that staffing constraints will be alleviated over time and, in the interim, suggest that NYSDEC fully use the PRISM network to employ many of the priority strategies within the *Draft Management Plan*. A

   Response: The authors of the *AIS Management Plan* concur with this comment, and it is the intention of the plan that the Department will continue to work with the PRISM network.

4. **Comment:** Education is a key component of preventing the spread of invasive species. We are glad that this remains a focus of the *Draft Management Plan* but noted that Invasive Species Awareness Week was not cited within the document. We encourage NYSDEC to continue this education effort, as the 2014 event was deemed a great success. A

   Response: New York's Invasive Species Awareness Week (NYISAW) was held July 6-12, 2014 and is an example of a brief education and outreach campaign. The Department anticipates that this will become an annual occurrence; however, implementation will depend upon strong participation of Partnerships for Regional Invasive Species Management (PRISM). While the Governor proclaimed ISAW, PRISM planned and conducted virtually all of the over 100+ events held during the week.

5. **Comment:** While we are encouraged that there is a heavy emphasis on this major pathway, there is no stated plan to address the canals. We urge the Canal Corporation and NYSDEC to take leadership and collaborate with the Army Corps of Engineers to resume discussions regarding the Champlain Canal, including moving forward with the approved feasibility study for a potential barrier and expand this work to include solutions for the Erie Canal. A

   Response: NYSDEC, as co-chair of New York's Invasive Species Council, will continue to encourage and support the Canal Corporation (also a member of the NY Invasive Species Council) in its efforts to enter an agreement with the Army Corps of Engineers to conduct a technical study of the feasibility of installing a barrier between the Champlain Canal and Lake Champlain. Such a study could inform other similar efforts in New York, such as at the Erie Canal.

6. **Comment:** Studies indicate that it is most effective for boaters to take action to clean their watercraft when leaving launches. Therefore, we encourage NYSDEC to require that boaters take reasonable precautions, such as removing visible vegetation from watercraft upon exiting waterbodies, in the regulations that will be promulgated as a result of this new law. Both motorized and non-motorized watercraft have the potential to spread invasive species, and both should be addressed. A

   Response: This is already required under NYSDEC regulations at NYSDEC access sites and will be required statewide under recently enacted statute. Draft “reasonable precautions” regulations are being developed.

7. **Comment:** Other potential pathways could be included and expanded upon within the *Draft Management Plan*. For instance, wading anglers, waterfowl hunters and trappers are all pathways that are not addressed, but they should at least be mentioned. These are pathways that species like New Zealand mud snails may have used to move around the landscape. A

   Response: See Immediate actions for the Prevention Objective under the Research and Information Strategy. All pathways and mechanisms of AIS introduction will be investigated and evaluated; however, it is not necessary to list them in the plan.

8. **Comment:** Increase the Environmental Protection Fund to $200 million, with $8 million dedicated to invasive species, and invest New York Works funds for needed infrastructure to prevent invasive species spread. Appropriately fund state agencies on the Invasive Species Council for the implementation of the *Draft Management Plan*. A

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

9. **Comment:** Further engage the Invasive Species Council so that member agencies are working together to address this critical threat to our waterways. A

Response: Coordination and cooperation with the Invasive Species Council is already being done and is one of the top 10 priorities identified in the *AIS Management Plan*.

10. **Comment:** Include specific action items to address the threat from New York's canal system. A

Response: NYSDEC, as co-chair of New York's Invasive Species Council, will continue to encourage and support the Canal Corporation (also a member of the NY Invasive Species Council) in its efforts to enter an agreement with the Army Corps of Engineers to conduct a technical study of the feasibility of installing a barrier between the Champlain Canal and Lake Champlain. Such a study could inform other similar efforts in New York, such as at the Erie Canal. Other actions can include supporting expansion of the Canal Corporation's Boat Steward Program, which started in 2014.

11. **Comment:** Invest in research to identify best prevention models, including an analysis on the efficacy of AIS disposal stations compared to high-pressure boat washing stations. A

Response: AIS disposal stations are not intended to replace appropriate inspection and decontamination actions taken by boaters to prevent the spread of AIS. They serve as a receptacle for proper disposal on AIS removed from boats, and provide an opportunity for educational messages. Further, they are simple structures that can be constructed by volunteers, organizations, lake associations, and youth groups, thus helping give "ownership" to AIS prevention efforts.

12. **Comment:** Include the estimated cost of the 10 high-priority actions. Given that an effective AIS program is resource intensive and limited capital is available, the estimated total cost of the 10 high-priority actions is essential to understand the viability of the program. FTE estimates within the implementation plan are useful for internal budgeting; however, the 10 high-priority action items need to have associated estimates of cost. Because only $20,000 was allocated from the federal government to NYS for aquatic nuisance species management, a discussion of potential funding sources with estimated amounts would clarify overall feasibility of implementation. B

Response: Costs will depend on the extent to which an aquatic invasive species program is developed within NYSDEC and with partners. It is not feasible to develop cost estimates until the scope, quality, and schedule of such a program is defined and further refined.

13. **Comment:** Add risk evaluation of AIS and pathways to the 10 high-priority actions. AIS that present the greatest ecological, economic, and social impacts and associated high risk pathways should be identified and prioritized. This action will drive prevention, detection, and response actions and allocation of resources. Synergies in actions and available resources could be achieved across multiple invasives and pathways with proper planning. B

Response: Risk evaluation of AIS and pathways has already been identified as an action item, although it is not one of the top 10 priorities.

14. **Comment:** Prioritize 10 high-priority actions. Due to financial constraints, ranking of 10 high-priority actions is needed. Use of PRISM resources and volunteers should be considered to assist in achieving actions. Ranking actions which achieve highest impact to multiple aquatic invasive species, and high-risk pathways with minimal capital investment should be high priority. B

Response: Highest priorities do not have to be accomplished sequentially, so prioritization is not necessary.

15. **Comment:** Develop a centralized database for fishing tournaments and other transient activities, for accountability, liability, etc. C

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

16. **Comment:** Augment law enforcement. C

Response: Enforcement and allocation of penalties is outside the authority of the authors of the *AIS Management Plan*.

17. **Comment:** Weak in means of informing out-of-state folks of NYS policy regarding AIS. C

Response: The plan includes an immediate action of developing communications plans and calls for involving Department staff with appropriate expertise for crafting measures for reaching *all* audiences. NYSDEC has contracted for a poll of the general public on its attitude toward and awareness of invasive species as well as more detailed polling of individuals who self-identified in the initial poll as anglers, boaters, campers, hikers, and gardeners. One example of a current effort to educate those coming from out of state as well as in state to NYSDEC and OPRHP campgrounds is AIS spread-prevention information that appears prominently when people are making on-line camping reservations.

18. **Comment:** Need a means of reaching non-motorized boaters. C

Response: See comment 17.

19. **Comment:** Plans to address float plane operators? C

Response: See comment 17.

20. **Comment:** Provide a “comprehensive” aid program to support boat wash stations. C

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

21. **Comment:** Ensure greater state funding for AIS spread prevention. This comment occurred 148 times. D

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

22. **Comment:** Support boat washing and inspection stations. Comment occurred 148 times. D

Response: Appropriate AIS spread-prevention tactics will be considered, including boat inspection and decontamination.

23. **Comment:** Support the role of PRISMs. Comment occurred 148 times. D

Response: PRISMs are an essential component of NYSDEC's approach to addressing all taxa of invasive species, including AIS. The plan appropriately integrates the private-public PRISMs in plan implementation. Administration and coordination of all eight NYS PRISMs are funded by NYSDEC, and all PRISMs are operational. Further, the Adirondack Park Invasive Plant Partnership has a full-time state-funded AIS coordinator and employs state-funded seasonal interns and a state-funded AIS response team to address AIS infestations. These commitments demonstrate very significant support for PRISMs with respect to AIS.

24. **Comment:** Increase canal-oriented action items. D

Response: NYSDEC, as co-chair of New York's Invasive Species Council, will continue to encourage and support the Canal Corporation (also a member of the NY Invasive Species Council) in its efforts to enter an agreement with the Army Corps of Engineers to conduct a technical study of the feasibility of installing a barrier between the Champlain Canal and Lake Champlain. Such a study could inform other similar efforts in New York, such as at the Erie Canal. The Canal Corporation began a Boat Steward Program in 2014, and NYSDEC is coordinating with the Canal Corporation to ensure this program complements and integrates with other stewardship programs. The Canal Corporation partnered with the US Army Corps of Engineers to treat a hydrilla infestation in the western end of the Erie Canal, and NYSDEC continues to coordinate with the Canal Corporation in responding to this infestation. NYSDEC will encourage the Canal Corporation to continue to strengthen its AIS education, outreach, and other AIS management strategies; however, NYSDEC does not have authority to require certain actions be taken by the Canal Corporation with respect to AIS.

25. **Comment:** Adirondack Mountain Club recommends that the invasive species eradication grant/cost-sharing program should be re-implemented and that it should be raised in priority from “additional actions” to “immediate actions.” D

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

26. **Comment:** NYSDEC should also incorporate a more detailed overview of how the plan will be monitored and evaluated, and how progress and accomplishments will be shared with partners. NYSDEC should identify specific metrics and timeframes. D

Response: It is expected that when the plan is adopted, specific actions identified, and metrics developed to measure progress, monitoring and evaluation can be conducted.

27. **Comment:** Herons come into my pond and introduce AIS in the form of *Chara*, etc. I am unable to get chemicals in NYS or have them shipped to NYS, to eradicate the problem. E

Response: The availability of specific aquatic pesticides should be discussed with the NYSDEC Regional Pesticide Control Specialist.

28. **Comment:** Allocate sufficient resources to AIS staffing. F

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

29. **Comment:** The volunteer approach, or the APPIP model, won't work everywhere and cannot replace staff. F

Response: Citizen participation is a vital component of a successful AIS management plan.

30. **Comment:** Include examples of the voluntary actions that work. F

Response: NYSDEC funds administration and coordination of Partnerships for Regional Invasive Species Management (PRISMs), which are responsible for developing and implementing volunteer programs. Examples of such programs include volunteer AIS monitoring in the Adirondacks, ash tree inventories in the Catskills, and manual control projects for a variety of invasive species. Volunteers having participated in invasive species identification workshops have occasionally been the first to report a new infestation of an invasive species. Other voluntary efforts include the Citizens Statewide Lake Assessment Program, which is a volunteer lake-monitoring and education program managed by NYSDEC and the New York State Federation of Lake Associations (NYSFOLA).

31. **Comment:** Specify an audience for “generic fact sheets.” F

Response: The term “generic” was meant to indicate that the audience for the fact sheets would be anyone interested, including the general public, stakeholders, and NYSDEC staff. The term generic will be dropped.

32. **Comment:** Adopt bait regulations to address collection of bait in dreissenid-infested waters. F

Response: This is already covered by NYSDEC bait fish regulations. Personal collection and use is only permitted on the same waterbody.

33. **Comment:** The “Clean, Drain and Dry” messaging is not included. F

Response: This is an example of a specific message (“Clean, Drain, and Dry”) to a specific target audience (boaters). The purpose of this plan is to present an overarching strategy. Implementation of the strategy, as identified in Part VIII Implementation Table 2015-2020, calls for an AIS awareness campaign to target specific audiences. Audience-specific messages will be developed and delivered as part of any outreach campaign.

34. **Comment:** We are assuming that “public waterways” include all of the waterways in New York State and that as “navigable waters,” all of our kettle lakes would be left out. G

Response: The terms “public waterways” and “navigable waters” were not used in the *AIS Plan*. Actions identified in the plan are applicable to varying degrees to all waterbodies of the state. A statement has been added to the plan to indicate that AIS actions would be applicable to all Waters of the State as defined in ECL Art 17.

35. **Comment:** Increase AIS awareness in conjunction with increased enforcement. G

Response: Enforcement and allocation of penalties are outside the authority of the authors of the *AIS Management Plan*.

36. **Comment:** Elevate AIS violations to actionable offences, like poaching, that could be reported by the public. G

Response: Enforcement and allocation of penalties are outside the authority of the authors of the *AIS Management Plan*.

37. **Comment:** Coordinate grants to lake associations for their own stewardship programs. G

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time. As currently organized, PRISMs do not administer grant programs, but PRISMs can advise and partner with lake associations.

38. **Comment:** Lack of organizational chart showing staff hierarchy. H

Response: A proposed organizational chart was part of an earlier draft, but proposing an organizational infrastructure was premature. The possible AIS management hierarchy has not been determined yet. References to the organizational chart that were inadvertently left in have been deleted.

39. **Comment:** The plan pays insufficient attention to existing AIS populations. H

Response: Actions described in the *AIS Management Plan* do not distinguish between new or existing AIS infestations. There is a tendency to focus on new threats, but existing infestations warrant attention because they are vectors themselves.

40. **Comment:** There is an admitted lack of capacity. H

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

41. **Comment:** There is a lack of enforcement in the plan. Use ECOs for outreach, issuing warnings rather than tickets. H

Response: Enforcement and allocation of penalties are outside the authority of the authors of the *AIS Management Plan*.

42. **Comment:** Monitoring should be an objective on its own. H

Response: In the existing plan, monitoring is coupled with surveillance under the objective “DETECT.” While monitoring is a critical portion of the *AIS Plan*, it shares many elements with surveillance. The plan authors believe that “DETECT” is a more comprehensive objective that should encompass several tasks, including those that are required to “monitor” infestations.

43. **Comment:** OCCA recommends elimination of the phrase “no action” and emphasizes that education and outreach are response objectives. H

Response: "No action" is explained in the plan as meaning that the response is limited to education and outreach rather than implementing specific activities directly against the AIS.

44. **Comment:** "Generic" fact sheets seem pointless. H

Response: The term "generic" will be deleted.

45. **Comment:** The *AIS Plan* should not rely on volunteers in lieu of staff. H

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

46. **Comment:** The plan has insufficient detail about the rapid response teams, such as where, who, etc. H

Response: The term "*rapid* response team" is not used in the AIS Management Plan. The structure, size, and composition of *regional* response teams has not been determined and will undoubtedly vary from region to region.

47. **Comment:** Acronyms are used inconsistently throughout the plan. H

Response: The acronyms used throughout the *AIS Management Plan* have been reviewed and corrections made, as necessary.

48. **Comment:** The plan should address education/outreach to young folks. I

Response: This is a component of the new beginning fishing curriculum that the Bureau of Fisheries is creating.

49. **Comment:** Issue of leaving boats at remote lake being discouraged. I

Response: The authors of the *AIS Management Plan* have not adopted a position regarding this comment.

50. **Comment:** It is clear that New York State will continue to devote only modest resources to invasive species management. J

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

51. **Comment:** It's hard to see where the proposed list of 10 priorities comes from. In my opinion, it contains some but not all of the best opportunities for managing aquatic invaders in New York and is not actually "foundational" as claimed. J

Response: The priorities listed represent the consensus of the staff tasked with preparing the plan.

52. **Comment:** The suggestion that volunteers be trained to hand harvest invasive plants is potentially harmful because these plants can perform beneficial ecosystem services. J

Response: Removal of invasive nonindigenous species would allow for the re-establishment of native vegetation that can provide the same services.

53. **Comment:** There are ample studies showing which pathways are important in bringing invaders into the region, so the action should be to reduce the number of invaders coming in along these pathways, not simply to identify and evaluate risks. I guess I don't object to further studies of pathways, but we don't need to wait for more studies to start shutting down these pathways. J

Response: The authors generally concur with this comment. There is no intent to limit response actions to identifying and evaluating risks; however, those are the necessary first steps, particularly when considering pathways that have not been investigated.

54. **Comment:** Priorities for Action, item number 6, probably should be broadened to consider all barriers to rapid response, not just legal barriers. We need to know the circumstances in which rapid responses are legal, feasible, and effective, to determine whether/when they belong in our tool kit. J

Response: The scope of barriers to a rapid response could change with every specific interest. There are, however, specific legal and regulatory "barriers" that broadly apply to rapid response in general. By addressing legal and regulatory barriers, the way will be cleared for regional response teams to address other, response-specific barriers if and when such rapid responses are necessary.

55. **Comment:** Rethink your priorities list to better match your capabilities and to focus on actions with the greatest impacts. J

Response: The priorities listed represent the consensus of the staff tasked with preparing the plan.

56. **Comment:** It was surprising to me that the plan did not recommend serious study or implementation of canal barriers. J

Response: NYSDEC, as co-chair of New York's Invasive Species Council, will continue to encourage and support the Canal Corporation (also a member of the NY Invasive Species Council) in its efforts to enter an agreement with the Army Corps of Engineers to conduct a technical study of the feasibility of installing a barrier between the Champlain Canal and Lake Champlain. Such a study could inform other similar efforts in New York, such as at the Erie Canal. Other actions can include supporting expansion of the Canal Corporation's Boat Steward Program, which started in 2014.

57. **Comment:** A better analysis of the economic impacts of dreissenid on water intakes was provided by Connelly NA, O'Neill CR, Knuth BA, and Brown TL. 2007. Economic impacts of zebra mussels on drinking water treatment and electric power generation facilities. *Environ Mgmt.* 40: 105-112. J

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

58. **Comment:** I don't know of any bodies of water that are so heavily invaded that they don't support ecosystem functions and recreation (p. 5). J

Response: Recreation and ecosystem function in many waterbodies can be significantly impaired by invasives. Heavy infestations of milfoil can significantly impact swimming, boating, and water skiing, and can alter fish community structure. Heavy infestations of water chestnut can nearly eliminate fish populations.

59. **Comment:** Not all of the canals you list connect formerly unconnected watersheds (p.7). J

Response: Canals were originally constructed to support boat/barge traffic. Even though waters could already be connected, a canal might provide an alternative, more expeditious route for invasive species transport that might bypass a barrier.

60. **Comment:** A good recent discussion of the origin of sea lampreys in New York lakes was given by Eshenroder, R.L. 2014. The role of the Champlain Canal and the Erie Canal as putative corridors for colonization of Lake Champlain and Lake Ontario by sea lampreys. *Transactions of the American Fisheries Society* 143: 634-649. J

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

61. **Comment:** Seaplanes can act like recreational boats as vectors and should be treated comparably. See: Strayer, D., and E. McNeil. 2009. Avoiding the transport of invasive species by seaplane*. Water Flying* 172: 18-25; and McNeil, E., and D. Strayer. 2010. A checklist to help stop the spread: a procedure to avoid transporting invasive species by seaplane. *Water Flying* 181: 18-25. J

Response: Department notes and thanks commenter for providing the references. While the plan does not address all individual pathways or vectors, the intent is to use it to identify and address the pathways that introduce and transport the most AIS and that can be addressed by the state. The Department recognizes that seaplanes can be vectors of AIS and, in 2013, requested a short white paper on this topic from the NY Invasive Species Research Institute.

62. **Comment:** Misidentification of nursery or aquarium stock is very common, as is contamination by unwanted species. See: Thum, et al. 2012. Loopholes in the regulation of invasive species: genetic identifications identify mislabeling of prohibited aquarium plants. *Biological Invasions* 14: 929-937; Duggan, I.C. 2010. The freshwater aquarium trade as a vector for incidental invertebrate fauna. *Biological Invasions* 12: 3757-3770; Maki, K., and S. Galatowitsch. 2004. Movement of invasive aquatic plants into Minnesota (USA) through horticultural trade. *Biological Conservation* 118: 389-396. J

Response: The authors of the AIS Management Plan acknowledge and appreciate this comment.

63. **Comment:** I think that waterfowl aren't vectors nearly as much as claimed, so I would play this down. They've been flying around for millions of years, yet many invaders were bottled up in small nature ranges before humans started moving stuff around. J

Response: The text was changed. Specific reference to the movement of hydrilla by waterfowl was deleted.

64. **Comment:** The section on historical AIS problems is very incomplete, not mentioning such widespread invasions as stocking of sport and forage fish, canal invasions, and solid ballast introductions of plants, all of which were common in the 19th century. Maybe the section could be expanded, or at least a sentence added that says that the historical review is very incomplete. J

Response: The historical section is intended to serve as a synopsis to aid in informing a reader of the nature of the AIS problem and is not intended to be comprehensive.

