PROTECT YOUR WATERS

Prevent the spread of aquatic invasive species

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Purpose of Manual

The goals of this handbook are to:

(1) provide an overview of aquatic invasive species in New York

(2) offer information about challenges, opportunities, and details of steward positions

(3) recommend standard protocols for conducting inspections, decontaminations, and interacting with the public

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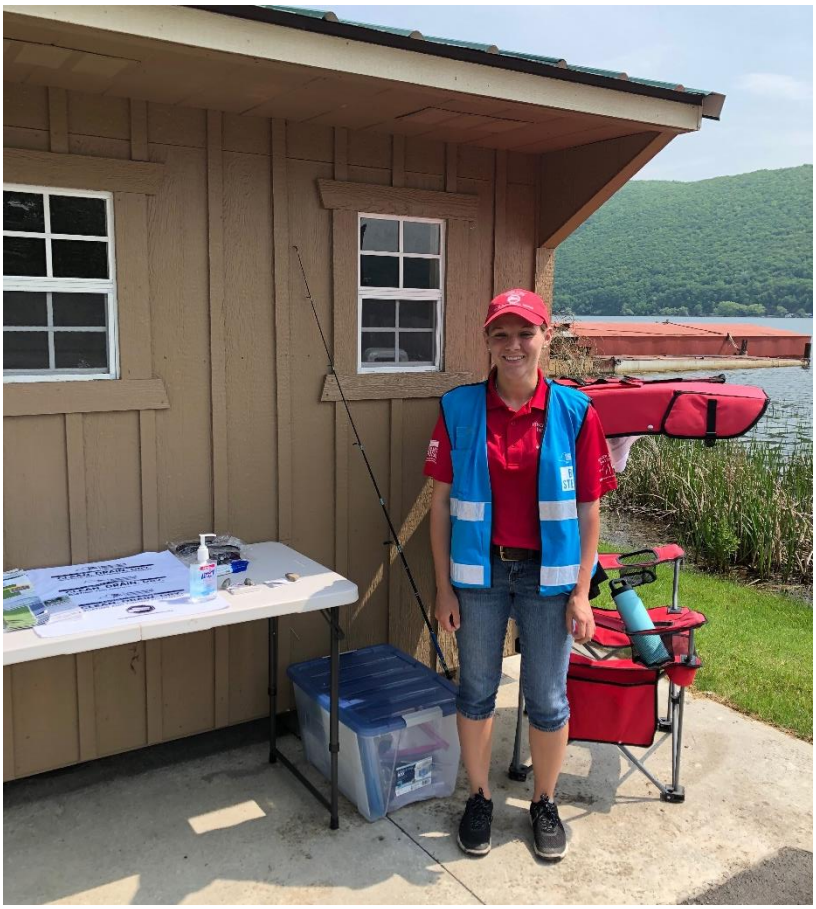
Section 1: Background/History of Watercraft Inspection Program



Introduction to Aquatic Invasives

New York State is a water-rich state and its citizens and visitors enjoy its abundance of lakes, ponds, rivers, and marine waters. As people and their boats and recreational equipment move to, from, and between different bodies of water in NY they can bring with them unwanted aquatic hitchhikers. Some of these hitchhikers are non-native species that can harm the environment by displacing or competing with native species, impact the local economy by decreasing shoreline property values, costing local municipalities and lake associations money to manage infestations, and sometimes can cause harm to human health. These species are called aquatic invasive species (AIS).

Aquatic invasive species are defined in Executive Order 13112 as "nonnative species whose introduction does, or is likely to, cause economic or environmental harm or harm to human health".

https://www.invasivespeciesinfo.gov/executive-order-13112

There are other ways by which AIS can move around the landscape. The source of most AIS in New York State are the Great Lakes (GLANSIS 2021). 188 non-native species have been introduced to the Great Lakes from international shipping vessels carrying these species in through ballast water and other means (GLANSIS 2021). To prevent any new introductions the International Maritime Organization now requires ballasted ships to exchange their ballast mid-oceanic transit to reduce the likelihood of freshwater organisms surviving the transit from their port of origin. Once established in the Great Lakes, AIS can hitchhike on boats, trailers, fishing line, in bait buckets, live wells, and boat motors to other bodies of water in the region. Other AIS introductions may occur from aquarium dumping, religious ceremony release, water garden escape, and intentional illegal stocking.