65. **Comment:** Zebra mussels were in Lake Erie before the Hudson. See: Strayer, D.L., J. Powell, P. Ambrose, L.C. Smith, M.L. Pace, and D.T. Fischer. 1996. Arrival, spread, and early dynamics of a zebra mussel (*Dreissena polymorpha*) population in the Hudson River estuary. *Canadian Journal of Fisheries and Aquatic Sciences* 53: 1143-1149). J

Response: The text has been revised to say: A *near* simultaneous introduction appears to have occurred in the Hudson River...

66. **Comment:** New Zealand mud snails were brought to the western US in a shipment of rainbow trout eggs. J

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

67. **Comment:** Hydrilla is now widespread in the Croton River. J

Response: The Department agrees that *Hydrilla verticillata* is in the Croton River, a tidal tributary to the Hudson River in Westchester County. The Lower Hudson Partnership for Regional Invasive Species Management hired a consultant to delineate the extent of this invasive plant in the Croton River (*2014 Croton River System Hydrilla Delineation, Lower Hudson PRISM*; Allied Biological, Inc., 2014). A team is investigating potential management options.

68. **Comment:** You might remind readers that there are many more recent invaders than those you describe on pages 12-14. J

Response: The text has been revised as suggested.

69. **Comment:** Another place to spread educational materials (p. 18) is at points of sale, including big box stores. J

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

70. **Comment:** I don't see how "research needs are met" (p. 19) if NYISRI doesn't do research (p. 17). Also on p. 19, we don't need more "providers" to conduct research–there are lots of competent people who can do the research–we need research dollars to support existing researchers. J

Response: A “research provider” is someone funded to meet a specific research need identified by the NYISC. The scope of the New York Invasive Species Research Institute is to coordinate and advise and does not include actual research because the best provider for research on a particular invasive species problem is unlikely to be already employed in NYISRI. The NYISRI and NYISC agencies work together to identify unmet research needs, research priorities, and potential funding sources. One state-funded research project currently underway is testing to identify methods to kill zebra mussels that may be taken by boaters.

71. **Comment:** All of the stuff about early detection and monitoring is pretty much moot and not worth doing unless some sort of rapid response is possible and actually occurs. The whole section on pp. 21-24 needs to be thought out more critically, modified, and perhaps even discarded. If this section is kept, eDNA might receive more emphasis as an early detection tool. J

Response: The plan authors agree that all detection elements cited in it will have limited effectiveness if appropriate and timely response measures are not available. This is why both objectives are cited in the plan.

72. **Comment:** P. 25. states not that “more AIS introductions are possible” but that “more AIS introductions will occur.” This is an important distinction. J

Response: The text has been revised as suggested.

73. **Comment:** Even if a species is new to North America, there typically is at least some information about its biology from its native range (p. 25). J

Response: The information available at the time a new infestation occurs can be very limited or might be in a foreign language.

74. **Comment:** “No action” (p. 26) may also be appropriate when the invader provides ecological or economic benefits (e.g., denitrification by water-chestnut beds, cited above). J

Response: Such potential benefits are taken into account when listing prohibited or regulated species. Species with moderate or higher ecological invasiveness are subject to a socio-economic assessment to weigh costs and benefits. This concept is also reflected in NY's legal definition of invasive species; that is, that potential harm must significantly outweigh any benefits.

75. **Comment:** I’m not sure that the fact sheets proposed at the bottom of p. 26 are feasible, given the wide range of species, environments, and control methods that would have to be considered. J

Response: The fact sheets will communicate to a variety of audiences why or why not a particular response may or may not be considered.

76. **Comment:** The "immediate" and "additional actions" proposed on the bottom of p. 27 are so broad that they may not be feasible with a modest budget. J

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

77. **Comment:** Mobile apps for stewards have already developed. K

Response: Mobile apps and other similar technologies will be evaluated for their use across all stewardship programs.

78. **Comment:** Just a small text detail: iMapInvasives is one word. K

Response: The text has been changed as suggested.

79. **Comment:** It would be great to get management actions of at least high-priority infestations recorded in iMapInvasives as treatment records. Also, there are ways to document treatment effectiveness over time. This helps other professionals across the state by providing additional information about what has worked and what hasn't worked. K

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

80. **Comment:** The Nature Conservancy of Eastern NY developed the "Invasive Plant Management Decision Analysis Tool" (IPMDAT), which is designed to help evaluate whether or not further control actions will be effective against infestations. This might be a useful component of strategic decision making, especially when trying to decide whether or not to enact a response. We recently worked with TNC to launch the IMPDAT online: http://www.ipmdat.org/. K

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

81. **Comment:** What is missing in this document is an identification of the NYSDEC agency or units responsible for each goal. L

Response: The specific NYSDEC elements tasked with implementing the AIS Management Plan are still being determined.

82. **Comment:** P. ii, 2nd line: Replace “were identified” with “were identified:” L

Response: The text has been changed suggested.

83. **Comment:** P. ii, recommendation 1: The rationale for ensuring the consistency of these programs statewide is not clear. As an example, boats moving between marine waters and boats moving between freshwater lakes might be treated differently. Boats moving into waters without state access might be treated differently than boats moving into waters with state access. Finally, waters known to be more pristine might have additional safeguards above those used on less pristine waters. L

Response: It is not intended that all boat steward programs will be identical; however, consistent messaging and standard operating procedures are critical to delivering an effective stewardship program. Stewardship and boat decontamination programs should be established within a set of accepted principles, designed based upon local conditions such as travel corridors, use patterns, public access, launch type, staff safety, known AIS-inhabited waters, and effective AIS removal methods. The Department partnered with NY Sea Grant and Cornell Cooperative Extension to develop guidance and training for entities starting new AIS boat steward programs. This document is available online at http://www.nyis.info/user_uploads/files/NYSWISPHandbookIntro.pdf. Pursuant to ECL Title 17 Section 9-1710, the Department is developing regulations prescribing a suite of “reasonable precautions” that an individual must take prior to launching a boat or floating dock. Individuals can select, based on the risk posed by a particular boat or dock, available equipment, feasibility of the method, and manufacturers' recommendations. The regulations are expected to take effect in September 2015.

84. **Comment:** P. ii, recommendations 3 & 5: This recommendation might be reworded to ensure NYSDEC is viewed as the lead agency for such actions. Recent initiatives by Parks indicates that they might believe that they have the leadership role in training watershed stewards statewide. The MOU discussion on Page 19 might be cross referenced parenthetically here. L

Response: OPRHP has not assumed this leadership role, other than for training watershed stewards assigned to OPRHP launch sites. There are many partners in training stewards. For example, Sea Grant developed the manual, Paul Smith's College trains stewards, and OPRHP coordinates its own training and steward deployment. Priority Action 5 has been reworded to provide clarification.

85. **Comment:** P. ii, final paragraph: Who will perform the annual evaluations? Without identifying an agent for monitoring and evaluations, this statement is merely an expression of optimism without basis. The review responsibility discussion on P. 41 might be cross referenced parenthetically here. L

Response: The AIS coordinator is tasked with producing an annual report summarizing the progress attained on each objective.

86. **Comment:** P. 9, "Recreational Boats": A sentence in this otherwise great paragraph should underscore the threat posed by canoes and kayaks, particularly those with "closed" compartments. L

Response: To address this concern, the text of the plan has been revised to say "recreational watercraft" rather than boats, wherever appropriate.

87. **Comment:** P. 18, 1st recommended strategy: The rationale for ensuring the consistency of these programs statewide is not clear. As an example, boats moving between marine waters and boats moving between freshwater lakes might be treated differently. L

Response: It is not intended that all boat steward programs will be identical; however, consistent messaging and standard operating procedures are critical to delivering an effective stewardship program. Steward and boat decontamination programs should be established within a set of accepted principles, designed based upon local conditions such as travel corridors, use patterns, public access, launch type, staff safety, known AIS-inhabited waters, and effective AIS removal methods. The Department partnered with NY Sea Grant and Cornell Cooperative Extension to develop guidance and training for entities starting new AIS boat steward programs. This document is available online at http://www.nyis.info/user_uploads/files/NYSWISPHandbookIntro.pdf. Pursuant to ECL Title 17 Section 9-1710, the Department is developing regulations prescribing a suite of "reasonable precautions" that an individual must take prior to launching a boat or floating dock. Individuals can select, based on the risk posed by a particular boat or dock, available equipment, feasibility of the method, and manufacturers' recommendations. The regulations are expected to take effect in September 2015.

88. **Comment:** P. 32, "Implementation Table:" Needs a legend, particularly to explain the numbers in the "Yr." columns. L

Response: A legend has been added as part of the caption, as suggested.

89. **Comment:** The Saratoga Lake Protection & Improvement District is totally in favor of this plan to control AIS. We would favor even stronger regulation, so that the stewards can report boaters carrying AIS. M

Response: Stewards are not precluded from reporting boats transporting AIS to law enforcement authorities. A change to the regulation is not needed.

90. **Comment:** Will the new "precautions" present significant challenges to the transport, storage and maintenance of a boat? N

Response: The new reasonable precautions will be typically what boaters have been asked to do voluntarily for years. Boaters will be able to select from a suite of protocols, and it is not expected that any would pose an unreasonable hardship.

91. **Comment:** Enforcement is very unclear. This is a big concern for us as HRBYCA clubs are community facilities open to the public. Will community boat clubs be asked to "enforce" the regulation, and, if so, what authorizes this? N

Response: Every citizen and all groups are expected to comply with state laws and regulations. Individuals and groups have no authority to enforce laws and regulations but must realize and understand that compliance is in their best interests for preventing spread of AIS.

92. **Comment:** What are the potential penalties for a HRBYCA club (not a "person"), if any, for failure to follow this regulation? N

Response: Enforcement and allocation of penalties is outside the authority of the authors of the *AIS Management Plan*.

93. **Comment:** What new liabilities could HRBYCA clubs be subject to as a result of this new regulation? N

Response: Enforcement and allocation of penalties is outside the authority of the authors of the *AIS Management Plan*.

94. **Comment:** Also unclear is the cost to taxpayers or "waterbody" users. Will boaters (and our 3,500 HRBYCA members) have to pay new "fees"? Will they have to pay to wash their boats for official inspections? Will any new costs be borne by state taxpayers? N

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

95. **Comment:** Will NYS be making any funds available to community boat clubs to comply with the regulation? (Fund wash stations? Stewards? AIS disposal bins? Who will pay for wash site annual maintenance and utility costs?) N

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

96. **Comment:** How will this this regulation affect short/long hauls from same HRBYCA location? N

Response: Enforcement and allocation of penalties is outside the authority of the authors of the *AIS Management Plan*.

97. **Comment:** Who and what determines when AIS measures need to be escalated at a certain launch site (boat club), for example, going from a visual self-inspection to a wash station site? N

Response: Regional priorities, research, and experience derived from AIS management programs will guide the development of more specific, operational plans for boat launches.

98. **Comment:** Kayaks, canoes, power and sail boats ("watercraft" of any sort) must be washed, dried and drained before being moved from one waterway to another or one site to another on the same waterway. It's acknowledged that current washing facilities are few. N

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

99. **Comment:** NYSDEC has installed AIS disposal stations at many NYSDEC-maintained launches. However, many launch sites are not NYSDEC maintained nor do they have facilities to wash watercraft. N
Response: AIS disposal stations are not intended to replace appropriate inspection and decontamination actions taken by boaters to prevent the spread of AIS. They serve as a receptacle for proper disposal on AIS removed from boats and provide an opportunity for educational messages. Further, they are simple structures that can be constructed by volunteers, organizations, lake associations, and youth groups, thus helping give "ownership" to AIS prevention efforts.

100. **Comment:** How will boaters know that washing is necessary? N

Response: Boaters should take all appropriate measures to ensure that their boats are free of AIS.

101. **Comment:** How will boaters be educated and kept current about these regulations and any changes or updates in the inspection scheme? N

Response: Education and outreach are recognized as key components of this plan. Developing communications plans is an immediate action.

102. **Comment:** Are there any lessons learned from the AIS program on Lake George? N

Response: The Lake George program is a two-year pilot program, and information gained over the course of the program will guide decisions on appropriate AIS spread-prevention tactics.

103. **Comment:** Support regional response teams. O

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

104. **Comment:** Increase funding for AIS management. O

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

105. **Comment:** The plan does significantly focus on freshwater and does not really do any justice as it just mentions marine issues. I suggest it either say it is all about freshwater or be more inclusive of marine issues. DM

Response: A decision was made at the executive level that this plan would focus on freshwater invasives issues.

106. **Comment:** There is no discussion regarding climate change and its impact on invasive species. DM

Response: The plan focuses on identifying specific actions to prevent, detect, and respond to invasions of AIS species. While climate change could alter the likelihood of AIS invasions, the actions, in terms of preventing, detecting, and responding, would largely be the same.

107. **Comment:** Need to discuss aquaculture (target or non-target organisms, pathogens, harmful algal bloom) as a vector. DM

Response: Aquaculture is certainly a possible vector for the movement of AIS species into and within New York. The plan did not attempt to list every possible vector, and, certainly, this is a vector that would be addressed by a specific risk assessment.

108. **Comment:** Not much in here to inform the reader of what species are so far the problem. DM

Response: Examples are provided in the draft plan to give general background on the AIS problem. The plan is not intended to provide general information to the public on AIS species and problems. Rather, it is intended to identify a direction and actions for the staff tasked with implementing the plan.

109. **Comment:** Staff have personally seen snakeheads at the tide gate to Flushing Meadow Creek. Not so sure how much salinity hinders their movement. DM

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

110. **Comment:** Chinese Mitten crabs are a threat to the Long Island Sound estuary. DM

Response: While the Hudson River is the primary focus of concern for Chinese mitten crabs, every water connected to an infested water must be considered to be threatened.

111. **Comment:** What about using the new NYSDEC Fish and Wildlife app? Little mention of new technologies or social media use to educate the public. DM

Response: This is a good idea, but the new app was just recently released, and the potential for using it as an AIS tool has not been explored.

112. **Comment:** Implementation Table – Is this the best format for tracking implementation? While the FTEs shown may be a realistic amount of time, it doesn't look promising the way it allocates "little bits of time" for each action. Also, might not be informative for the public. They want to know what you will accomplish in a certain time frame. DM

Response: The details and format of the Implementation Table are consistent with the guidelines of the federal ANS Task Force. This plan provides initial estimates of what actions can be accomplished. As with any plan, those initial estimates will certainly have to be re-evaluated once implementation of the plan begins.

113. **Comment:** Although alewives may be considered “invasive” in the Great Lakes, they were, in fact, considered for listing under the ESA a few years ago, and I think they are still a NOAA species of concern. So it all depends on where the species are located. DM

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

114. **Comment:** Boat washing should be mandatory in all endangered lakes. PERIOD. P

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

115. **Comment:** This is a much needed step forward. Thank you. Q

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

116. **Comment:** Condense the sections on AIS History and the Introduction. R

Response: Other commenters have suggested that the AIS History section be expanded. A brief description of AIS history is a component of the *AIS Management Plan* guidance provided by the federal ANS Task Force. The authors of the plan feel the sizes of the AIS History section and the Introduction are appropriate.

117. **Comment:** I totally agree with the importance of a well-educated public in preventing AIS. R

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

118. **Comment:** Focus on modern media. If I were “king of AIS,” I would not print one more AIS brochure. R

Response: The Department intends to develop outreach for specific audiences using the message and methods that are most efficient, cost effective, and effective for the particular audience.

119. **Comment:** AIS education should be included in elementary school curriculum. R

Response: This is a component of the new beginning fishing curriculum that the Bureau of Fisheries is creating.

120. **Comment:** Develop an educational game/app of AIS outreach. R

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

121. **Comment:** Collaboration is important and effective. R

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

122. **Comment:** The *AIS Management Plan* should call for stiff penalties. R

Response: Enforcement and allocation of penalties are outside the authority of the authors of the *AIS Management Plan*.

123. **Comment:** The public should be engaged for detection. R

Response: The public certainly can play an important role in detecting new AIS infestations. Many invasions have been detected by the public (e.g., zebra mussels in Lake Champlain) before being detected by resource agencies.

124. **Comment:** A "code red" system is needed to cut through red tape in emergencies. R

Response: What the commenter suggests is largely the intent of the Response Objective, Immediate Action, 3rd bullet under Regulatory and Legislative Strategy.

125. **Comment:** AIS drills/simulations a good idea. R

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

126. **Comment:** I understand the need to “first do no harm,” but given the potential train wreck posed by AIS, I think the novel use of bio-control is worth some risk. R

Response: Biocontrol methods are already being employed in New York; for example, milfoil weevils and moths, and grass carp, and research into a bio control for water chestnut is underway. There are no plans to categorically reject biocontrol.

127. **Comment:** Any AIS awareness campaign should include the children! Get them educated, and they’ll be very effective at educating the adults, and you’ll also have an upcoming “AIS-educated generation.” R

Response: The second Immediate Action under the Response Objective, Education and Outreach Strategy, is the development and implementation of communications plans. Plans to reach specific target audiences such as children will be developed as part of this action.

128. **Comment:** The commenter supports expansion of the boat steward program. S

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

129. **Comment:** The commenter hopes that a statewide program would not stomp out local programs. S

Response: Successful implementation of this plan relies heavily on PRISMs, volunteers, and local programs. The program will seek to encourage local programs.

130. **Comment:** Include a pilot program of more boat decontamination stations. S

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

131. **Comment:** The *AIS Management Plan* does not mention how it would be enforced. S

Response: Enforcement and allocation of penalties is outside the authority of the authors of the *AIS Management Plan*.

132. **Comment:** The commenter has issues with how hydrilla is mentioned in the recent AIS Problems Section and whether or not it forms a dense canopy. They suggest that the *AIS Management Plan* understates the problem. T

Response: The text of the plan has been changed. An additional sentence was added, stating that monoecious hydrilla grows laterally along the bottom of the waterbody and then expends upward, creating thick stands within the waterbody. Both biotypes can result in significant ecological and economic impacts.

133. **Comment:** Impact to property value for lakefront owners not mentioned. T

Response: The text under header “Adverse Economic Effects…” (p.13) will be changed to read: “Many plant AIS are aesthetically undesirable, interfere with aquatic recreational activities such as swimming, boating and fishing, and can significantly reduce property values.”

134. **Comment:** Why focus on developing educational modules for summer campers rather than other audiences? T

Response: Educational modules for summer campers is only one of many components of an outreach campaign and were mentioned as one of several examples in the second Immediate Action bullet under the Education and Outreach Strategy for the Prevention Objective.

135. **Comment:** The commenter states that training to hand harvest may backfire as people feel it's always a good plan. T

Response: Training is necessary to inform volunteers when and for what species hand harvesting can be a successful strategy.

136. **Comment:** The plan is missing assessment as a component of the procedures in "Response Objectives." Assessment should be part of Detection and Response. T

Response: Assessment is a major factor for a successful response. The response framework will integrate invasion assessment with appropriate responses. All three components/objectives of the plan (prevent, detect, respond) work together to achieve the common goal.

137. **Comment:** Monitoring must follow every AIS control effort. T

Response: The commenter is correct. All response actions must be monitored to determine effectiveness. This is briefly noted in the last sentence on page 25.

138. **Comment:** Weed/AIS disposal stations should be linked to the expanding boat launch steward program. T

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

139. **Comment:** Plan focuses on collaboration with government and should focus on collaboration with communities. U

Response: New York's eight landscape-level Partnerships for Regional Invasive Species Management (PRISM) are the most effective and appropriate entities for collaborations with local government and communities. This was among the intended outcomes when the Department established PRISMs and funded their administration and coordination. PRISMs encourage participation of local government and communities. The Department's Invasive Species Coordination Unit maintains close communication and cooperation with every PRISM.

140. **Comment:** Appendix B is missing. V

Response: Appendix B was deleted. A reference to Appendix B was inadvertently left in the document, and that has now been deleted as well.

141. **Comment:** An annual AIS conference is a good idea. W

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

142. **Comment:** I encourage vigorous implementation of this plan with legislation and budget money. X

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

143. **Comment:** The commenter wondered about liability in volunteer situations. X

Response: The comment raises a detail that, while a legitimate concern, is beyond the scope of the plan. NYSDEC has specific policies in place regarding the protection of volunteers.

144. **Comment:** The commenter wonders about cost of hiring staff versus contractors. X

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

145. **Comment:** What is the suggested wording for a general permit for invasive species control with the goal to streamline statewide regulatory processes for management in state-regulated wetlands and streams? (page 28) X

Response: Such a general permit is currently in process. Internal review is underway, and it is expected one will be available within a few months.

146. **Comment:** Monitoring restored as a requirement of grant funding. X

Response: If grant programs are implemented, monitoring should be a requirement.

147. **Comment:** Is there a plan for long-term funding? X

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

148. **Comment:** Public awareness is key and should be rapid. X

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

149. **Comment:** Is there legislation and budget to accomplish plan? X

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

150. **Comment:** How can we ensure that the projected number of personnel are funded? X

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

151. **Comment:** Punitive measures are not appropriate. Education is a better option. Y

Response: Education and outreach and individuals voluntarily taking appropriate and effective actions to prevent the spread of AIS are preferred. However, having enforcement authority to encourage those who refuse to take reasonable precautions to prevent the spread of AIS is an important tool in preventing the spread of AIS.

152. **Comment:** How can this be accomplished when NYSDEC is already spread thin? Y

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

153. **Comment:** Protecting uninfested lakes should be a NYSDEC priority. Z

Response: The Department's goal for the plan is to prevent the spread of AIS into and within New York's waterbodies. Protecting waters that are not known to be inhabited by AIS is a priority, and often protecting such waters may be best accomplished by taking specific actions at strategic locations in the vicinity of waters known to be inhabited by AIS.

154. **Comment:** The Lake George program is good, but it has redirected boat traffic to other waters. Z

Response: The Lake George program is a two-year pilot program. Information gained over the course of the program, along with other spread-prevention efforts both in and out of New York State will be used to guide decisions on appropriate AIS spread-prevention tactics.

155. **Comment:** NYSDEC must take complete responsibility for launches as they are “flashpoints.” Z

Response: AIS management is a shared responsibility. NYSDEC provides opportunities for public access and recreation, but the public must participate in protecting the resource.

156. **Comment:** Penalties should be in the multi-thousand-dollar range. Z

Response: Enforcement and allocation of penalties are outside the authority of the authors of the *AIS Management Plan*.

157. **Comment:** The lack of funding is disconcerting. AA

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

158. **Comment:** Lake associations, as first responders, need help fighting AIS. AA

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

159. **Comment:** The financial investment needs to be made by the state in addressing this issue. We cannot continue to rely on local municipalities and lake associations to provide the funding required for AIS treatment programs. New dedicated sources of funding need to be identified. AA

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

160. **Comment:** A successful AIS program requires strong partnerships, a collective and collaborative effort by many. Developing regional strategies, such as the strategic placement of boat inspection centers throughout the park would offer one significant way in addressing the introduction of new invasives into our waters. AA

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

161. **Comment:** NYSDEC needs to be a strong voice and advocate for significant increases in AIS funding. AA

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

162. **Comment:** Regarding 2014 AIS laws and regulations, can the bill/regulations numbers be added to the document so readers can easily search/reference them? BB

Response: Bill numbers and legislative and regulatory citations have been added.

163. **Comment:** Recreational boats (i.e., powered boats) are mentioned as a major pathway for AIS spread. It should also be noted that AIS could be spread via non-powered boats as well (such as canoes, kayaks, sailboats, and related equipment). BB

Response: To address this concern, the text of the plan has been revised to say “recreational watercraft” rather than boats, wherever appropriate.

164. **Comment:** Page 9: Interconnected Waterways. Should also note interconnectivity of Finger Lakes and Erie Canal system. BB

Response: Text has been added as suggested.

165. **Comment:** Although not confirmed, it appears that a number of introductions of hydrilla (*Hydrilla verticillata*) in private ponds in Broome Co. (NY) may have occurred through aquaria trade/releases as well. Hydrilla is often misidentified as elodea. BB

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

166. **Comment:** On page 13, the document states "approximately 25 mile east of the original site (Levri, et al. 2012)." It should be "25 miles." BB

Response: The typographical error was corrected.

167. **Comment:** Based upon observed growth in the Cayuga Inlet, and discussions with Mike Netherland (USACE), monoecious Hydrilla appears to grow horizontally (runners) during the beginning/middle of the growing season, then vertically towards the surface. Thick vegetative growth (mats) were observed in areas of Cayuga Inlet 1-2 years after initial infestation. The last line of the paragraph states "*but the plant may still become problematic.*" This sentence fails to illustrate the serious environmental and economic impacts that hydrilla will certainly have on NY's waters if allowed to spread unchecked. Perhaps consider revising to deliver a stronger message. BB

Response: The text of the plan has been changed. The referenced sentence ends after..."Southern US." An additional sentence was added that states: "However, monoecious hydrilla grows laterally along the bottom of the waterbody, and then expends upward, creating thick stands within the waterbody. Both biotypes can result in significant ecological and economic impacts."

168. **Comment:** On page 16, the last full sentence before the page break has a double period. BB

Response: The typographical error was corrected.

169. **Comment:** Regulatory and Legislative Strategy (Page 20): This is an incredibly important aspect of AIS introduction/spread prevention. Great strides have been made, especially in 2014. These components (along with enforcement) will be vital moving forward. An excellent section of the *AIS Management Plan*. BB

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

170. **Comment:** Leadership and coordination strategy (page 23): "*Encourage PRISMS to host AIS training workshops.*" An excellent initiative with needed expansion. BB

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

171. **Comment:** Regulatory and Legislative Strategy (page 24): "Additional Actions." Requiring monitoring as part of NYS AIS grants and permits will further help to ensure efficacy of management/response efforts. As monitoring/sampling activities can be intensive and demanding (resources, funding, etc.), grant funding should also be allocated for such monitoring activities. BB

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

172. **Comment:** Regulatory and Legislative Strategy (page 28): "*Develop specific regulations to enable rapid response actions (declaration of AIS emergency) to new introductions of specific AIS into either New York State or to uninfested water bodies.*" This is a very important component of the *AIS Management Plan* for NYS. Regulations that allow for rapid and aggressive AIS response (similar to the state of California) will be critically important in addressing new infestations while the best opportunities exist. BB

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

173. **Comment:** Capacity Objective (page 29): "*Secure adequate long-term funding for AIS programs in New York State.*" An excellent and much needed component of statewide AIS management. BB

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

174. **Comment:** Implementation Table **(**page 32): "*Expand boat launch steward programs for public and private boat access sites, and ensure consistency of boat launch steward programs.*" For participants, could the NYS PRIMs be included? BB

Response: Although such programs are not typically administered under PRISMs, a PRISM may choose to develop and administer a boat steward program under state funding when such programs are consistent with their contractual responsibilities and that PRISM's strategic plan.

175. **Comment**: Implementation Table (page 35): "*Promulgate state regulations at state launch sites (NYSDEC and OPRHP) aimed at AIS prevention.*" Participants currently include NYSDEC. Should the OPRHP also be included as a participant? BB

Response: OPRHP was added to the participants.

176. **Comment:** Implementation Table (page 39): "*Assemble a catalog of ongoing research pertaining to AIS being conducted in New York State (and elsewhere), including points of contact.*" Participants currently include ISC and NYSDEC. Should the NYISRI also be included as a participant? BB

Response: NYISRI was added to the participants.

177. **Comment:** The plan states that "New York State gained the express authority needed to prevent the spread of AIS in September 2014; however, this law sunsets in 2019."(p.18). Obviously, this law needs to be extended, but neither the specific law nor the actions required and the responsible parties to extend the law are identified. This action with supporting details must be added to the plan. CC

Response: The authors of the *AIS Management Plan* agree that it would be desirable if the legislation was extended.

178. **Comment:** Must have additional outreach capacity beyond PRISMs. CC

Response: The plan includes an immediate action of developing communications plans. This action calls for involving appropriate programs with the expertise for crafting measures for reaching all audiences, including those out of state. Education and outreach needs have been assessed, and outreach has been developed and delivered under partnerships with non-governmental entities in addition to those with PRISM administrators.

179. **Comment:** NY should either produce guides or suggest some. CC

Response: While the plan does not explicitly call for invasive species guides, the plan includes an immediate action of developing communication plans. Other AIS programs, PRISMs and other partners have developed guides based on particular needs and audiences.

180. **Comment:** Should include communications to lake associations. CC

Response: Channels of communication already exist. For example, PRISMs provide an effective link between the Department and lake associations.

181. **Comment:** Approach boat (and recreational equipment) vendors and manufacturers to disseminate information. CC

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

182. **Comment:** The volunteer program requires infrastructure. CC

Response: The Department recognizes that effective design and coordination is necessary for successful volunteer programs.

183. **Comment:** Apps exist and should be publicized. CC

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan. The best available technology should be employed for AIS programs.

184. **Comment:** An authority should be available to answer questions submitted via app. CC

Response: NY State Invasive Species Database, also known as iMapInvasives, does provide such expertise.

185. **Comment:** A procedure should be in place to communicate new findings of invasives to neighboring communities so that they can increase local monitoring CC

Response: The plan authors agree with the comment. This suggestion is already being implemented through a partnership between iMap and NYSFOLA. NYSDEC lake reporting will include tables showing AIS distribution within the county of the waterbody.

186. **Comment:** The plan indicates that the APIPP model should be followed, but it does not describe the APIPP model, and so this model must be explicitly described. CC

Response: A detailed description of the APIPP in not within the scope of this plan. The PRISM network currently meets and shares examples of model programs run within each PRISM. This is the appropriate framework for sharing these model programs.

187. **Comment:** We support the requirement of monitoring as part of AIS grants and permits. Also, every time monitoring takes place, the preparation and submission of herbarium specimens should be encouraged to support current documentation and future research. CC

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

188. **Comment:** Response is highly dependent upon an entity or individual who will take action, especially when an infestation expands over several properties, communities, or waterbodies.
CC

Response: This is addressed in the immediate action of developing/adopting a response framework that will assure consistent response actions. Each response is highly dependent upon lead agency, timing, scope, commitment, etc.

189. **Comment:** The plan should address what to do if no local organization exists with the capacity to respond to the AIS. CC

Response: Regional response teams will work with PRISMs and Agency headquarters to identify participants for response actions. Each response is highly dependent upon lead agency, timing, scope, commitment, etc.

190. **Comment:** While regional AIS response teams would be beneficial, the roles of PRISMs and regional NYSDEC teams must be clear to prevent overlaps or gaps in responses. CC

Response: Regional response teams and PRISMs must work together. Training exercises will be conducted to develop efficient cooperation. NY's draft rapid response framework provides guidance on roles and responsibilities.

191. **Comment:** The capacity element is a critical portion of this plan for without funding and leadership, this plan cannot be implemented. CC

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

192. **Comment:** The plan must have a leader and lines of responsibility for the details behind it, and then for the overall responsibility for implementation and coordination. CC

Response: The *AIS Management Plan* includes an immediate action of establishing an AIS manager charged with overseeing the implementation of the plan.

193. **Comment:** The plan should address whether some funding should be allocated from some existing source such as fishing licenses and boating registrations, or whether it must be allocated from the general fund. CC

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

194. **Comment:** A coordinated effort between organizations would be needed for an effective program. DD

Response: The *AIS Management Plan* calls for extensive coordination and cooperation.

195. **Comment:** The strategic plan is a praiseworthy document, but without the monetary support to implement such actions, it is ineffective. DD

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

196. **Comment:** The commenter believes that the State of NY needs to more fully address the spread of AIS by providing a better regulatory framework and increased staffing and financial resources. EE

Response: The purpose of the plan is to identify goals, objectives, and actions that need to be accomplished so the state can determine staffing needs and allocate resources.

197. **Comment:** Will the stewardship program be adequately funded? Will it fall to Lake Associations? How inclusive? EE

Response: Specific details of the boat steward program are beyond the scope of this plan.

198. **Comment:** A framework needs to be in place that covers waterbodies without lake associations or that are otherwise “low profile.” EE

Response: The plan is not limited to waterbodies with associations.

199. **Comment:** NYSDEC will provide the resources necessary to implement and maintain a viable management program. This is a highly laudable goal but very vague. Both “resources” and “viable” need to be defined. EE

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

200. **Comment:** Need to make sure outreach is not “preaching to the choir.” EE

Response: Results and recommendations of a statewide survey of invasive species awareness, and identification of specific user groups will be critical to developing appropriate messages for the public and those user groups.

201. **Comment:** Coordinating actions is laudable since there is a lot of “reinventing the wheel” when it comes to AIS outreach. EE

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

202. **Comment:** Identify legal, regulatory and institutional barriers that could impede a rapid response to an AIS introduction. We fully concur with this priority. In particular, there needs to be a mechanism for rapid review of aquatic pesticide permits in certain instances. However, we would also add “financial” as one of the barriers that prevent a rapid response. EE

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

203. **Comment:** Expand the use of AIS disposal stations at waterway access sites. The message from most of our lake associations is that disposal stations rapidly fill up with more trash than invasive species, and NYSDEC is not very good at collecting the garbage. This becomes yet another role for lake associations, and it’s not one they particularly enjoy. EE

Response: The Department is aware of the need for maintenance of the disposal stations that it provides.

204. **Comment:** Create regional “first responder” AIS teams to incorporate local expertise in planning and implementing appropriate responses to AIS. Again, our concern here is that this priority is very much slanted towards the larger, high-profile locations. There needs to be more consideration with regard to smaller waterbodies. EE

Response: The plan is aimed at protecting *all* waters that could be infested with invasive species. High-profile waters are waters with high levels of public activity, thus there is a greater likelihood of receiving an invader and greater impacts to the public that use the water body. The Adirondack Park Invasive Plant Program (APIPP) piloted a successful PRISM-based AIS response team and will continue the team under a partnership with NYSDEC. The waters addressed are typically not necessarily large, high-profile waters.

205. **Comment:** Continue to coordinate NYSDEC activities within the New York Invasive Species Council. We concur since many of the activities need to include agencies and partners other than NYSDEC. Continued engagement with other members of the council is important. EE

Response: The *AIS Management Plan* calls for continued coordination and cooperation with the Invasive Species Council.

206. **Comment:** NYSFOLA fully supports the research goals stated on pages 17 and 19. We are highly concerned that retirements have devastated the limnology staff within the Division of Water. The hiring of at least one research scientist should be a top priority for the Department. EE

Response: Commenter identifies an important issue for the Agency, but this is not within scope of the plan.

207. **Comment:** We concur that the regulatory framework to address AIS is “patchy” but support local regulation in the absence of statewide regulation. We disagree that the effectiveness of local laws is reduced simply because regulations are not identical in all locations. We support the actions stated on page 20 but do not want to see state law that is less stringent than local laws already in place. EE

Response: Statewide AIS spread-prevention laws do not preempt local laws.

208. **Comment:** Outreach goals and audience need to be better defined. EE

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

209. **Comment:** As the state improves access to waterbodies with new boat launches, it should also bear the responsibility of making sure these waterbodies are not infested as a result. This should include all launches, not just those for motorized watercraft. EE

Response: Protecting waters from AIS is a shared responsibility. Individual boaters that make use of launch facilities share an equal burden in protecting the resource from adverse impacts such as pollution and AIS.

210. **Comment:** We also encourage the continued use of iMap but hope that it can be fully updated to realistically reflect the invasive species that exist in the state's waterbodies. EE

Response: Should monitoring and surveillance programs be implemented, the resulting data would be entered into iMapInvasives. There is currently no statewide, standardized AIS data collection effort. Therefore, data entered are the result of the efforts of individuals, stakeholders, and PRISMs gathering and reporting their data as well as the aggregation of other AIS datasets, including the Citizen's Statewide Lake Assessment Program (CSLAP).

211. **Comment:** Volunteers at lake associations are getting "burned out" in many instances. It is also an increasingly older volunteer pool. EE

Response: Any successful program aimed at preventing the spread of AIS will require full engagement of agency staff and non-governmental organizations, as well as trained volunteers. This is recognized by the Department in that PRISM contractual scopes of work require both paid full-time coordinators for each PRISM, as well as volunteer recruitment and training.

212. **Comment:** All watercraft and accompanying equipment must comply with a mandatory inspection program. FF

Response: Inspection programs will be considered as part of a comprehensive effort to prevent the spread of AIS in New York waters.

213. **Comment:** In addition to the external parts that might harbor contaminants, all watercraft must be drained of bilge water, and all live bait wells must be clean and dry. All fishing rods and fishing equipment must be dipped in a bleach solution or otherwise disinfected to eradicate all invasives prior to use in a different water body. FF

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan. Furthermore, the use of some disinfectants in such a manner *may* violate pesticide label requirements.

214. **Comment:** Inspections in the Adirondack Park could occur either at entry points to the park or at various, high-visibility locations throughout the park, and/or at all launch points. FF

Response: Department agrees that any inspection program in the state should be strategically placed for maximum effectiveness and minimal disruption to recreational activities.

215. **Comment:** Wash stations could be fewer and farther between, perhaps at NYSDEC maintenance facilities. In other words, since these stations are expensive, extra expense need not be incurred to provide convenience to contaminated boaters. FF

Response: Wash stations should be strategically placed for maximum effectiveness and minimal disruption to recreational activities.

216. **Comment:** Funding for this program can be offset by fees charged to boaters for their inspections and by even larger fees charged for decontamination. FF

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

217. **Comment:** This is of statewide concern and should be dealt with on a statewide basis, including the out-of-state visitors who use our waters. As much of the cost as possible should be borne by the parties who are transferring the aquatic invasive species with the use of their watercraft. FF

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

218. **Comment:** NYSDEC must take sole and full responsibility for all inspection and cleaning at their launch points. FF

Response: Protecting waters from AIS is a shared responsibility. Individual boaters that make use of launch facilities share an equal burden in protecting the resource from adverse impacts such as pollution and AIS. The number of boaters far outnumbers the number of available staff to conduct inspections and cleaning activities. Boaters must take personal responsibility for conducting their own reasonable precautions to prevent the spread of AIS.

219. **Comment:** Operators of private launch sites (such as marinas) should be compensated for the cost of the inspections that they conduct. FF

Response: This recommendation is beyond NYSDEC's statutory authority.

220. **Comment:** Local concerns about compliance with this program can be satisfied by measures similar to those instituted by Lake George—where boats taken out of Lake George are banded to their trailers and can be re-launched there without inspection if the seal is unbroken. A similar measure could be applied to any well-trafficked body of water with a regulated launch site—thereby removing the nuisance factor for local boaters, but preserving the integrity of the system while streamlining the inspection process. FF

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

221. **Comment:** There should be serious penalties for failure to comply with these new regulations (up to and including multi-thousand-dollar fines and/or impoundment of boats) if boaters or launch operators are found guilty of causing the spread of invasive species. FF

Response: Enforcement and allocation of penalties is outside the authority of the authors of the *AIS Management Plan*.

222. **Comment:** Funding and staffing are a primary concern. GG

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

223. **Comment:** AISMP capacity needs to be expanded for plan to work. GG

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

224. **Comment:** Funding for local authorities needs to be secured. GG

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

225. **Comment:** Waterfowl hunters, wading anglers and trappers need to be addressed as vectors in the plan. GG

Response: It is understood that boaters are not the sole vector for the transport of AIS. All known pathways should be evaluated.

226. **Comment:** Clearer deliverables need to be established so the program can be evaluated. GG

Response: The plan calls for evaluation. The implementation table describes actions that include deliverables.

227. **Comment:** Boat wash stations need to be noted more prominently as response tools. GG

Response: Boat wash stations will be considered as part of a comprehensive effort to prevent the spread of AIS in New York waters.

228. **Comment:** The invasive species eradication grant/cost-sharing program should be re-implemented and raised in priority from "additional actions" to "immediate. GG

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

229. **Comment:** The *AIS Management Plan* does not describe any actions regarding canals. GG

Response: NYSDEC, as co-chair of New York's Invasive Species Council, will continue to encourage and support the Canal Corporation (also a member of the NY Invasive Species Council) in its efforts to enter an agreement with the Army Corps of Engineers to conduct a technical study of the feasibility of installing a barrier between the Champlain Canal and Lake Champlain. Such a study could inform other similar efforts in New York, such as at the Erie Canal. Other actions can include supporting expansion of the Canal Corporation's boat steward program, which started in 2014.