Research has shown that recreational boating is identified as a key pathway in the spread of AIS across the Great Lakes Basin including inland waterbodies (Rothlisberger et al., 2010). Organisms such as the spiny water flea, Eurasian watermilfoil, hydrilla, zebra and quagga mussels, and fish diseases such as Viral Hemorrhagic Septicemia (VHS), can be transported on anything that contacts water. Early life stages of many plant and animal species, as well as pathogens and bacteria, that are not visible to the naked eye pose a significant threat and require special consideration when preventing the spread of AIS.

Steward-demonstrated watercraft inspections are a proven, effective way to:

- Inform boaters about the impacts of AIS and teach them how to prevent their spread
- Help reduce the spread of AIS between different bodies of water
- Empower boaters to protect the natural resources they love

Watercraft inspection consists of visually inspecting all areas of boating and recreational equipment (i.e., boat, trailer, motor, livewell, anchor, personal floatation devices, fishing gear, etc.) before and/or after each use. Inspection includes visually checking all areas that come in contact with or hold water; removing all visible plants, animals, and mud; and draining water from all compartments and containers."

Boaters can help prevent the spread of AIS from one body of water to another by checking boats, trailers, and equipment for aquatic hitchhikers and draining their boats and all other areas that

can hold water before entering or leaving a waterbody.

Although more prevalent on motorized and/or trailers boats, AIS can be transported on or in any type of boat. Watercraft inspection stewards are trained to inspect and remove AIS and identify high risk watercraft and equipment for decontamination.

Aquatic Invasive Species Regulations

It is the boater's responsibility before boating in any body of water to check and understand federal, state, and local AIS regulations. Federal regulations are overarching for all states. States may adopt additional laws. Mandates become increasingly specific through the state, county, municipal, and local levels. Examples follow.

Federal Invasive Species Regulations

The policies within the National Invasive Species Act of 1996 increased national and international focus on ballast water as a vector for AIS introduction. The US Environmental Protection Agency and the U.S. Coast Guard are responsible for regulating the concentration of living organisms in ballast water. Click here for more details on U.S. Coast Guard Ballast Water Management or visit the U.S. Department of Homeland Security Homeport website at https://homeport.uscg.mil/

The Lacey Act, dating back to 1900, is one of the oldest wildlife-related laws in the U.S. The statute requires a permit for the importation and some shipment of wildlife species that are officially designated as injurious. Find more information on the U.S. Fish and Wildlife service website: http://www.fws.gov/injuriouswildlife/

Injurious Wildlife Fact Sheet: www.fws.gov/fisheries/ans/pdf_files/InjuriousWildlifeFactSheet2010.pdf

The U.S. Department of Agriculture (USDA) Animal and Plant Inspection Service (APHIS) **Federal Noxious Weed Program** "is designed to prevent the introduction into the United States of nonindigenous invasive plants and to prevent the spread of newly introduced invasive plants within the United States. APHIS noxious weed activities include exclusion, permitting, eradication of incipient infestations, survey, data management, public education, and (in cooperation with other agencies and state agencies) integrated management of introduced weeds, including biological control."

General New York State-Level Invasive Species Regulations

In 2012, Environmental Conservation Law was amended to require the New York State Department of Environmental Conservation and the NYS Department of Agriculture and Markets to "restrict the sale, purchase, possession, propagation, introduction, importation, transport and disposal of invasive species." The legislation requires the Departments to promulgate regulations. NYCRR Part 575 provides a listing of prohibited and regulated invasive species, and specifies the criteria used in making such a classification. The regulations prohibit the possession with the intent to sell, import, purchase, transport, or introduce as well as the importation, sale, purchase, propagation, transportation, or introduction of invasive species classified as prohibited. Regulated species may be sold, purchased, propagated, and transported, but not knowingly introduced into a "free-living state." Permits can be issued for research, education or other approved activities.