230. **Comment:** The 10 priorities should be listed in order. GG

Response: Authors agreed that there was no particular priority order except we have consensus that the boat steward program would be #1. Implementation of priorities may be based on what resources become available.

231. **Comment:** The effectiveness of disposal stations should be evaluated. GG

Response: Nuisance Invasive Species Disposal Stations are designed to provide a dedicated location for boaters to dispose of AIS removed from their boats. They serve the same function as a trash can does for trash and provide the added benefit of promoting AIS spread prevention. Recent visits to NYSDEC boat launches have noted that if positioned at the proper location near the ramp, the stations are seeing frequent use and are welcomed by the boat launch stewards.

232. **Comment:** Non-motorized craft need consideration too. GG

Response: To address this concern, the text of the plan has been revised to say “recreational watercraft” rather than boats, wherever appropriate.

233. **Comment:** Fish should be noted as vectors. GG

Response: The plan has been modified to include consideration of fish as vectors.

234. **Comment:** Hydrilla poses a far more extensive problem and is of greater concern than is depicted. Further explanation of the potential severe negative impacts and implications of a hydrilla infestation should be addressed in the plan. GG

Response: The plan does not go into detail on any one AIS species. The data presented on hydrilla is only used as an example/illustration. The whole purpose of the plan is to outline a program for addressing such species.

235. **Comment:** NYS AIS Awareness Week should be included in the plan. GG

Response: New York’s Invasive Species Awareness Week (NYISAW) was held July 6-12, 2014 and is an example of a brief education and outreach campaign. The Department anticipates that this will become an annual occurrence; however, implementation will depend upon strong participation of Partnerships for Regional Invasive Species Management (PRISM). While the Governor proclaimed ISAW, PRISM planned and conducted virtually all of the 100+ events held during the week.

236. **Comment:** Volunteers need to be trained in hand harvesting and proper documentation of control efforts. GG

Response: Training is a necessary component of any successful volunteer program.

237. **Comment:** Education material such as identification keys, tip sheets, signs, and web content should be made readily available to public outreach and boat steward programs. This will make it easier to start new boat steward programs, avoid wasteful duplication of effort, and ensure consistency of the message. HH

Response: The *AIS Management Plan* calls for the use of an extensive suite of communications tools.

238. **Comment:** An education outreach to tournament fishermen should be a top priority. HH

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

239. **Comment:** The New York State Office of Parks, Recreation & Historic Preservation (OPRHP) operates the only public, trailer-capable boat launch on Conesus Lake. Before OPRHP issues a fishing tournament permit, the sponsoring group should be required to demonstrate a plan for self-certifying that boats, trailers, and fishing gear have been properly decontaminated. HH

Response: OPRHP is a partner in AIS management.

240. **Comment:** Some fishermen believe that hydrilla provides good “cover” and would improve fishing. A fact sheet targeted to fishermen should be developed to explain the rationale why hydrilla is actually a threat to fishing. HH

Response: The plan includes an immediate action of developing communication plans. These plans will be crafted for reaching specific audiences.

241. **Comment:** The new legislation that will require visible plant and animal material to be removed before launching represents a major change for boaters. Is there a plan to install appropriate signage at all NYSDEC and OPRHP launch sites at the time the law takes effect? HH

Response: The plan calls for appropriate signage and kiosks as part of the AIS Public Awareness Campaign. The new statute passed in 2014 requires ALL public boat access sites have standard signs—even those not owned and operated by state agencies. Statute requires such signs to be installed by 9/23/15. Signage concerning the new regulations in effect at NYSDEC boat launches have been developed and either have been or will be posted at all NYSDEC boat launches prior to the 2015 boating season. Similar signage will be created for the AIS law.

242. **Comment:** OPRHP personnel that operate boat launches should be provided with basic training about the AIS threat. The training could be as simple as required reading during idle times on the job. At the minimum, they should be expected to inform, after the legislation becomes effective, that it is a violation of NYS law to launch a trailered watercraft without first removing visible plant and animal material. HH

Response: This suggestion has been conveyed to OPRHP and that agency has such regulations in place.

243. **Comment:** When no OPRHP staff is present at a boat launch, boaters approach the boat stewards asking for help. Since the stewards in reality become acting boat launch staff, is there a way OPRHP and NYSDEC can work together to combine the boat steward and launch staff function to reduce costs? This would seem to be practical at times when boat traffic is low. HH

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

244. **Comment:** If herbicides or pesticides are determined to be the only alternative for eradicating a newly detected AIS infestation, an off-the-shelf education package will be an important tool for getting out in front of the issue before opposition momentum builds based on incomplete or erroneous information. HH

Response: That is one of the functions of the communications plan and response fact sheets.

245. **Comment:** Individuals launching boats should be required to pay a small fee to provide financial support for the boat steward program. A couple of dollars added to the existing OPRHP launch fee would be a modest additional cost when compared to all the costs involved in owning a boat. Traveling boaters have a responsibility to do their part to protect the lake from the AIS threat. Currently, the majority of the Conesus Lake Boat Steward Program cost is funded by lake residents. HH

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

246. **Comment:** An up-to-date online database of water bodies with known AIS should be available real time to boat stewards. This knowledge will alert boat stewards prior to a high-risk launch. HH

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan. iMapInvasives may provide this capability.

247. **Comment:** Is there an existing best practice for ensuring that live fish transport tankers, commonly used by state and private hatcheries for stocking fish, are not transporting an AIS? HH

Response: NY State hatcheries use well water for transporting fish for stocking.

248. **Comment:** Do NYSDEC and other NYS agencies have sufficient subject matter professionals to successfully implement and manage the priority actions and the entire AISMP over the long term? HH

Response: NYSDEC staff are trained fish and wildlife professionals. Several staff members have considerable experience in AIS-specific issues.

249. **Comment:** The NYSDEC-style AIS disposal stations have been installed at all NYSDEC fishing access sites and the OPRHP boat launch on Conesus Lake. The boat stewards found that the stations were valuable in providing a focal point while educating boaters about the AIS threat. HH

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

250. **Comment:** Education and Outreach Strategy, Immediate Action: Develop an AIS survey planning guideline that identifies steps to enhance AIS survey activities. Typically, the volunteers' survey pool contains a limited number of individuals, especially individuals trained in the identification of AIS. An AIS planning guideline document can direct volunteers to survey those water locations/habitats that have a probability of containing AIS. For example, this would consist of locations around public boat launches, inlet streams from adjacent bodies of water, shoreline areas that are downwind from prevailing winds, and shoreline areas that contain extensive emergent plant growth. II

Response: This is a reasonable suggestion, but it is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

251. **Comment:** Request that the plan authors develop and include a fifth plan objective—ENFORCEMENT—and include its implementation in the Implementation Table. JJ

Response: Enforcement and allocation of penalties is outside the authority of the authors of the *AIS Management Plan*.

252. **Comment:** Request publication of a guide to aquatic invasive species similar to the one done by the State of New Hampshire – photos, descriptions, comparison with similar looking plants, how to identify, how to eradicate, etc. JJ

Response: The plan does not explicitly call for new invasive species guides. A number of excellent invasive species guides are already available that would be applicable to New York. The need for additional AIS guides will be evaluated.

253. **Comment:** Last paragraph of Executive Summary – I think it more productive if the annual evaluation and monitoring of the plan be done by an independent team, rather than the *AIS Plan* team. JJ

Response: The Department is responsible for monitoring and evaluating the effectiveness of its programs. Input from stakeholders will be sought as well.

254. **Comment:** P. 9, Para. Recreational Boats, sentence 3 – "Boats can move…" add after "hulls" and before "fishing": "sailboat keels, centerboard and dagger-board trunks, and rudders." JJ

Response: Text was added as suggested.

255. **Comment:** P. 18, Para. "Education and Outreach Strategy," "Immediate Actions" add after "Expand the use…" "including the construction of a minimum of one boat/trailer washing station on each lake on where public access points are supervised by the NYSDEC." JJ

Response: Boat wash stations will be considered as part of a comprehensive effort to prevent the spread of AIS in New York waters.

256. **Comment:** P. 19, Para. "Additional Actions," bullet two: delete "As appropriate technologies are developed," and move the remaining sentence to Para. "Immediate Actions." JJ

Response: Currently, NYSDEC lacks the expertise to implement this action in the manner the commenter suggests.

257. **Comment:** P. 20, Para. "Immediate Actions," add in bullet two after "regulations": "including required inspection of boats and trailers by state personnel at point of entry into the facility." JJ

Response: Regulations have been promulgated that require watercraft operators using NYSDEC and OPRHP boat launches to inspect and remove visible plant and animal material before launching and before departing. This is a personal responsibility of the watercraft operator.

258. **Comment:** P. 23, Para. “Immediate actions,” add in bullet six after “information”: “including a manual containing photographs, diagrams, and descriptions of AIS with comparisons of similar-looking species.” JJ

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

259. **Comment:** P. 30, No. 1. “Expand…” add in bold print following “programs”: “Train personnel at boat launching sites to inspect boats and trailers, and require them to perform such inspections at the point of entry into the facility.” JJ

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

260. **Comment:** P. 32, Implementation Table, cell in row 2, column 3, add: “Train personnel at boat launching sites to inspect boats and trailers, and require them to perform such inspections at the point of entry into the facility.” JJ

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

261. **Comment:** P. 32, Implementation Table, cell in row 4, column 3, add: “including required inspection of boats and trailers by state personnel at point of entry into the facility.” JJ

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

262. **Comment:** P. 34, Implementation Table, cell in row 2, column 3 (counting only on page 34): Require the construction of a minimum of one boat/trailer washing station on each lake on where public access points are supervised by the NYSDEC.” JJ

Response: Wash stations should be strategically placed for maximum effectiveness and minimal disruption to recreational activities.

263. **Comment:** Commenter offers to partner and teach eDNA sample collection to volunteer groups. Samples would of course be processed through CAAHP. KK

Response: Decisions about how to proceed in this direction have not yet been made.

264. **Comment:** I think that consideration of that would change the plan format to relate to the three remaining objectives as what you are trying to accomplish and then treating Capacity as the means (strategy) of accomplishing those objectives. LL

Response: The commenter is correct regarding actions related to Capacity. They are grouped together as an objective both to raise their visibility and as a means to track progress.

265. **Comment:** I would prioritize the 10 high-priority actions that you identify and list them in descending order of importance. LL

Response: Highest priorities do not have to be accomplished sequentially, so prioritization is not necessary.

266. **Comment:** Whatever order shakes out, it should form the basis of a timeline and should clearly reflect the most essential items of the plan. LL

Response: A timeline is a good idea, but it is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

267. **Comment:** Consider describing those modes of entry and perhaps again prioritizing their order in the plan based on amount of water impacted or potentially impacted or numbers of different organisms introduced by the respective vectors. LL

Response: This is more of an operational proposal that can be integrated into the strategic actions already described in this plan.

268. **Comment:** I think that it is necessary to treat separately outside invasives and invasive New York native critters in non-native waters in New York, legal stocking and citizen stocking. LL

Response: New York State's legal definition of an invasive species relates to the ecosystem and not to a political boundary, and all are addressed in a similar manner.

269. **Comment:** Climate change needs consideration. LL

Response: The plan focuses on identifying specific actions to prevent, detect, and respond to invasions of AIS species. While climate change could alter the likelihood of AIS invasions, the actions, in terms of preventing, detecting, and responding, would largely be the same.

270. **Comment:** Disaster response must be considered also re: invasives. LL

Response: To the extent practicable, disaster response efforts should integrate measures to prevent movement of AIS.

271. **Comment:** The bottom line for an effective response to this problem is effective legislation, money and smarts. LL

Response: The draft plan notes the need to review current regulations and legislation, and recognizes adequate resources are required to fully implement it.

272. **Comment:** The proliferation of Rudd in New York, now all over the state but before, just in Roe Jan system, is something that shouldn't have happened if the bait business had been regulated. LL

Response: Point taken. The live fish bait business is now regulated in terms of allowable species ("green list") and requires fish health inspections.

273. **Comment:** Part of the legislation should be fines fitting the crime. LL

Response: Enforcement and allocation of penalties are outside the authority of the authors of the *AIS Management Plan*.

274. **Comment:** So, first order of business should be to pursue the ability to obtain essential legislation, I mean law with teeth and not regulations, at both the state and federal levels, and also international when necessary. LL

Response: The authors of the plan agree that appropriate legislation is an essential tool for effective AIS management, and legislation is identified several times as a priority. However, Department staff have limited capability to recommend legislative proposals.

275. **Comment:** All common fish names by order of AFS new checklist of fishes, begin with a large case letter. LL

Response: The plan team is comfortable with the current approach used.

276. **Comment:** Compile a listing that notes the critters that are known to be invasive. Assemble an annotated catalog in which the writer can include anything and everything known about the critter or where such info can be found. LL

Response: NYSDEC regulations identify prohibited and regulated invasive species. It is beyond the scope of this plan to prepare an annotated catalog of AIS.

277. **Comment:** Has this draft plan been shared with representatives of the partnerships for Regional Invasive Species Management (PRISM) boundaries or were they consulted during the planning? LL

Response: The PRISMs were not specifically consulted but were able to provide input through public comment.

278. **Comment:** The emphasis must now be on what laws are present, enforcing them and getting legislation to do what is now not being done or which still remains legal to do. LL

Response: Enforcement and allocation of penalties is outside the authority of the authors of the *AIS Management Plan*, and Department staff have a very limited capability to recommend or propose legislation.

279. **Comment:** Re: program monitoring and evaluation. What are the metrics by which progress is shown? LL

Response: Metrics for program evaluation have not been determined yet. Such metrics are more of an operational detail that can be integrated into the strategic actions already described in this plan.

280. **Comment:** Definition for AISMP is missing the word invasive following Aquatic in the first line. LL

Response: The typographical error was corrected.

281. **Comment:** Why is Dreissenid listed in definitions and no other invasive included? LL

Response: The definition is provided only to explain that the term refers to the combined grouping of zebra mussels and quagga mussels.

282. **Comment:** Rapid response notes eradiation when it should list eradication. LL

Response: The typographical error was corrected.

283. **Comment:** Does the plan consider pairing decontamination with boat steward inspections? MM

Response: Boat steward and concomitant decontamination programs should be established when and where deemed appropriate, within a set of accepted principles, designed based upon local conditions such as travel corridors, use patterns, public access, launch type, staff safety, known AIS-inhabited waters, and effective AIS removal methods.

284. **Comment:** The section on recent AIS problems focuses mainly on animals, with only one plant, *hydrilla*. You could also have used floating water primrose, or starry stonewort. NN

Response: These plants are certainly AIS of concern, but the section on recent AIS issues pertinent to New York State is not intended to provide a complete nor real-time representation of our most-recent invasions.

285. **Comment:** The list of response objectives should also include exclusion and suppression. NN

Response: Exclusion (actions to prevent an AIS from entering a waterbody) and suppression (actions to keep the AIS at low levels in a waterbody) are legitimate responses, but the list provided was only intended to illustrate the range of various responses available without trying to identify every possible response.

286. **Comment:** I think you are leaving out the assessment part of the procedure between Detection and Response. NN

Response: Assessment is a crucial step for selecting an appropriate response once an AIS infestation is detected. This is discussed on page 31 of the plan. While not explicitly stated, assessment is a key component of the response framework identified in immediate action 3B1.

287. **Comment:** The plan does not talk about field assessment first. It may be that a response is not needed at all. NN

Response: The plan does not explicitly discuss field assessment, but the commenter is correct in that a good field assessment will be instrumental in determining if and what responses are appropriate.

288. **Comment:** The plan does not appear to discuss setting up a monitoring program after control to see if the action worked or not. NN

Response: On page 27, the *AIS Plan* states that monitoring is also critical for documenting the success of AIS response efforts and to refine site-specific response plans.

289. **Comment:** Leave out Brooklyn Botanical from the Implementation Table. The Science Department was shut down. NN

Response: The text was modified as suggested.

290. **Comment:** It seems like the PRISMs could be included in a lot more of the participants' categories in the Implementation Table. NN

Response: The Implementation Table was reviewed and PRISMs added as participants where appropriate.

291. **Comment:** Definitions
AISMP: It is missing the word Invasives in the definition.
ANS: Lately, people have been using the word nuisance to refer to native problem species.
iMapInvasives: It should be a data management and mapping system.
Rapid Response: Eradication is misspelled. The word "introduction" should be replaced with "detection."
Monitoring: The plan is defining assessment here, not monitoring. There is no period at the end of the sentence, and it should end with the words "after they are detected." Traditionally, monitoring is what is done after a response to see if the response worked.
PRISMs: PRISMs should be defined and a link provided to NYIS Info. NN

Response:
AISMP: The text was corrected.
ANS: The term was defined here only for historical context. AIS replaced ANS for exactly the reason mentioned by the commenter.
iMapInvasives: Definition modified as suggested.
Rapid Response: Spelling error was corrected.
Monitoring: The *AIS Plan* defines the terms "surveillance" and "monitoring" as used in the context of the plan. The commenter is correct that "monitoring" should be done after a response to evaluate the effectiveness of the response.
PRISMs: The PRISM acronym is adequately defined in the text.

292. **Comment:** What is lacking is identification of the DEC employees or other agencies and organizations responsible for leadership in the execution of each goal. OO

Response: The possible AIS management hierarchy, to include the assignment of specific responsibilities, has not been determined yet.

293. **Comment:** Although Priority Action 4X1 is laudable, it's unclear exactly how NYSDEC will provide the resources necessary to implement and maintain a viable AIS management program. OO

Response: Providing sufficient funding and resources for AIS management is a high priority for the Department. Beyond that, it is not feasible to respond to specific suggestions, recommendations, or comments regarding funding and resource issues at this time.

294. **Comment:** The *AIS Plan* places a large burden of responsibility on the PRISMs, lake associations and other partners to achieve the plan's goals. Although PRISMs are critical players for leveraging resources and recruiting volunteers, volunteer recruitment and retention can be difficult and is a time-intensive undertaking. OO

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

295. **Comment:** Volunteers tend to prefer to work within an already established community or network. This leaves smaller, lesser-known water bodies with no stewardship coverage. Some consideration must be given to coverage of "low priority" water bodies that are just as likely to serve as sources of infestation within a watershed. OO

296. **Comment:** NYSDEC oversight and collaboration will be extremely important to attain statewide consistency in all and any management activities. OO

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment.

297. **Comment:** Implementation of the recommendation on page 19 to provide leadership by establishing an AISMP manager or supervisor is of critical importance. OO

Response: The authors of the *AIS Management Plan* acknowledge and appreciate this comment. Efforts to hire an AIS Plan coordinator are under way.

298. **Comment:** There is little mention of the need for accurate follow-up monitoring subsequent to infestation management. OO

Response: See the response to comment 288. The *AIS Plan* discusses monitoring in general without identifying specific objectives of different monitoring efforts.

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

ENB - Statewide Notices 10/29/2014

Public Notice

Notice of the Draft Aquatic Invasive Species Management Plan

Aquatic invasive species (AIS) threaten the ecology of New York's freshwater resources and can harm water-based recreational and commercial uses to the point that they impact local economies. New York is particularly vulnerable to AIS due to its vast marine and freshwater resources, major commercial ports and the easy access that ocean-going vessels have to the Great Lakes via the state's canal system. Managing an infestation is extremely costly, so prevention is the most cost-effective strategy.

The goal of this plan is to prevent the spread of aquatic invasive species in New York State. This will be accomplished through the completion of over 50 actions concerning the prevention, detection and response to AIS. Priority actions identified in the plan include:

- Expanding the boat launch steward program and ensuring consistency of these
- programs statewide. Developing an AIS response framework to guide decision-making when AIS are detected, and communicating the reasoning for the response selected
- Implementing an AIS public awareness campaign and evaluating its effectiveness in reaching target audiences
- Expanding the use of AIS disposal stations at waterway access sites
- Creating regional “First Responder” AIS teams to incorporate local expertise in planning and implementing appropriate responses to AIS.
- Identifying and evaluating the risks associated with various pathways for AIS introduction and movement within New York

The plan is primarily focused on the freshwaters of New York

State. The draft plan is available at:

www.dec.ny.gov/animals/99053.html.