New York's Environmental Conservation regulations (Chapter 1, Part 180.9 b) address the buying, selling, offering for sale, possessing, transporting, importing, exporting, and causing to be transported, imported or exported live individuals or viable eggs of designated species of fish, which are determined present a danger to indigenous fish populations. Release into the wild or allowing said species to exist with a likelihood of escape into the wild is prohibited.

Specific AIS Prevention Regulations Related to New York State Boat Launches

In 2014, the New York State Department of Environmental Conservation adopted aquatic invasive species spread prevention regulations (6 NYCRR Part 59.4 & Part 190.24) requiring that any watercraft launched or retrieved from a DEC owned Boat Launch and Fishing Access Site must be free of any visible plant or animal matter and all water-holding compartments must be drained.

In 2016, DEC Regulation (6 NYCRR Part 576) was enacted which further expanded requirements for Aquatic Invasive Species (AIS) Spread Prevention to all public waterbodies. This regulation states that: *No person shall launch, or attempt to launch, a watercraft or floating dock into a public waterbody unless the following reasonable precautions of cleaning, draining, and treating have been taken.*

These "reasonable precautions" include requirements for cleaning, draining, treating, and drying that should be performed prior to placing watercraft or floating docks into public waterbodies.

In 2021, the Environmental Conservation Law was amended to create the establishment of "aquatic invasive species inspections stations" at any location in the Adirondack Park and within a 10 mile radius. When launching a motorboat within this area, operators must possess an inspection certificate documenting their compliance with the requirements of Part 576 by either possessing a self-issued certificate or an inspection certificate obtained from an inspection station.

Additionally, New York State Office of Parks, Recreation, and Historic Preservation (NYS OPRHP) regulations (9 CRR-NY 377.1) requires that boat or watercraft users must take reasonable precautions when launching or retrieving at a NYS OPRHP owned or operated boat launch. Reasonable precautions include inspecting boats or watercrafts and removing any plant, aquatic life, animal, or parts thereof and draining all water from the boat or watercraft at a distance from the waterbody and above any high water mark to avoid contact of the drainage within the waterbody.

Article 3 of the Navigation Law requires NYSDEC to develop a universal, downloadable AIS spread-prevention sign and mandates all owners of public boat launches to conspicuously display this sign.

https://www.dec.ny.gov/docs/fish_marine_pdf/invstandardsign.pdf

More information on NYS regulations can be accessed on the NYSDEC website: https://www.dec.ny.gov/animals/99141.html.

Local Invasive Species and Watercraft Inspection Regulations

Access to some public waterbodies may be controlled by local government or organizations. In example, the Lake George Park Commission (LGPC) Lake George Mandatory Boat Inspection and Decontamination Regulations, a regulatory program which requires the inspection of all trailered boats prior to being launched into Lake George. For more information about this program see: https://lgpc.ny.gov/lake-george-boat-inspections

New York State Invasive Species Program Network

Many people have been working to control aquatic invasive species in NYS for decades. In 2003, NYS government took the lead in identifying and coordinating local and regional efforts along with multiple organizations including:

- Cornell University Cooperative Extension
- New York iMapInvasives.org
- New York Heritage Program

- New York Invasive Species Clearinghouse at Cornell University
- New York Sea Grant
- Soil and Water Conservation Districts
- Partnerships for Regional Invasive Species Management (PRISM)

The NYS Invasive Species Task Force recommended building and funding eight Partnerships for Regional Invasive Species Management (PRISMs) across NYS, to prevent or minimize the harm caused by invasive species to New York's environment in its 2005 report to the governor and legislature. New York State, authorized under Title 17 Environmental Conservation Law 9-1705(5)(g), has formed and funded PRISMs in their efforts to address invasive species. PRISMs coordinate invasive species management functions including coordinating partner efforts, recruiting and training citizen volunteers, identifying and delivering education and outreach, establishing early detection and monitoring networks and implementing direct eradication and control efforts.