Due Date for Comments:

Comments may be submitted in writing through December 12, 2014 to NYSDEC Bureau of Fisheries, AIS Management Plan, 625 Broadway, Albany, NY 12233-4753 or by e-mailing (put “AIS Management Plan” in the subject line).

Contact: Phil Hulbert, New York State Department of Environmental Conservation (NYSDEC) Division of Fish Wildlife and Marine Resources, Bureau of Fisheries, 625 Broadway, Albany, NY 12233-4753; Phone: 518-402-8890.

Science, Service, Stewardship

NOAA FISHERIES SERVICE

Boats can transport invasive species into new locations. Watercraft operators should follow the Clean, Drain, Dry strategy in between every body of water, every time (Photo credit: NY Department of Environmental Conservation).

Once introduced, aquatic invasive plants can spread quickly. Once established they reduce light and oxygen to native wildlife (Photo credit: Maine Bureau of Land and Water Quality).

Preventing Invasive Species: Cleaning Watercraft and Equipment

Background

Aquatic, as well as many non-aquatic, invasive species are readily spread by flowing water. In addition, many aquatic invasive species are capable of survival out of water for extended periods of time. To prevent the accidental introduction organisms transported through water, all watercraft and equipment that are to be placed in a water body should be cleaned to remove invasive species, including any fragments, seeds, or other materials. This recommendation applies to equipment arriving on the project site as well as equipment that is relocated within the project.

To prevent cross contamination with other lands or water bodies, whenever possible, keep equipment and vehicles at the same project area for use only in that project area. If practical, the least infested (or least likely to be infested) sites should be visited first to reduce the risk of accidentally infecting a new area during restoration activities.

Clean, Drain, and Dry!

When done properly before entering a new body of water, this general set of procedures can effectively prevent the spread of invasive species into new waters.

Drain:

- Drain **every conceivable space** or item that can hold water.
- Follow factory guidelines for eliminating water from engines.
- Always drain the bilges of the boat by removing the drain plug. Bilge pumps are not capable of removing all water from the boat hull.
- Drain live-wells, bilge, ballast tanks, and transom wells.
- Empty water out of kayaks, canoes, rafts, etc.

Clean:

- Remove any visible **plant or plant fragments**, as well as **mud or other debris**. Plant material, mud, and other debris routinely contain other organisms that may be an invasive species.
- Check trailer, including axle and wheel areas, in and around the boat itself: anchor, props and jet engines, ropes, boat bumpers, paddles.
- Clean all parts and equipment that came in contact with water using one or more of the methods listed below.

Dry:

- Allow everything to completely dry before launching into new waters; **five days** in warm, dry weather and up to **30 days** in cool, moist weather. Calculate local dry time at: **http://www.100thmeridian.org/Emersion.asp**
- If sufficient drying time is not available, decontaminate all surfaces using one or more of the cleaning methods described below. Carefully inspect for invasive organisms before entering a new water body.

Cleaning Methods

Set up the best staging area possible for cleaning operations. A paved area with accommodations to elevate vehicles or otherwise allow easy access to the undersides of vehicles and equipment is ideal. Equipment of all types should be cleaned at the location of last use. If this is not possible, arrange for cleaning at a facility that is specially designed for equipment cleaning. Commercial hot-water car washes are effective for disinfecting boats and vehicles.

Water runoff carrying sediment, plant material, algae, animals, and/or petroleum contaminants, must be managed with the use of berms or other containment. Silt fence installed along perimeters of work areas can also aid in preventing spread of contaminated materials outside of the washdown location. Despite very careful efforts to capture and quarantine materials from cleaning operations, site-specific invasions are likely to occur; therefore, part of the cleaning process should involve monitoring the washdown areas for invasive species and using appropriate control methods early to prevent additional spread.

Personnel who use equipment during cleaning operations are responsible for properly using Personal Protective Equipment (PPE) that is appropriate to the cleaning activity. Using cleaning and disinfectant chemicals, power washers, air compressors, and other types of cleaning equipment may present working hazards. PPE items to protect hearing, skin, eyes, and respiration may be required. All personnel should undergo proper training of all equipment prior to performing any cleaning operation.

Brushing (Physical Removal)

Brushing is considered to be moderately effective in removing invasive material from equipment or gear. A follow-up with water washing, high-pressure air blasting, or high-pressure wash is also recommended.

- If there is a nap to fabric (e.g., upholstery, carpeting, or clothing), brush with the nap rather than against it. Brushing against the nap could further embed small seeds or plant fragments into the material.
- A combination of soft and stiff bristles of varying length is recommended for use on carpeting or components made of rubber, nylon, or plastic.
- Bristles of medium length and stiffness are desired for removal of mud and other matter from fabrics and upholstery.
- Stiff bristles are recommended for the tread of wheels that become encrusted with sediment and mud.

Vacuuming (Physical Removal)

Vacuuming equipment or clothing with a brush attachment is suggested to remove most loose particle matter, but care should be taken because small seeds and plant fragments may become further embedded in materials. To prevent contained plant and soil matter from being redeposited following the cleaning process, collected matter should be bagged and incinerated or disposed of in a sanitary landfill. A follow up with water washing, high-pressure air blasting, or high-pressure wash is also recommended.

Use of Adhesive Roller (Physical Removal)

Adhesive is considered to be moderately effective in removing the majority of plant material from equipment or gear. Seed and fragment materials readily attach to the adhesive sheets and are effectively lifted out of seams and the weave of loose particle fabrics; proper attention and care given during removal is a direct reflection of the potential efficiency of this technique. A follow up with water washing, high-pressure air blasting, or high-pressure wash is also recommended. To prevent contained plant and soil matter from being redeposited following the cleaning process, adhesive sheets should be bagged and incinerated or disposed of in a sanitary landfill.

Thermal Treatment

Thermal treatments involve the use of extremely hot temperatures in order to kill all invasive material. Using steam, hot air, or hot water to clean vehicles and field equipment has proven to be especially effective when used to bring of the surface temperature of the up to 140 °F for 30 seconds. A hand-held infrared thermometer can be used to verify the surface temperature. Disadvantages to the use of thermal treatments are the apparent risk of burns, its labor-intensive nature, and the initial cost of equipment.

To prevent the spread of invasive species, all equipment should be inspected and cleaning after exiting the water body.

Chemical Treatment

Many chemical agents are available to prevent the potential movement of invasive species. However, the use of chemical treatments sometimes poses disposal and wastewater concerns. If chemical treatments are used, local standards of waste disposal must be followed. Since local regulations for chemical disposal may vary, always contact a local chemical waste management facility, the Environmental Protection Agency, or refer to the Material Safety Data Sheet for recommendations on proper disposal prior to use of any chemical. Some state states may also require certification or licensing for personnel who use chemical treatments. Finally, some solutions may cause corrosion on metal surfaces and electrical connections; thus be sure to follow all label restrictions and manufacture guidelines. Following treatment, rinse all surfaces with clean water and dry thoroughly.

Diluted household bleach solution provides an inexpensive, effective way to control invasive species. Soak or spray equipment for at least one minute with a two percent bleach solution (three ounces of household bleach mixed with one gallon of water). If invasive pathogens or diseases are suspected, a 10 percent solution should be used (13 ounces of household bleach mixed with one gallon of water). Bleach is an extremely effective disinfection agent, but it is a caustic substance that can be corrosive to aluminum and other sensitive fishing and boating equipment.

Of the materials traditionally used to disinfect for human or animal health purposes, quaternary ammonium compounds have been found to be effective in controlling viruses and pathogens. Commercial formulations, such as Parvasol® and Kennelsol®, are available through laboratory or veterinary supply companies. Household cleansers/disinfectants, such as Formula 409® and Fantastic® that contain the quaternary ammonium compound alkyl dimethyl benzyl ammonium chloride can also be used to disinfect equipment. These solutions can be used full strength as a spray, or diluted for soaking with two parts water to one part disinfectant. For all materials, follow label instructions and be sure to soak equipment for a minimum of 10 minutes*. Be sure to dispose of materials away from surface waters in accordance with label restrictions.*

Other common chemical decontamination methods are:

- Undiluted white vinegar for 20 minutes.
- 1% potassium permanganate solution at 24-hour exposure.
- 5% quaternary ammonium solution for 10 minutes.
- 250 mg/L ROCCAL (benzalkonium chloride) for 15 minutes
- 500 mg/L hydrogen peroxide for 60 minutes
- 167 mg/L formalin for 60 minutes

General Water Washing

General water washing can be used in conjunction with a physical removal technique such as brushing or vacuuming and is moderately effective in removing residual foreign material. Some seeds or fragments may remain viable following a wash treatment. In extreme situations, where known invasive materials are present, wastewater can be treated or filtered, and the waste materials bagged and incinerated or disposed of in a sanitary landfill.

High-Pressure Water Washing

High-pressure washing is the most effective means of cleaning heavily soiled and contaminated items to eliminate invasive species materials and prevent their spread. There are many models of high-pressure washers, from simple hand-held nozzles to laser guided systems. In some cases, containment sheds are portable. Not all items are capable of withstanding the pressure of this treatment, and it should only be used where applicable. In certain situations cleaning with compressed air, rather than water, could prevent damage to certain equipment areas such as engine wiring systems and vehicle cabs.

Cleaning boats and equipment before leaving the landing is an important step that citizens can take to prevent the spread of invasive species
(Photo credit: Aquatic Nuisance Species Project).

Minimum water pressure for vehicle cleaning should be at least 90 pounds per square inch. Water can be supplied as high volume/low pressure or low volume/high pressure. Each option has advantages and disadvantages based on specific cleaning needs and water availability:

- Heavy accumulations of soil and debris on large equipment can best be cleaned using high water volumes.
- Cleaning watercraft and in-water equipment usually requires lower volume, high-pressure washing systems.

Water Availability and Disposal

Water availability must be considered in cleaning operations. Freshwater in a quantity suitable for all cleaning operations is necessary. When this is not possible, consideration should be given to other water options such as water recycling systems or use of compressed air to remove soil. Raw water, or even gray water, is sometimes used, but potential health issues may require precautions such as immunizations or specialized safety equipment for personnel. If pumping water from field sources, unintentional movement of exotic plants, algae, and other invasive aquatic species must be addressed. Proper placement of pumps away from aquatic or shoreline vegetation that is known to be invasive is a practical first step.

Water storage tanks, filters, and recapture systems can offer adequate onsite water supplies with less water use than would otherwise be necessary without recycling. By using sand or cartridge filters, many contaminated substances can be captured during cleaning operations to be safely handled later. In addition to soil and invasive species, wash water and used wash water filters may also contain oily residues from cleaning certain types of equipment. Such items may require handling, treatment, and disposal according to state and local standards.

Activities that require use of water also need to consider invasive species control. The equipment used in transporting and spraying water should be cleaned before arrival on site.

Decontamination of Specific Watercraft Parts

Watercraft Compartments

- Bilge compartments, water holding tanks, wet wells, live wells, and any other compartments that could hold water from an infested water body should be drained of water at the boat ramp before leaving the area.
- If a compartment has carried water from another location, remove all water into a container and heat it to at least 140 °F, or treat it with one of the chemical treatment solutions listed above. If adult mussels are found in these compartments, use the recommended hot water treatment.
- If the compartment is too large to make filling practical, high pressure wash the compartment thoroughly with hot water.

Watercraft Hull Surfaces, Anchors, and Trailers

- Wash down with hot, high-pressure water. Then, visually inspect and feel by hand to remove any remaining foreign material.
- Watercraft hulls, anchors, or trailers will be assumed to be free of invasive species if they have been thoroughly scrubbed, inspected, and any visible foreign materials have been removed or if they have remained dry and out of the water for five days.

When inspecting and cleaning, special attention should be given to the cracks and crevices in which material may become trapped as well as aquatic plants or fragments that may be present on trailers or propellers. Particular attention must be paid to trailer pads made of carpet and foam rubber, which could trap invasive species. If possible, such material should be removed from trailers before doing work in infested waters.

Invasive species can become trapped in watercraft engines and transported to new locations. Proper engine flushing is recommended to prevent future invasions (Photo credit: Bureau of Reclamation).

Watercraft Engines

If the watercraft engine is not a closed cooling system configuration (if the engine intakes its cooling water from the environment), the following applies:

- A hot water treatment is recommended for engine decontamination; barrel filled with 140 º F to 160 º F water and operating the engine for 5 to 10 minutes.
- An appropriate flushing attachment, such as an “earmuff” attachment, may be used in place of the hot water treatment. Refer to the manufacturer’s directions for flushing attachment hookup and operation.
- Running a chemical solution through an engine to decontaminate it may violate the terms of the engine’s warranty, or otherwise damage the engine. Chemical treatments on engines are **not** recommended, unless specified by the manufacturer.

All surfaces of the propeller, rudder, driveshaft, and driveshaft bearing and supports must be cleaned to remove any clinging foreign material by washing with hot, high-pressure water. Then, visually inspect, feel by hand, and remove any remaining foreign material. Finally, decontaminate the engine cooling system by using the appropriate flushing attachment.

Decontamination of Field Equipment Used in Water

Thermal Treatment

Field equipment can be effectively decontaminated by soaking in water kept above 140°F for one minute or for 20 minutes in water that is at least 110°F. Note that hot water can delaminate Gore-Tex® fabric and damage other sensitive clothing items. Household steamers may also be used for disinfection by exposing equipment to steam for one minute.

Chemical Treatment

Field equipment can also be cleaned by soaking, dipping in, or scrubbing with one of the chemical decontamination solutions listed above under decontamination of watercraft. If adult mussels are found during inspection, the equipment should be steam cleaned, washed with hot, high-pressure water, or dipped treated in hot water, and allowed to dry completely before the next use. (*See Decontaminating of Mussels*).

NOTE: Felt-soled waders and wading shoes, which have been identified as a vector for whirling disease spores and *Didymo*, are difficult to disinfect. Rubber or studded soles are now readily available that provide similar traction, and are much less likely to transport invasive species.

Personal gear, including waders, can introduce aquatic invasive species into new locations if not properly cleaned following use (Photo credit: NOAA).

Drying equipment for a minimal period of 5 days can be an effective method of preventing the spread of invasive species (Photo credit: NY Department of Environmental Conservation).

Suggested Resources:

Aquatic Invasive Species Hazard Analysis and Critical Control Point Training Curriculum
Sea Grant Great Lakes Network. Aquatic Invasive Species – Hazard Analysis and Critical Control Point Training Curriculum. 2nd Ed. Editors Jeffrey L. Gunderson JL., Ronald E. Kinnunen RE. Minnesota Sea Grant Publications Number: MN SG–F11. 91 pp. Available online at http://www.seagrant.umn.edu/ais/haccp
This manual identifies critical pathways through which aquatic invasive species and/or non-target aquatic species could be moved to new waterbodies. It explains an approach (called AIS-HACCP) to prevent the inadvertent transfer of these species.

Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species
U.S. Department of the Interior Bureau of Reclamation. 2009. Technical Memorandum No. 86-68220-07-05. 203 pp. Available online at: http://www.usbr.gov/pps/EquipmentInspectionandCleaningManual_Sept09.pdf
This manual provides recommendations for inspection and cleaning of vehicles and equipment as a prevention tool to limit the spread of invasive species.

Maine's Safety Net - A Practical Guide to Building Wash Stations
Friends of the Cobbossee Watershed and Lakes Environmental Association. March 2006.28 pp. Available online at: http://www.watershedfriends.com/L.%20L.%20Bean%20handbook.pdf
This handbook has been designed to assist those organizations and citizens in building Boat Wash Stations.

Preventing Accidental Introductions of Freshwater Invasive Species
U.S. Department of Agriculture, Forest Service. Available online at: http://www.fs.fed.us/invasivespecies/documents/Aquatic_is_prevention.pdf
This document provides standard sterilization techniques that are effective against New Zealand mudsnail, Whirling disease, and Chytrid Fungus.

Protect Your Boat, Fight Quagga and Zebra Mussels A Guide to Cleaning Boats
California Department of Fish and Game. October 2009. Available online at: *http://www.nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=4957*
This guide was compiled specifically for boat owners and watercraft users. The information contains general guidelines for all boaters and a basic checklist for inspecting and cleaning boats and recreational equipment for Quagga/Zebra mussels

Protect Your Boat and Engine from Zebra Mussels
Wisconsin Department of Natural Resources. Available online at: http://dnr.wi.gov/invasives/publications/pdfs/protectyourboat.pdf
This document describes simple and proactive steps boat owners may implement to protect their investment and prevent the spread of invasive species into more of Wisconsin's waters.

Protect Your Waters
Aquatic Nuisance Species Task Force. Available online at: http://protectyourwaters.org
This site provides recommendations for recreational users who want to help prevent the spread aquatic nuisance species.

Transfer of Invasive Species Associated with the Movement of Military Equipment and Personnel. Cofrancesco, Jr. AF., Reaves DR. Averett DE. July 2007. Army Corp of Engineers, Engineer Research and Development Center. ERDC/EL TR-07-8. Washington D.C., 126 pp.
Available online at: http://el.erdc.usace.army.mil/elpubs/pdf/trel07-8.pdf
This document provides an overview of the current process that exists to clean, inspect, and regulate the movement of invasive species through ports of embarkation and debarkation.

PROTECT YOUR WATERS

Help Prevent the Spread of Aquatic Invasive Species

AQUATIC INVASIVE SPECIES (AIS) are plants and animals that can:

- interfere with boating and fishing,
- harm native plants and animals,
- destroy habitat,
- lower waterfront property values, and
- reduce the quality of drinking water.

YOU can help prevent AIS from spreading to new lakes and rivers.

CLEAN. DRAIN. DRY.

- Inspect your watercraft and trailer, and remove anything that shouldn't be there, like plants, animals, mud, or debris.
- Drain all water-holding compartments.
- Wash your boat and allow it to fully dry before entering a new waterbody.

INSPECT AND CLEAN your gear before using it in another waterbody.

VISIT a launch with a boat steward for help inspecting your boat and a free wash.

NEW YORK STATE

has more than **70,000 MILES** of rivers and streams, and more than **7,600** freshwater lakes, ponds, and reservoirs.

REHOME unwanted pets responsibly—never release them into the wild.

Dispose of plants and aquarium gravel in the trash.

THINK before you buy—make smart choices about the pets and plants you bring home.

DISPOSE of unused bait in trash cans and dump bucket water on dry land (not into the water).

Purchase only certified, disease-free bait.

TELL A FRIEND!

Together, we can all help protect the lakes and rivers we love.

JOIN US ON SOCIAL MEDIA!

Use the hashtags:
#ProtectNYWaters
#CleanDrainDry

Thank you for keeping New York's waters swimmable, fishable, drinkable, and livable!

Learn more by searching for "aquatic invasive species" on our website: dec.ny.gov.

NEW YORK STATE | Department of Environmental Conservation

Appendix 7 – Cable Floatation

Unique Group

Buoyancy Solutions

RANGE OVERVIEW

Seaflex SeaSerpent™ Overview

Buoyancy & Ballast

www.uniquegroup.com

Seaflex SeaSerpent™ Overview
Continuous Support for Cables

Perfected and Patented

+ SeaSerpent™ is the safest, most effective and most flexible cable installation buoyancy system in the market, and has become the industry's system of choice for installing cables in shallow water. Efficiently replacing outmoded multiple floats to support a submarine cable during installation in shallow water, the patented SeaSerpent™ buoyancy system is a continuous inflatable tube directly attached to the cable at 1 to 1.2 metre spacing intervals to suit the cable weight.

Optimised for your Operation

+ Unlike traditional solid floats, with the SeaSerpent™ it is easy to park the cable on the seabed during adverse tide or weather conditions and to re-float it when required. SeaSerpent™ even allows you to easily lift and reposition a cable to hit a trench, impossible with traditional methods. Sections of cable can also be easily towed to installation sites several kilometres from the launch point.

  SeaSerpent™ is generally supplied in 'lay flat' form tightly wound on a braked deployment drum mounted above the cable where it exits the cable engine; the SeaSerpent™ tube is inflated as it unspools and is attached to the cable just before the launch point. This allows rapid and near continuous deployment. A powered drum can then be used to recover the SeaSerpent™. For one-off applications, SeaSerpent™ can also be supplied on a simple timber drum if so required.

  The SeaSerpent™ integrated system is not subject to the high attrition rate of traditional individual cable floats and saves a huge amount of deck space and manpower at the launch point. With only 1.5 square metres of deck space required to deck load a remarkable 1 kilometre of buoyancy, SeaSerpent™ reduces transport, storage, handling and replacement costs alongside its operational advantages of speed and control.

Unrivalled Support and Control

+ SeaSerpent™ support and control of the cable cannot be matched. Its key advantage is the operational flexibility it allows the installer; the easy launching procedure is followed by a progressive and controlled sinking sequence which can be started, slowed, or reversed by simple surface control, without subsea intervention.

  The form stiffness developed by the SeaSerpent™ inflation pressure greatly decreases cable kinking tendencies, eliminates catenary sagging between floats and thereby removes the requirement to keep constant tension on the cable. This is a particular advantage when the cable contains sensitive fibre-optic elements.

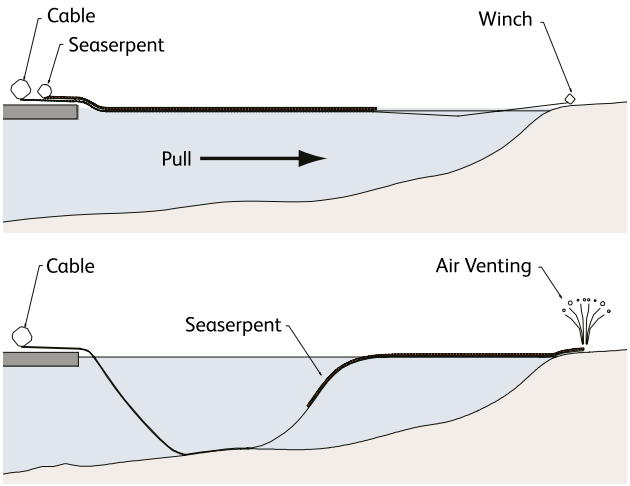
Customised SeaSerpents™ and Handling Systems

+ Most cable types and weights can be immediately addressed from stock using the standard SeaSerpent™ range, catering to up to 170kg of buoyamncy per metre. However, in the unlikely event that your cable can't be covered by our standard range we will manufacture a SeaSerpent™ to suit your specific buoyancy requirement. SeaSerpent™ handling systems are available for hire, and customised launch and recovery systems can be built by us to a client's fabrication drawings.

On the Job Support

+ To assist our customers with the smooth operation of the SeaSerpent™, we are able to supply supervisory expertise from our own technicians - who have experience of working with the system on projects right around the world. Many of our SeaSerpent™ customers are now taking advantage of this service, to benefit from the efficiencies and the further cost-savings which result from having Seaflex expertise onboard their vessels.

The Controlled Way to Install Cables in Shallow Water



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Seaflex SeaSerpent™ Overview

Key Features and Benefits at a Glance

For Your Peace of Mind

+ Tested and proven to greater than 3:1 over maximum working pressure.
+ Supports cable fully and gently, with reduced risk of kinking.
+ No stress point loads.
+ 50% reserve buoyancy factor at maximum working depth.
+ Low capital cost.

For Your Ease of Operation

+ Surface control of the sinking process.
+ Can be towed at up to 5 knots.
+ Lift capacities from 40-170 kg/m.
+ Compact and therefore cost-effective to ship, store and deploy.
+ No need for excessive cable tension.
+ Eliminates loss of individual floats.
+ Systems can be supplied with Seaflex technicians, or we can train your people to use it efficiently themselves.
+ Payout speeds in excess of 10m/minute have been achieved.

Seaflex SeaSerpent Specifications

Type	Lay Flat Width	Inflated OD (mm)	Buoyancy Kg/m	Weight (Kg) 50m Section	100m Drum Diameter & Width
3000-4-13	355	226	40	43	770 x 450
3000-3-10	480	306	74	54	770 x 550
3000-2-7	730	465	170	76	770 x 800

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SeaSerpent™ Punctures

One of the 'frequently asked questions' about SeaSerpent™ is " What happens if we get a leak, do we lose the whole cable?" The answer is ' No' - and here's the reason why.

+ Imagine a 50kg SeaSerpent™, with a 25kg/m cable attached, is floating on the surface with a positive pressure inside the tube of 0.2 bar. In this state it is quite firm to the touch and if any part of it was pushed underwater, it would maintain inflation (and thus its buoyancy) down to a depth of 2m. Lets say the total water depth is 14m.

  Now take a sharp knife and slash a big hole in the SeaSerpent.™ The pressure immediately drops around the hole as air escapes, the buoyancy disappears and it starts to sink towards the seabed.

  As the leak passes the 2m depth, the tube collapses and no more air can escape.

  Although no more air is escaping, there is now a length of cable with no support which will sink to the seabed and continue to drag down more and more cable each side of it until the pressure rise inside the SeaSerpent caused by the decreasing volume is sufficient to support the cable down to a certain depth. The actual depth at which this happens is the same %age of the overall depth of water as the reserve factor of buoyancy.

  This is because the reserve factor of 50% means one metre of 50kg/m SeaSerpent™ will support 2m of 25kg/m cable. So if the water is 14m deep only half this depth of SeaSerpent will be required to support the cable to the seabed i.e. a depth of 7m.

  So if the SeaSerpent™ is ruptured for any reason, all is not lost although a fair length of cable may be on the seabed and the SeaSerpent remaining on the surface will have increased pressure to equal that of its lowest point of inflation, in this case 0.7bar.

  To recover the situation, the damaged SeaSerpent™ section must be repaired, sealed or replaced, after which the portion of cable on the seabed can easily be raised by putting more air into the SeaSerpent™.

  This will progressively lift the cable off the seabed and back to the surface.

  While on the subject of problems - there is another point that should be mentioned - namely, the ties.

  It is absolutely essential that these are strong enough and secured so that they cannot come undone. Any decent knot ensures the latter but the strength required can be under estimated if the bursting stress of the tube is not allowed for.

  It is not enough to say the cable weighs 20kg/m, so a tie every metre only needs to accept this load. In the sinking situation above, the last two or three ties are supporting 7m of cable which should be allowed for, as well as the load created by the internal pressure in the tube. As a rule of thumb, a safety factor of at least 6:1 should be used. 8mm, 10mm or 12mm polypropylene rope is usually favoured.

  Having said all this, to date we have no reports of a SeaSerpent™ that has suffered a rupture failure and only one case where inadequate ties caused a problem. Provided propellers are kept away from the tube, it is a very robust and tolerant piece of equipment and gives very few problems in service.

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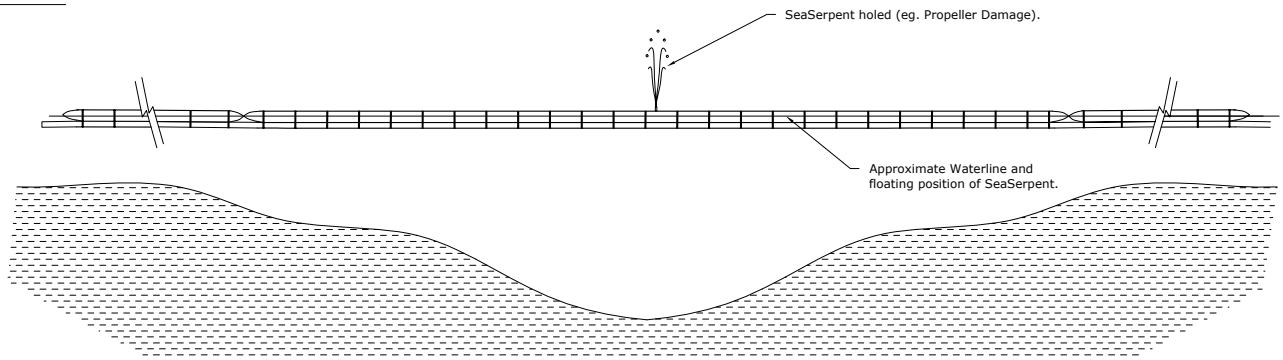
SeaSerpent Self-Sealing Puncture Recovery Process

STAGE 1



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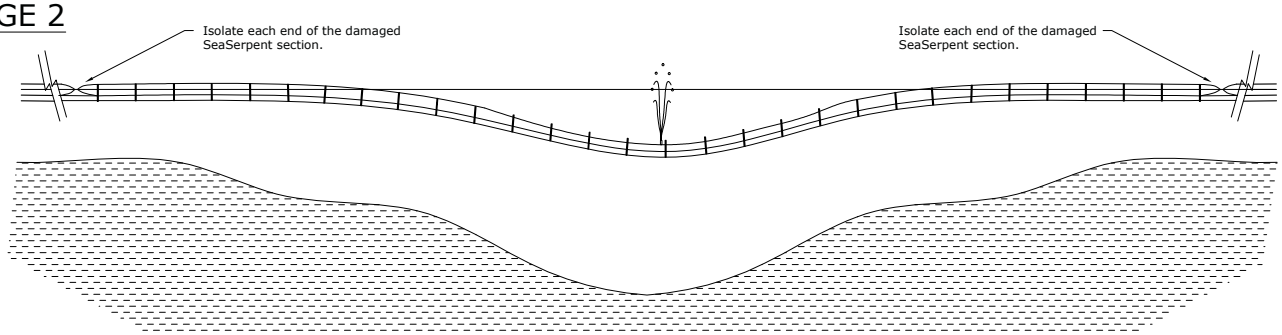
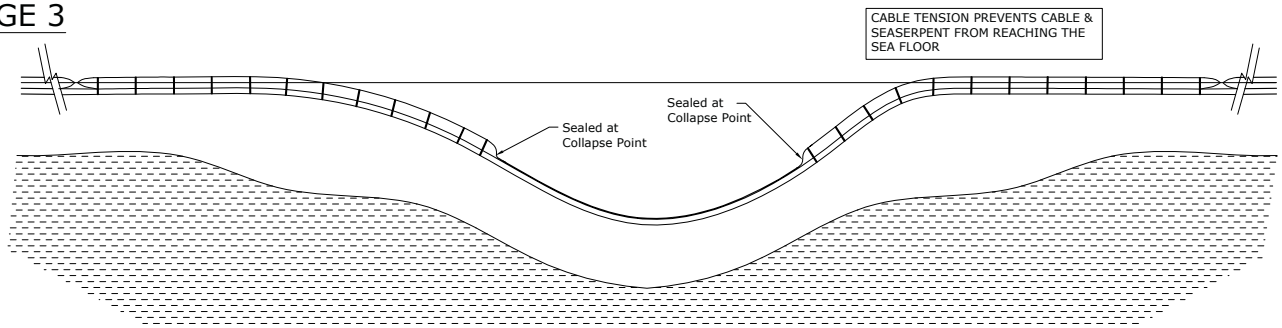


STAGE 3



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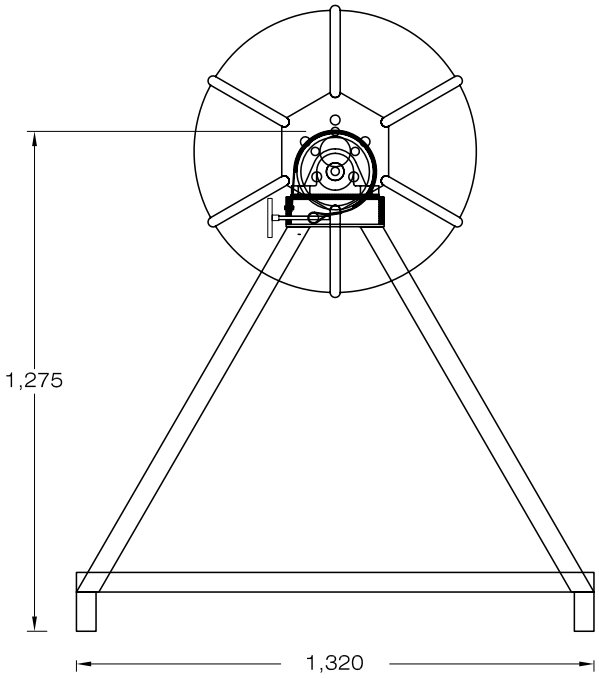
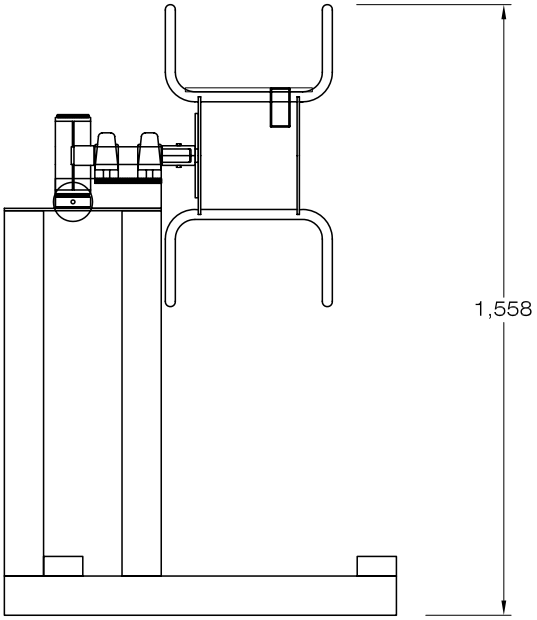
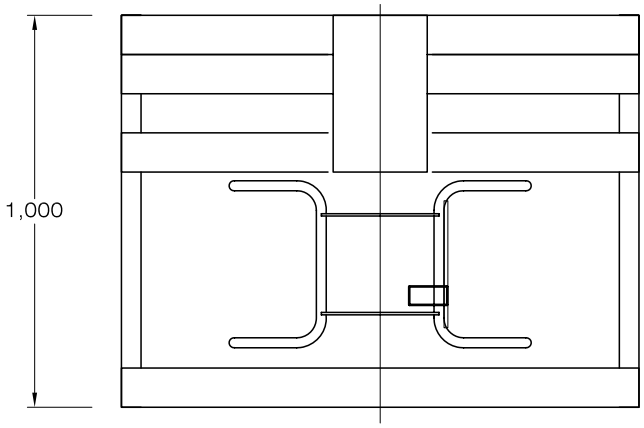
SeaSerpent Launch Pedestal







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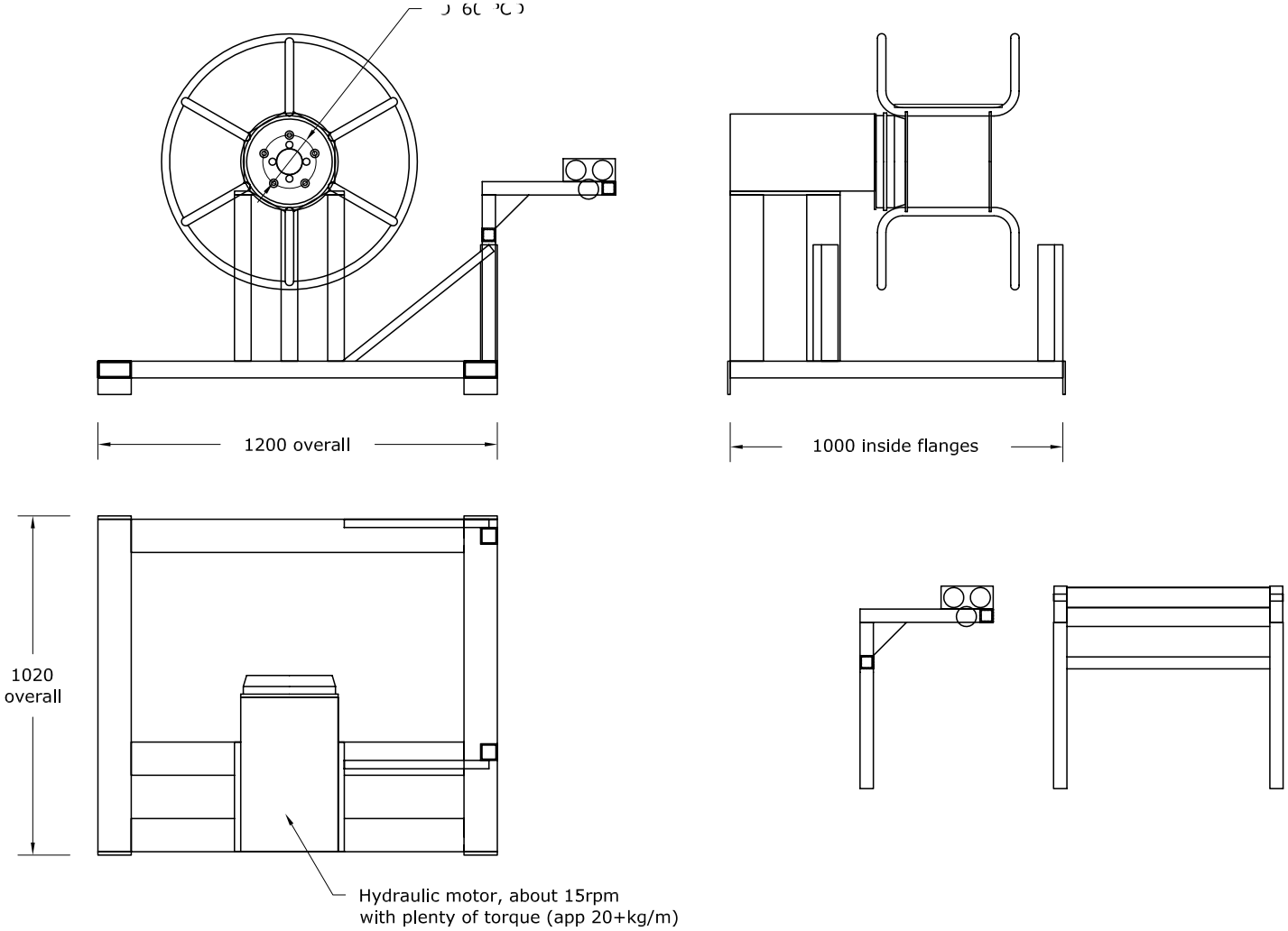
SeaSerpent Recovery Pedestal



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Seaflex SeaSerpent™ Overview

Continuous Support for Cables






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Case Study

Channel Island Electricity Grid Project Submarine Cable Shore

Client : **VDS CABLE BV**

Operator : **CHANNEL ISLAND ELECTRICITY GRID**

Location : **GUERNSEY - JERSEY - FRANCE**

Water Depth : **0 - 35 MSW**

Project Overview

+ VDS Cable bv, a Dutch Submarine Cable Installation Contractor, was awarded the contract for the installation of 2 HVAC power cables and 2 (bundled) fibre optic cables by the Channel Island Electricity Grid. The submarine cables were installed between the Channel Islands Guernsey and Jersey, then on to mainland France.

  The power cables were manufactured by ABB High Voltage Cables of Norway; the fibre optic cables were manufactured by Ericsson of Sweden. The VDS Cable Installation Vessel 'SEA SPIDER' was used for the installation and burial of the cables.

  Due to large currents and tidal ranges, combined with restricted vessel access for the shore approaches, Seaflex was contracted by VDS Cable to supply their patented cable flotation system - SeaSerpent.

Seaflex Involvement

+ Seaflex Ltd. supplied 2000m of SeaSerpent cable flotation system Type 2350/2/10 giving a linear buoyancy of 106kg/m.

  The SeaSerpent was supplied in 100m (16 off) and 50m (8 off) sections delivered on steel transport, deployment, recovery (TDR) drums. To complement the flotation system two pedestal deployment and recovery systems (DRS) were also supplied.

  One manual brake DRS was stationed on the CLV SEA SPIDER for controlled deployment and one hydraulic DRS was stationed with the beach party.

For the start up of the project at Havelet Bay, Guernsey, Seaflex personnel were present to set up and initiate the first shore approach. During this first approach the cable was deployed at 260m per hour, 600m of SeaSerpent in total, cable towed to shore and laid in position within one tide. During the project the SeaSerpent spread was successfully used for a total of four HVAC and four F/O landings.