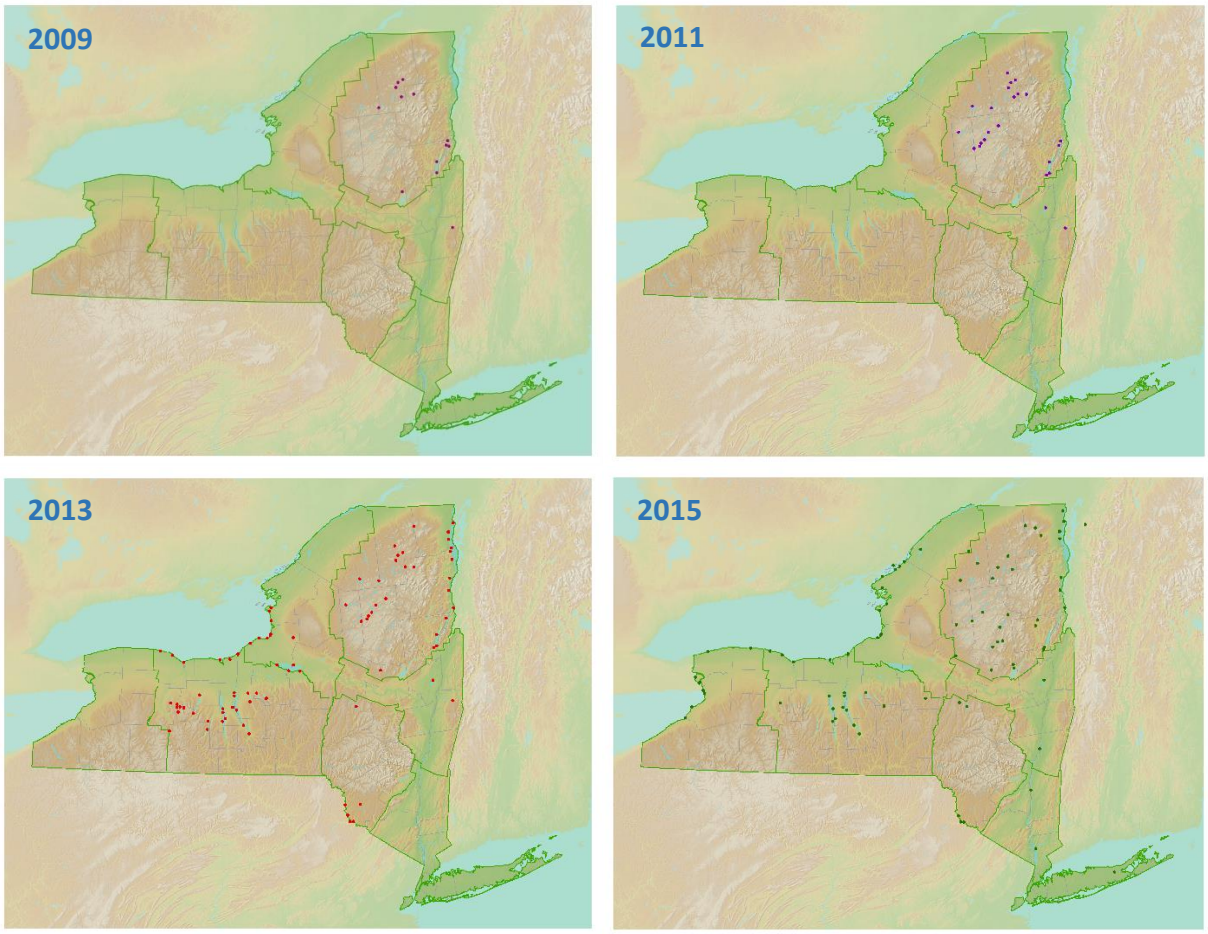
In addition, New York's Eight PRISMs:

- Plan regional invasive species management activities
- Implement invasive species prevention programs
- Conduct surveillance and mapping of invasive species infestations
- Detect new infestations early and respond rapidly
- Implement control projects
- Implement habitat restoration and monitoring
- Educate stakeholders on invasive species and their impacts
- Coordinate PRISM partners
- Recruit and train volunteers
- Support research through citizen science in collaboration with the Invasive Species Research Institute http://www.nyisri.org/
- Report observations to iMapInvasives
- http://www.nyimapinvasives.org/
- Act as regional communication hubs

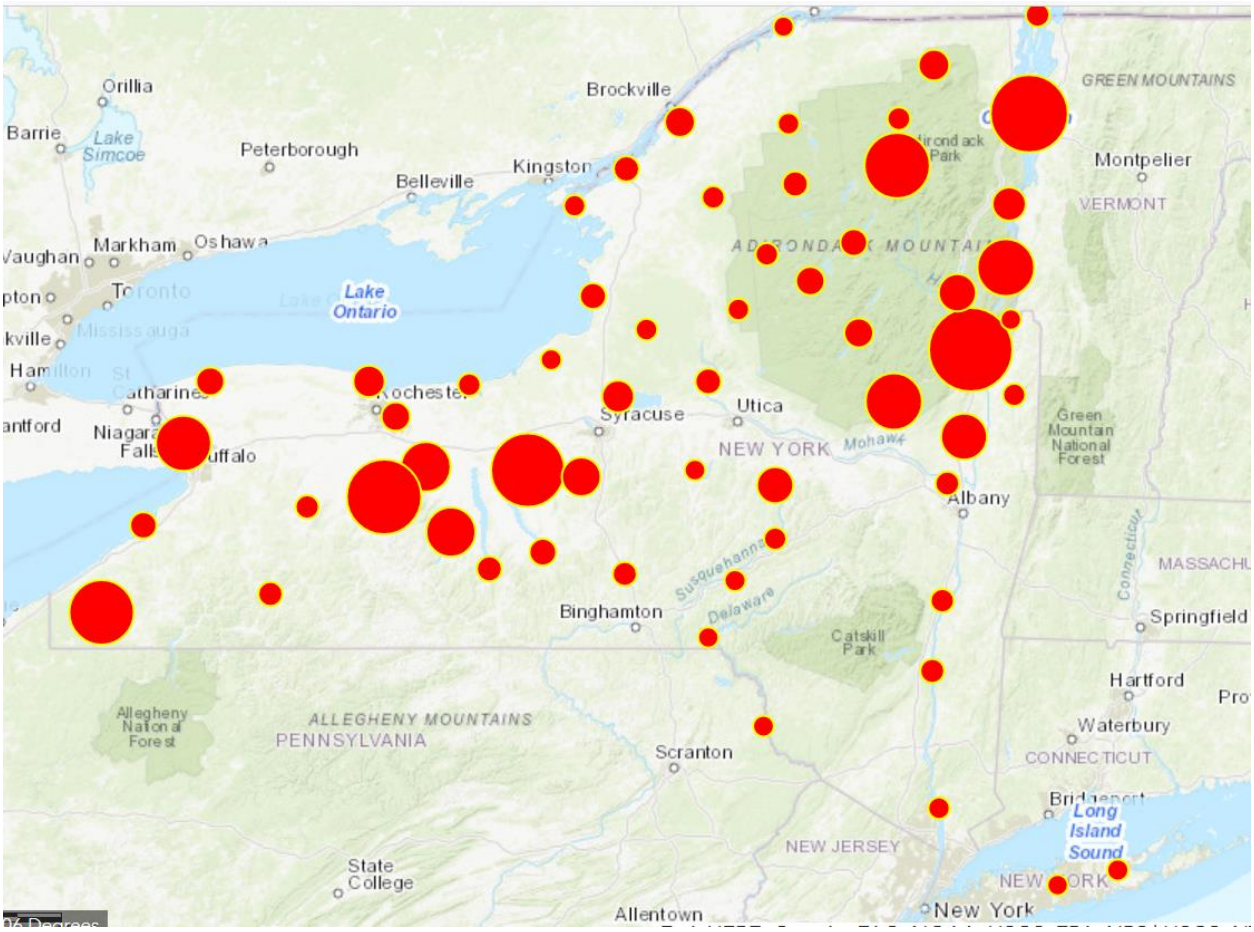
The Watercraft Inspection Steward Programs are a statewide effort that deploys stewards at boat launches across the state, including Lake Erie, Lake Ontario, the Finger Lakes, the Thousand Islands, the Adirondacks, the Catskills, Lake Champlain, Lake George, Saratoga Lake, the Hudson River, Delaware River, Susquehanna River, Mohawk River, and Long Island. Boat inspection programs, which began as grassroots efforts in the Adirondacks in the early 2000s, were recognized and supported with increased government funding around this time. Stewards participate in many education and outreach events and invasive species removal projects, and, during the boating season, inspect and remove invasive species from watercraft.