1. Early morning SeaSerpent equipment load-out on to CLV SEA SPIDER off Cowes, Isle of Wight.

2. SeaSerpent being attached to the HVAC cable showing Seaflex manual brake RDS.

3. The HVAC cable and SeaSerpent being deployed at Havelet Bay.

4. Small work boats are used to tow and position the cable.

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Case Study

Al Khalij Cable Shore Approach Project

Client : **HAMSTO SUBMARINE CABLE CONTRACTORS**

Operator : **ELF PETROLEUM QATAR**

Location : **HALUL ISLAND, GULF OF ARABIA**

Water Depth : **0-60 MSW**

Project Overview

+ As part of the Al Khalij oilfield offshore Qatar, Elf Petroleum Qatar (EPQ) required the installation of a submarine power cable between Halul Island and the DP1 platform, as well as DP1 platform to the wellhead platform.

  Through EPQ's main contractor, NPCC, HAMSTO was awarded the contract for the loading, transport and installation of the submarine cables. All cable operations were undertaken from the DP cable lay vessel 'HAM602'. The cables were manufactured by ABB Norsk Kabel AS, Tongsberg, Norway.

Seaflex Involvement

+ Seaflex Ltd. supplied the patented cable flotation system, SeaSerpent, for the vessel to beach cable pull-in operation. The SeaSerpent flexible buoyancy, complete with deployment/ recovery system, was delivered to the vessel ready for immediate use.

  The complete system was seafastened in position before the vessel loaded the cable in Norway.

  Once on location the SeaSerpent was successfully used to float the cable from the HAM602 in to the shallow water with the assistance of the lay vessel's MOB boat. Once at the landfall site the pulling wire was attached to the cable and pull-in operations commenced.

  On completion of the pull-in, positioning and controlled lay-down was executed using SeaSerpent. The cable was positioned above the trench, running parallel to the pipeline, and by venting of the buoyancy from the shore end a controlled S-lay was performed.

Seaflex Equipment

+ **Type 2650/6/15 SeaSerpent**
  Length: 500m (2 section of 250m)
  Linear Buoyancy: 11kg per metre (cable @ 6.5kg/m)
  Total Buoyancy: 5,500kg

+ **DRS System**
  Seaflex Ltd. designed and fabricated the DRS (Deployment, Recovery and Storage) System in-house to the project requirements of the client. Steel drums with manual brake solution was provided to take a minimum deck footprint.

SeaSerpent in action.

SeaSerpent DRS system positioned on deck at aft overboarding station.

Halul Island, Qatar, Gulf of Arabia.

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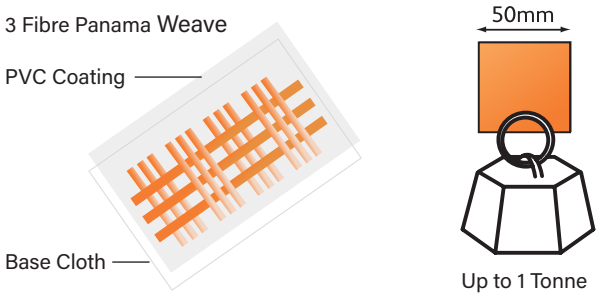
Technology, Service and Support

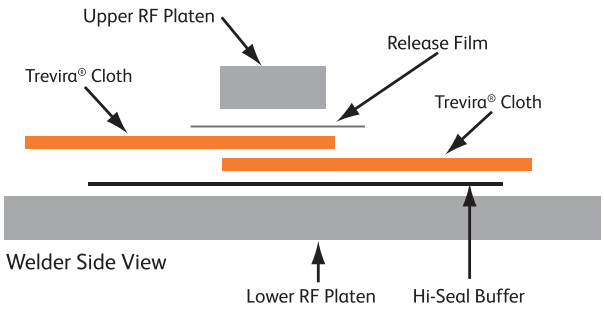
Manufacturing Technology

+ All Seaflex products are designed and manufactured in the UK. Our bag canopies are constructed from High Tensile Trevira® Polyester base cloth (either 2 /2 or 3 /3 fibre panama pattern weave) coated with heavy duty UV stabilised PVC coating or, for special applications, polyurethane. Trevira is incredibly strong; a 50 mm wide 3/3 strip has a break load of approximately 1 tonne. The panels for our bags are precision cut on our 15 metre long, 3 metre wide advanced automated table for perfect repeatability. Once inspected and approved panels are assembled by skilled personnel to using Radio Frequency welding to strict quality control standards.

Certification

+ All our work is carried out within a system which complies with the ISO 9001-2009 Quality Management Standard as audited by Lloyds Register Quality Assurance for full traceability – and we have now gained ISO 14001 and ISO 18001 accreditation.





Service

+ Whether for hire or sale, all Seaflex products are sent out fully tested and inspected against their build criteria. And we do also offer on-site support to our clients in the use of our products – this most often happens within the more complex buoyancy applications for our products.
  In the event that your Seaflex product should suffer minor damage in service, we can supply an approved, boxed field service kit comprising of patches, a professional quality heat gun and instruction manual to make good minor leaks prior to product refurbishment.
  We can also advise on the viability of carrying out more extensive repairs, which would typically be undertaken either at our factory or at one of our approved service centres.

Support

+ Our support philosophy is "Wherever, Whenever". This underlines the Seaflex commitment to not just sending out tested, proven products in proper shipping crates and with the most comprehensive documentation package in the business – but to assisting our customers in every way possible throughout their time using our products, whether the job is a hire project or an equipment sale.
  We offer worldwide support to our customers via either email or phone from head office in the UK and via our ever-growing network of offices and partners around the world.
  You can put your trust in Seaflex – we won't let you down.

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Unique Group's Buoyancy & Ballast products are available for hire or purchase from more than 20 other worldwide locations via our network of independent partners. Please contact us for more details.

Appendix 8 – Remedial Burial Tool - RIHC Amphibious Tracked Jetter

RIHC Hi-Traq Jetter Technical Information

Champlain Hudson Power Express

SUBMITTED TO:

NKT HV CABLES AB.

SUBMITTED BY:

CALDWELL MARINE INTERNATIONAL

1333 CAMPUS PARKWAY

WALL TOWNSHIP, NJ 07753

732-557-6100

CALDWELL MARINE INTERNATIONAL LLC. 1333 Campus Parkway, Wall Township, New Jersey 07753	**Type:** Technical Information **Prepared By:** Greg Gashlin, Dominic Palermo **Document #:** 1AA0635978 **Date**: 18 OCTOBER 2023 **Revision No:** 0.0

DOCUMENT TITLE: RIHC Hi-Traq Jetter Technical Information

APPROVALS:

Brett Bailey_____
General Manager – Caldwell Marine International LLC.

Thomas Ulisse_____
Project Executive – Caldwell Marine International LLC.

Rev.	Description	Date	Approval
0.0	Issued for client approval	10-18-23	TU

Table of Contents

1 Amphibious Hi-Traq Jetter Vehicle

1.1 The Hi-Traq Platform

The Surface Fed Amphibious Hi-Traq Jetter is an evolution of the original, field proven Hi-Traq vehicle. This version was developed as part of RIHC's continuous innovation strategy and looks to improve further the already impressive operational capabilities. The key general upgrades over the original Hi-Traq are as follows:

- Further increased clearance under chassis allowing for easier traversal over undulating terrain
- Improved Load Distribution Through Tracks
- Larger Tracks providing improved performance in soft grounds
- Improved cable following capability by lowering the height of the virtual pivot
- Improved access for maintenance of vehicle
- Significant reduction in weight, now only 13T in Air
- Jetting only focused build

Figure 1 - Hi-Traq Jetter, Surface Fed, Amphibious

The Hi-Traq traction platform has been designed to ensure product burial is performed in a safe and reliable manner. The platform enables a constant trench depth to be maintained independent of the seabed topography over which the vehicle is maneuvering. Constant ground contact maintains traction performance and a constant cutter face pressure, resulting in consistent and higher speed trenching rates through arduous topography and soil conditions. This ensures the vehicle does not impart undue forces and shapes to the product beyond its specified handling parameters.

This high traction (Hi-Traq) technology has been proven through rigorous testing of a demonstration vehicle at IHC's purpose built test facility along with over 2 years of successful trenching campaigns completed throughout the world.

The Hi-Traq Vehicle consists of the following main subsystems:

- 4 Track Drive and levelling System
- Jetting System
- Vehicle Control System

2 Track Drive and Leveling System

The innovative approach to the undercarriage provides a higher level of maneuverability and traction than conventional two-track, skid-steering vehicles. Each track provides the following independent functions:

1. Track Drive
2. Track Pitch
3. Track Levelling
4. Track Steering

Royal IHC (RIHC) patented 4 track solutions enables the vehicle to trench in even the most challenging terrains. The figure below shows off the 4 independent suspension arms operating at the extreme angles needed to trench in undulating sea beds with 20° slopes.

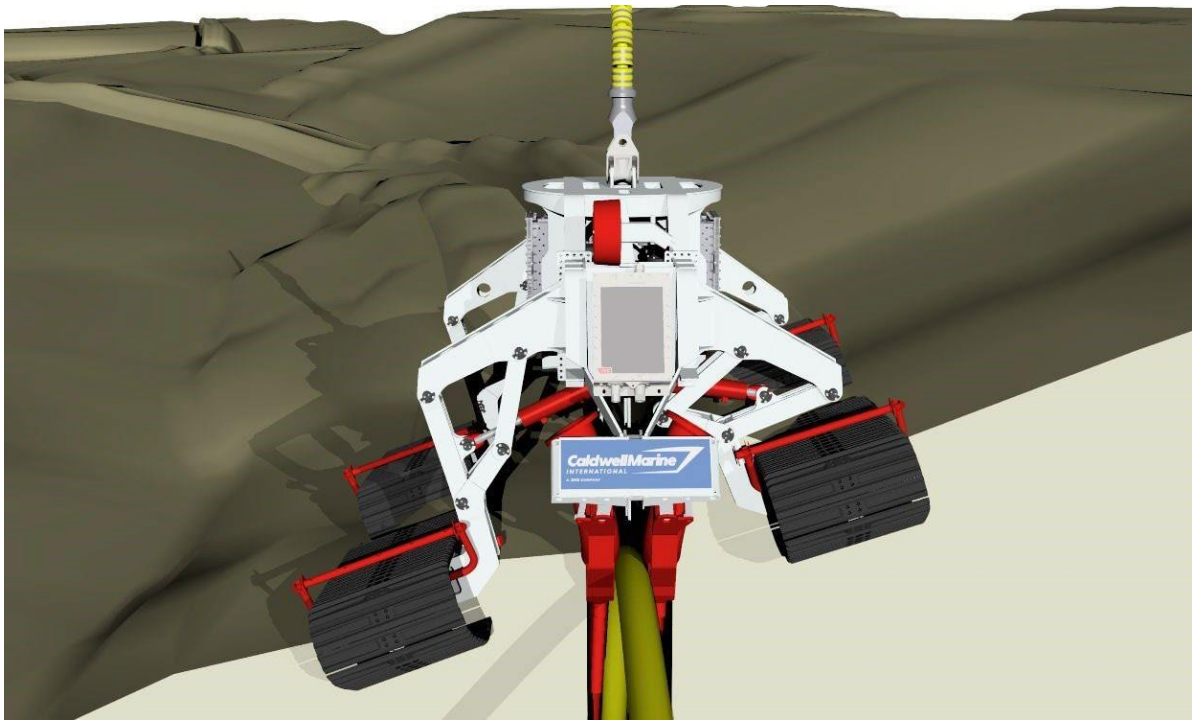


Figure 2 - Hi-Traq Jetter, Surface Fed, Amphibious – Trenching over challenging terrain

The range of motion and vehicle stability shown within Figure 2 is not possible with standard 2 track systems.

A typical two-track skid-steer vehicle requires a track of a certain length for vehicle stability and ground pressures. When a long track encounters variable terrain, ground contact is significantly reduced; consequently, traction performance and hence trenching performance suffer. Trench depth and path would also be affected placing undesirable forces on the product. Figure 3 shows how a Hi-Traq vehicle with four tracks can follow the ground contours to deal with terrain without effecting movement of the burial tool.

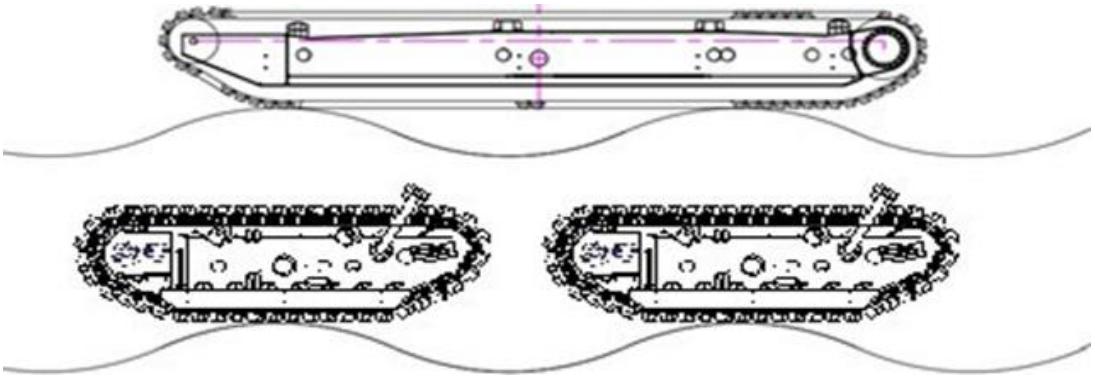


Figure 3 - Tracks

To maneuver a two-track vehicle to trench a product on a radius, skid-steering is employed, which reduces tractive effort or brakes one of the tracks. This has the effect of significantly reducing the cutter face pressure required for trenching in high strength soils and creates a force imbalance with the centrally mounted cutter reaction to the chassis. This results in a vehicle which is difficult to accurately control and risks undesirable forces on the cutter and the product

2.1 Track Drive

Each track has independent track drive with a software-controlled traction system limiting power to any slipping tracks. During turning operations, the software also determines the speed differential to each track dependent on the turning radius. This system is designed to minimize track slip and create even drive forces on port and starboard track about the central cutter. The result is a vehicle which can perform short radius trenching in a controlled and efficient operation.

Track Shoes

Plastic track shoes with integral plastic “grousers” are used and have been designed for subsea, low ground pressure applications. Additional metal grouser plates can be installed for soft ground.

Track Pitch

Each track is capable of pitching about a central through axle. The range of movement is limited to ±20° with a mechanical stop. The system is passively damped to maintain horizontal tracks during lifting for launch and recovery. The pitch can also be locked for maintenance or transportation.

Track pitch provides the capability to climb over obstacles such as boulders or undulating terrain without losing ground contact. Pitching of the vehicle is also avoided at the top of slope transitions.

Figure 4 - Track Pitch

2.2 Track Self-Leveling

The track self-levelling system is software controlled to maintain a transversely horizontal chassis and vertical cutter whilst maneuvering across side slopes or over uneven ground. This maintains a steady trench route producing a vertical trench with side walls that are less likely to collapse before the cable touches down. Unfavorable side loads on the cutter are also avoided using a virtual pivot point about the ground-to-tool interface.

Additionally, the software controls the levelling system to keep the chassis in a longitudinally horizontal position to maintain a consistent depth trench through uneven ground. The tracks have a ±1.0m range so individual tracks can climb obstacles or cross depressions without effecting trench depth. The vehicle body and cutter can also be raised or lowered with ±0.3 m range while maintaining good track ground contact. The system has a tolerance band to sense when both forward tracks are climbing a fore/aft slope, where the chassis will then remain parallel with the slope on climbing or descending.

The patented system is designed around non-parallel wishbones that create a virtual pivot point at the ground- to-tool interface Figure 6. This virtual pivot-point remains constant through the range of Etrack movement. The upward path traced by the track remains almost vertical with very little transverse movement to minimize side forces. The tracks operate through a ±20 ^{o} angle, enabling the vehicle to traverse side slopes while trenching at a constant depth and maintain full maneuvering capability.

Figure 5 - Track Self-Levelling

2.3 Track Steering

Each track has independent steering capability of ±20^{o}, which enable the vehicle to trench down to a radius of 15m. Four-track independent steering allows three possible turning methods:

1. Crab steering - Crab steering can be used to align the vehicle centrally with the product with minimal ground disturbance as well as used during slope traversing to inhibit side slip.
2. Wagon steering - Maneuvering operations in transit or while trenching. The turning point of the wagon steering mode can be modified fore and aft. See Figure 6.
3. Skid steering - Skid steering can be used when the product is unloaded for maneuvering on the seabed See Figure 6 for three steering mode options.

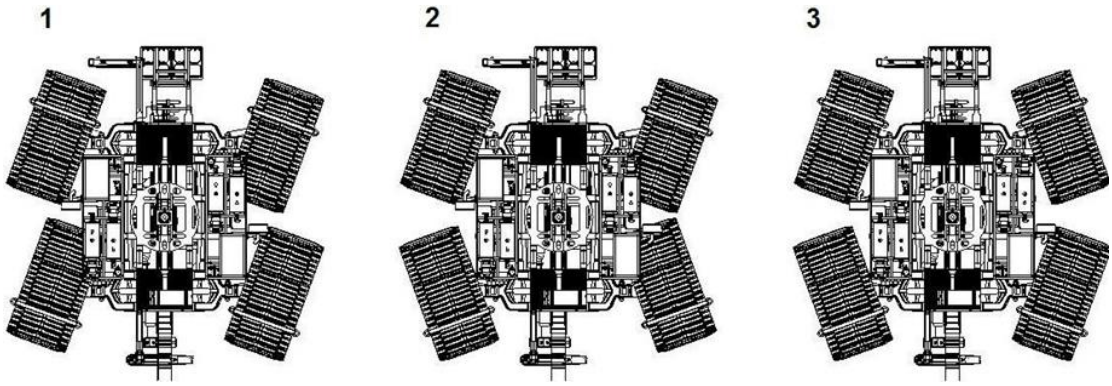


Figure 6 -Steering Modes

2.4 Wagon Steering

In wagon steering mode the turning center point of the vehicle may be varied between the fore and aft tracks. With the turning center point in the center of the vehicle, the fore and aft tracks would be turned at the same angle. When the turning center point is moved to the aft (or fore) of the vehicle in-line with the tracks, those tracks would remain straight ahead. This system enables the vehicle to be maneuvered with more precision.

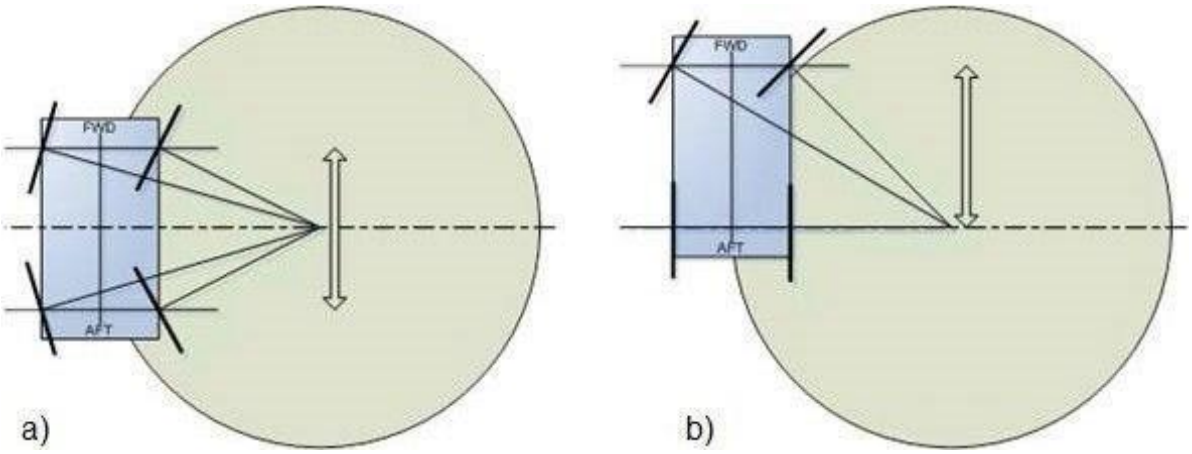


Figure 7 - Wagon Steering

2.5 Thrusters

High powered thrusters fore and aft of the vehicle are provided to orientate the vehicle in the water column. These are used for both landing to position the vehicle astride of the product, and for recovery to align the vehicle with the launch and recovery system.