As of 2020, boat steward programs are active at more than 200 locations across New York State. Many types of organizations host watercraft inspection steward programs including lake associations, colleges and universities, not-for-profits, county soil and water conservation districts, and municipalities. Use NYSDEC's interactive map to find watercraft inspection steward locations or visit NYSDEC's webpage on all boat launch locations for more information about public boat launches in New York State.

Growth of the NYS Boat Steward Program

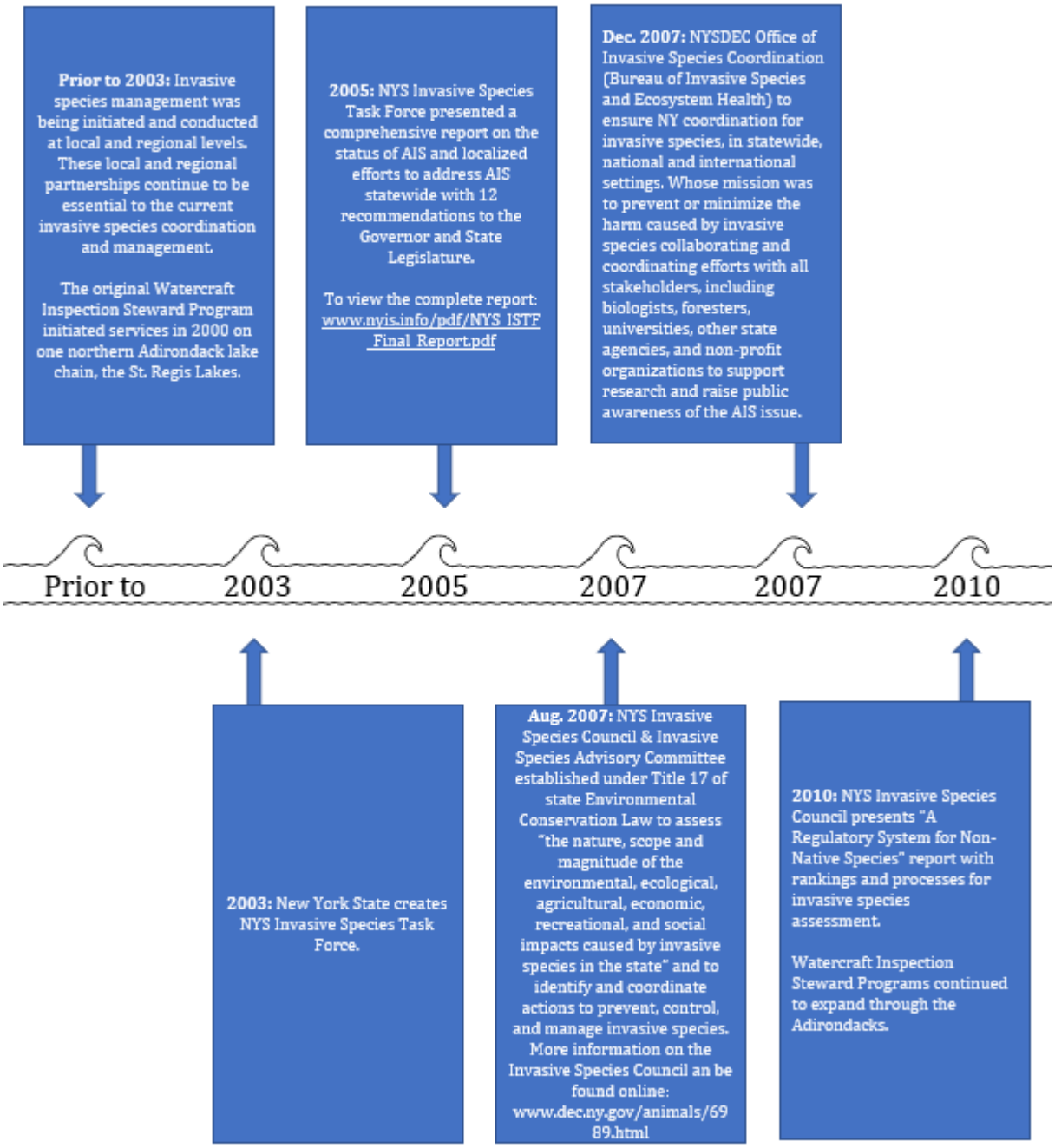


NYS Boat Steward Locations in 2021

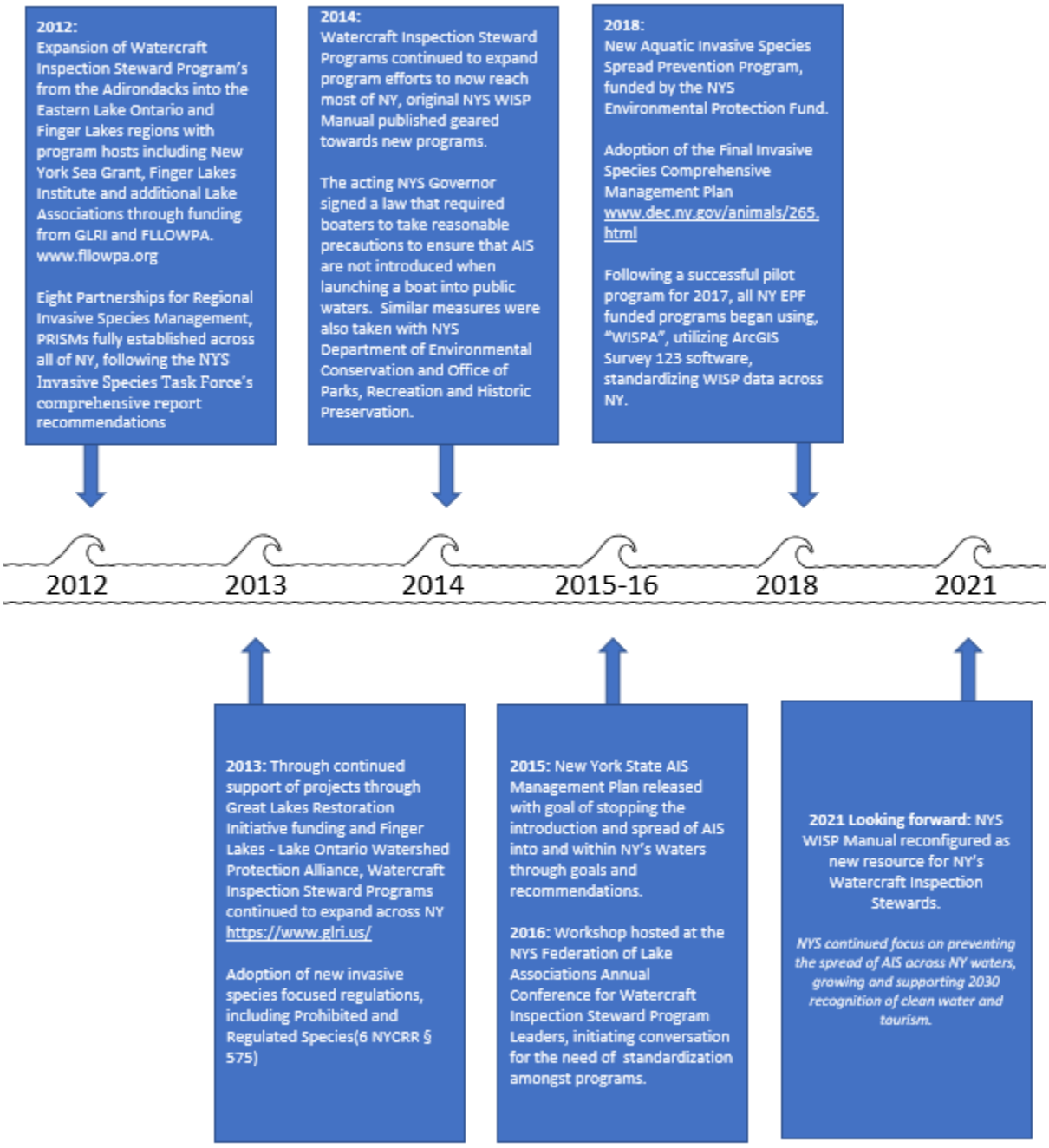


Note: size of circles denotes popularity of launches.