When landing the ability of the tracks to crab steer reduces time taken to position the trencher and capture the product.

3 Vehicle Specifications

3.1 Environmental

DESCRIPTION	SPECIFICATION
Air Temperature	Max 40° C Min -10° C
Humidity	100%
Wind speed	Max 20m/sec operational
Sea Water temperature	Max 40° C
Operational limit for sea state currents (knots)	3
Max Seabed Slope	+/- 20 deg
Max Seabed Step	+/- 1m
Min Operating Depth	0m Capable of shore work on land
Max Operating Depth	1000m Vehicle only. Operational depth limited by umbilical length, deck water hose length and deck mounted HPU capability.

3.2 Subsea Vehicle

DESCRIPTION	SPECIFICATION
Dimensions (approx. may change during detailed design.)	L5.3m x W4m x H2.75m
Weight in air	13Te
Installed power	Jetting power provided by client supplied deck mounted water pumps. Hydraulic power supplied by Deck mounted HPU
Max. seabed slope	±45° (roll and pitch) drive capability (Design Capacity) ±20° (roll and pitch) levelling capability for vertical trenching
Max. seabed step	+/- 1m
Min. water depth	0m Capable of shore work on land
Jetting power	Jetting power provided by client supplied deck mounted water pumps
Trench depth	0m – 1.5m (dependent upon available jetting power) Depth can be increased to 3.3m with optional 3.3m Swords
Jet leg separation	0.2m - 0.6m
Maximum product	Ø450mm
Minimum turning circle	10m on product
Depressor MBR	4.2m (does not have to be fitted)

3.3 Tracks

DESCRIPTION	SPECIFICATION
Number of Tracks	4 off 2.3m Long x 1.2m Wide
Type	Excavator type chain and support rollers on bogies
Transmission	Hydraulic via track drive gearbox
Ground pressure (submerged)	10kPa (Can be reduced further if buoyancy is used)
Transducers	Drive pressure, track speed
Steering position	In Cylinder Transducers (ICTs)

3.4 Control Cabin

DESCRIPTION	SPECIFICATION
Control Cabin	20ft ISO container Power distribution and protection Insulated and lined air-conditioning
Power Supply	Main supply: 440V AC three phase 50/60Hz Control supply: 230V single phase 50/60Hz
Control System	Siemens PLC
Diver Protection	Line insulation monitors on each motor circuit (where applicable) and pod supply. Earth continuity monitoring to the vehicle. Diver safe to AODC/IMCA guidelines.
Operator Controls	Console desk with pilot and co-pilot positions: Hardwires pilot controls for all main hydraulic functions 2x HMI touchscreens for general control, setup and alarm/monitoring functions (one each pilot and co-pilot)
Video Wall	Multi-screen video wall utilizing 4K resolution LED monitors. Capable of displaying minimum of 8x HD quality signals simultaneously. Video wall configurations can be saved and recalled via the SCADA Switching of video signals/sources can be performed in real time via the SCADA
Video Recorders	16ch IP digital video recorder with min. 2TB storage capacity c/w Integrated Audio Recording (4ch)
Fibre Optic Multiplexor	Rack-mounted, all telemetry and video multiplexed onto one single mode fibre, with standby spare
UPS	Rack-mounted uninterruptable power supply for all critical control equipment

3.5 Control Rack

DESCRIPTION	SPECIFICATION
Network Switch	16 port 10/100Mbps Autosensing Ethernet Switch
Fibre Optic Multiplexor	Focal multiplexer: 4x G/Bit Ethernet Channels – (expanded by managed switches in the Pod to provide at least 12 channels at the Subsea JB's) 8x Serial Channels (RS232/485 selectable) – this can be expanded on request 1x Trigger Channel

3.6 Deck Winch HPU

DESCRIPTION	SPECIFICATION
Electric Motors	100 kW @50Hz (2 Motor pumps 70kW with 30kW)
Pumps	1 x 45cc 7 1 x 100cc variable displacement piston pumps
Reservoir Capacity	100 litres

4 Jetting System

The Surface Fed Amphibious Hi-Traq Jetter comes with 2 PN16 swords which can cut a trench up to 1.5m deep suitable for Ø450mm cable. Jetting water will be supplied to the vehicle by client supplied deck pumps. Depth can be increased to 3.3m with optional 3.3m swords.

The vehicle comes with swords that are over 2.5m long meaning the angle they sweep through to achieve full 1.5m burial depth is only 38°. This allows the nozzle angles to be more easily optimized ensuring efficient jetting from 0° to 38°. This can reduce the need for having to control the flow through the swords as they sweep through the trench, reducing complexity of the overall jetting system. The additional added benefit of trenching with long swords is that the trench becomes long with a shallow gradient that more closely match the catenary of the cable. In addition, this shape of trench reduces the risk of collapse before the cable reaches the bottom.

To reduce losses between the water pump and the nozzles, the sword system is designed using standard pipe sections. To reduce complexity, water is supplied to the full length of the swords. Jetting nozzles can be physically blanked off if required and, nozzle diameters changed via swapping of hardwearing inserts.

In the bottom section of the swords (last 500mm), it will be possible to install forward facing nozzles or downward facing nozzles. In projects where over burial is a problem, the downward facing nozzles can be blanked off and forward facing nozzles installed.

Figure 8 - Hi-Traq Jetter with swords deployed (depressor not shown)

The swords height and width can be adjusted remotely allowing for variable trench depths (0 to 1.5m) and jet leg separation of between 0.2 and 0.6m

The jetting swords can be used with or without an independently controlled depressor. The depressor has been designed to limit the loading on the cable while also ensuring target cable burial depth is maintained by guiding the cable into the bottom of the trench.

5 Cable Detection

The depressor comes with custom built cable detection system (CDS) that spans the full width of the depressor. This ensures that the cable always sits within the detection range of the sensor.

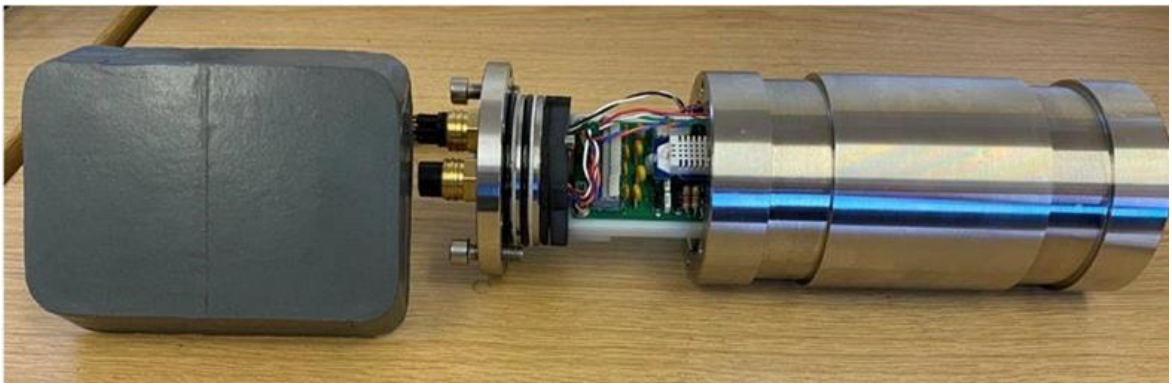


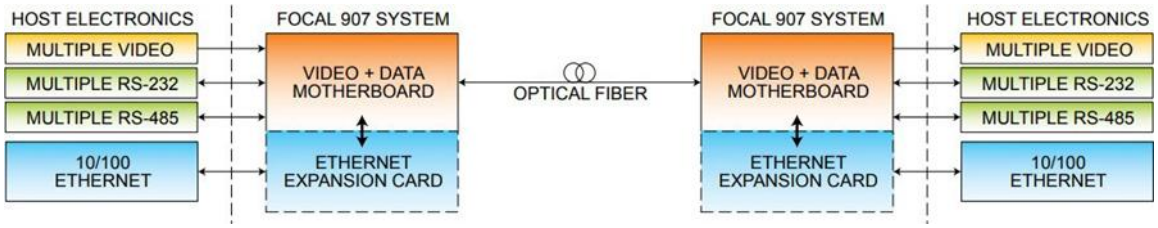
Figure 9 - RIHC Example Cable detection System

6 Vehicle Control System

Subsea Control Network

All control and instrumentation on the vehicle are interfaced through remote input/output modules, these are networked using industry standard Ethernet. All subsea data is taken through the fibre optic multiplexer to the surface PLC in the Control Cabin. Subsea, a distributed network of remote input/output modules is employed. Individual Junction Boxes or Valve Tanks have their own dedicated Remote IO nodes.

The multiplexer used is a Focal Model 907 system. The Model 907 system consists, of a Model 907 remote motherboard (multiplexer), and a Model 907 console motherboard. Each motherboard can operate as a standalone multiplexer used to combine analog video, digital video, or Ethernet with on-board or backplane serial data such as RS-232 and high-speed RS-485/422. Motherboards can all be stacked together and communicate with expansion cards to send and receive data over the backplane for additional data capabilities.



The focal unit comes with the following available channels:

- 4x G/Bit Ethernet Channels – (expanded by managed switches in the Pod to provide at least 12 channels at the Subsea JB's)
- 8x Serial Channels (RS232/485 selectable) –this can be expanded on request
- 1x Trigger Channel

Electronics Pod

The electronics pod houses the main subsea control equipment, including the main control transformer, subsea multiplexer and all control power supplies. The pod pressure vessel is capable of withstanding depths of up to 1000m. The faceplate is fitted with subsea connectors to interface all Valve Tanks (VTs) and Junction Boxes (JBs). The control system uses remote IO stations in the valve tanks and junction boxes to minimize the number of cable connections into the Pod and allow for easier sensor or equipment additions.

All JBs and VTs link back to the pod where they are fed from individually protected and switchable supplies. Any external node from the Pod can be isolated from the subsea network remotely using the SCADA; ensuring that a fault on one of the JBs or VTs does not bring down the entire network.

Thrusters

The vehicle's positioning thrusters can be automatically controlled by the PLC to align the vehicle to a predetermined heading set by the operator.

Auto Heading / Cable Tracking Mode

The PLC control system is capable of automatically controlling the trencher tracks to follow a set course or the product itself. In auto heading mode the vehicle uses real time data from the gyro compass to enable it to follow a set heading. In cable tracking mode the vehicle will use data from a third party cable tracking system (such as the TS440) to allow the vehicle to automatically follow the product.

Surveillance Equipment

The vehicle comes ready to interface with wide range of industry standard surveillance equipment. As discussed, the vehicle will come ready for use with:

- 2 Teledyne blue view m900 imaging sonars
- 1 Kongsberg M3 sonar
- 1 Aris 1200 acoustic camera

7 Eductor System

The Eductor system reduces the amount of fluidized sand and cut clay settling back under the product. The eductors are installed on each sword and consists of an annular eductor design. This design keeps a constant section diameter to avoid blockage as well as a back-wash valve which assists in clearing debris from the eductor inlet.

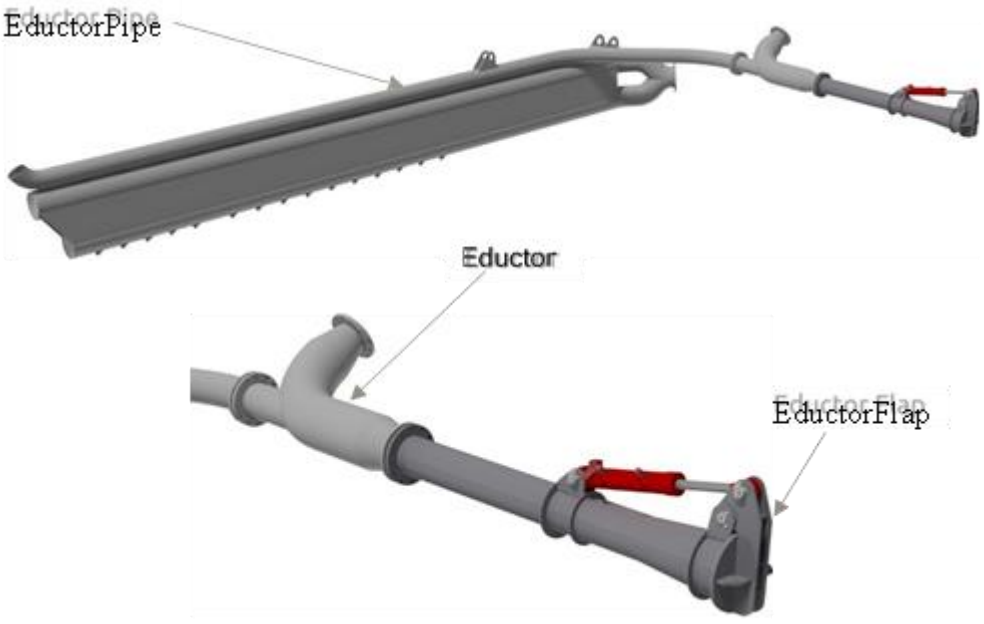


Figure 10 - Typical Eductor System Mounted to a Sword

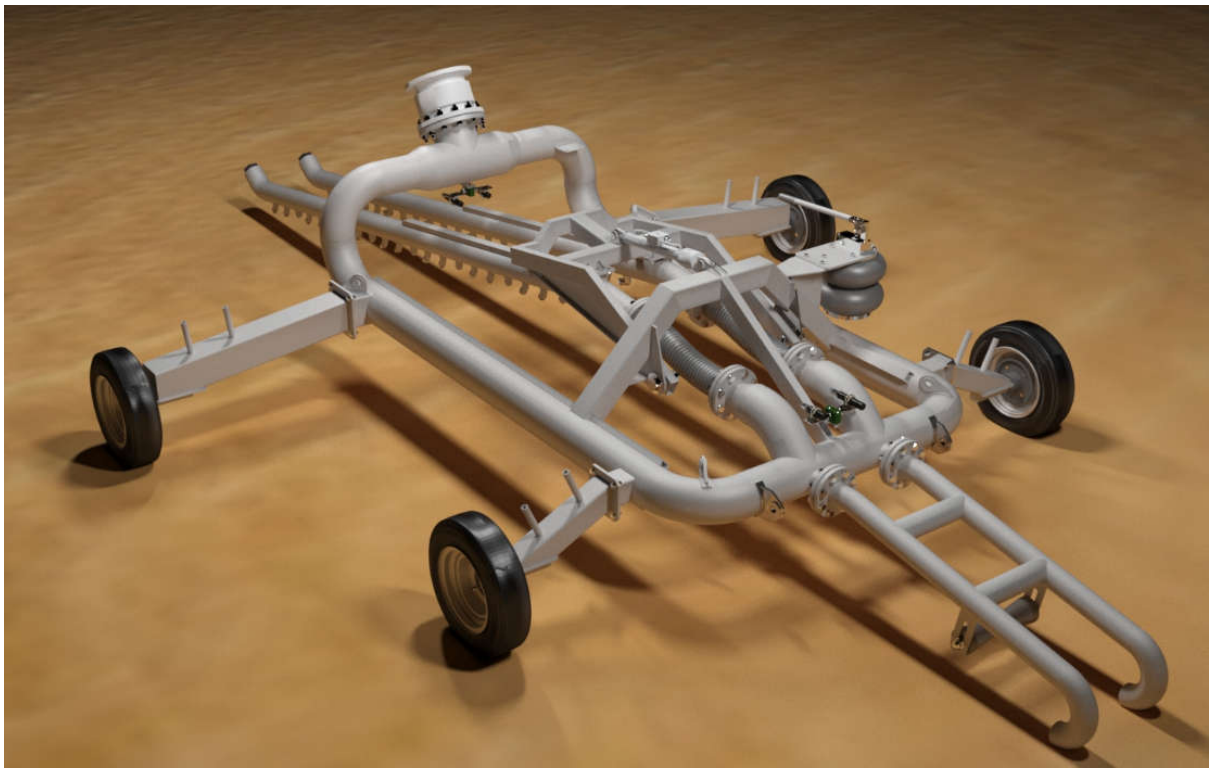
The eductor system consists of the following:

- Eductor Pipe mounted to back of Sword
- Eductor Chamber
- Eductor Flap
- Eductor Flap Cylinder and Pin Kit

The eductor flap is used to clear any blockages within the pipe work. By closing the flap, the flow of the eductor system is reversed which in turn blasts the blockage back out of the eductor inlet at the bottom of the Sword.

Appendix 9 - ETA ST-4 Diver Operated Jetter

Diver Operated Trencher: ST-4



The ST-4 is a diver operated trencher designed to provide cable burial in sands, silts and soft clays in water depths from zero up to 30 m. The trencher is self-propelled by the resultant jet reaction force of the water jets mounted on the frame and jetting share. Self-propulsion is effective in jettable sands and clay with smooth seabed. Typical forward speeds in good jettable soils are shown in the following table, this is independent of trenching depth provided that the ETA specified pump pressure and flows for the applicable depth are used. Performance is however subject to seabed conditions.

Jet tool penetration	**Typical forward speed**	**Water Pressure / Flow Requirement***
2.3m	180-300m/hr	800-900 m^3/hr at 14 bar

*Notes:

1/ Pressure/Flow requirement is based on 2.2m penetration swords spaced for 200mm maximum product diameter (Standard ST4 configuration) and is indicative for the modified

ST4 for 280mm maximum diameter product. Recommended pressure / flow will be recalculated for the modified tool but is expected to be close to the indicative value.

2/ Pressure can be reduced to approx 8 bar in loose sands to avoid undermining the rear wheels. In these conditions a light tow force from a workboat will assist progress.

Surface or sub-surface obstructions can inhibit self-propulsion as can hard underlying clay or dense sand layers. Tow points are fitted to enable the machine to be towed from a surface vessel if this becomes necessary. Typically a light towing load of up to 1000kg is sufficient to re-establish self propulsion. The tow load on the ST-4 can be monitored from the surface vessel via a load cell. As a safety measure the hydraulic deployment system for the jetting tool is designed to relieve under excess load allowing the tool to lift and avoid damage.

If the surface sediment is very soft the trencher wheels may sink and limit self-propulsion. For these conditions we recommend fitting skids to convert the trencher to a lightweight towed jet sled. Skids are available as an additional option.

Due to its compact design and minimum support requirements the ST-4 can rapidly be mobilised onto a variety of vessels. The ST-4 is ideal for post lay trenching of cables in jettable soils.

Divers are used to load the cable into the ST-4. This version has a hand pump operated hydraulic cylinder to lower the jet tool; as an option the hydraulic system can be upgraded to work with a surface mounted, electrically powered HPU via a hydraulic umbilical.

Performance Specification

The performance specification for the ST-4 trencher modified for Caldwell requirement is:

Water depth	30	m
Trench depth	2.3	m maximum
Max. product diameter	280	mm
Soils type	Sands and soft clays (limited by water pump pressure)	

Trencher Structure

The jetting trencher is generally constructed from grade 316 stainless steel.

All pins from 316 stainless steel.

Hydraulic System

The hydraulic system includes:

Deployment ram, subsea specification with spherical bearings both ends, fitted with counterbalance valves. As standard, the ram is activated by a diver operated hand pump.

Control System

Control system includes the following:

Peli case	Integrated video system includes lid mounted monitor based on a C-tecnics CV1000 C-Vision solo surface control unit. The system has an additional analogue to digital convertor fitted to input the sensor information (depth of bottom of jet tool below seabed, vehicle pitch and roll) from the ST-4 and display it on the video screen of the unit.
Camera/Lights	1 x colour camera. 1 x 24 v light.
Subsea Pod	The subsea pod is constructed of stainless steel. The face plate has a single bulkhead connector BCR1504M. The roll and pitch sensor is fitted in the pod.

Sensors	Jet leg depth (fitted in ram) Pitch (fitted in pod) Roll (fitted in pod)
Survey output	An RS232 ASCII string output of the trencher performance (depth of bottom of jet tool below seabed, vehicle pitch and roll) is provided.
Harness	Standard moulded harnesses fitted with Subconn connectors.
Umbilical	150 m ETA electrical control umbilical, extruded polyurethane jacket approx.14.5 mm OD fitted top and bottom with subsea connectors.

Water Delivery Hose

4 lengths of 25 m 8 inch lay flat water delivery hose, 15 bar working pressure. Each end fitted with PN16 flanges.