Timeline of Invasive Species Activity in New York State



Timeline of Invasive Species Activity in New York State



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Section 2: Aquatic Invasive Species

What are Aquatic Invasive Species?

Aquatic invasive species are nonnative species whose introduction does, or is likely to, cause economic or environmental harm or harm to human health as defined by Federal Executive Order 13112. In the context of the watercraft inspection and stewardship programs, it is important to be aware of all life stages of aquatic invasive species including their seeds, eggs, larvae, spores, turions, tubers or other biological material capable of propagation in order to effectively detect, remove, and prevent their introduction and spread.

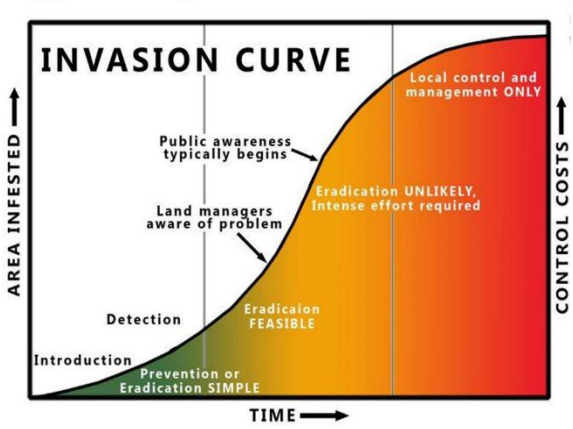
New York State's legal definition of invasive species is consistent with the federal definition and is "a species that is nonnative to the ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health…the harm must significantly outweigh any benefits" (ECL § 9-1703).

National Aquatic Nuisance Species Task Force

When Congress passed the Nonindigenous Aquatic Nuisance Prevention and Control Act in 1990, reauthorized with the passage of the National Invasive Species Act in 1996, the Aquatic Nuisance Species Task Force (ANSTF) was established. This multi-agency federal body co-chaired by U.S. Fish and Wildlife service and the National Oceanic and Atmospheric Administration is dedicated solely to preventing and controlling aquatic nuisance species. The ANSTF implements the Act by preventing introductions and dispersal, conducting research to manage and control, coordinating programs and activities of the ANSTF members and state agencies, and educating and informing the public about prevention, management and control of aquatic invasive species. The ANSTF is supported by regional Panels made of up state and provinces that implement aquatic invasive species spread prevention, management, research and education and outreach efforts and advise the ANSTF. New York State participates in the Great Lakes, Northeast, and Mid-Atlantic Aquatic Nuisance Species Panels where regional collaborations enhance the state's ability to respond to aquatic invasive species introductions, education and outreach messages are refined and shared consistently, priority species and infestations are addressed, and research priorities and management evaluation are shared. International, national, regional, and state communication and collaboration are critical to aquatic invasive species spread prevention efforts.

NY State AIS Management Plan

The ANSTF approved New York's first Nonindigenous Aquatic Species Comprehensive Management Plan in 1994. An updated, New York State Aquatic Invasive Species Management Plan was approved by the ANSTF in 2015 (https://www.dec.ny.gov/docs/fish_marine_pdf/nysaisplan15.pdf). The Plan identifies goals and supporting actions that aim to reduce the potential for the introduction and spread of nonindigenous aquatic species into New York Waters, minimizing harmful impacts from those organisms, and educating the public on the importance of preventing future introductions. The ANSTF approved Plan makes New York eligible for funding to support the plan from U.S. Fish and Wildlife Service. One of the ten high-priority actions identified in the plan includes expanding the boat launch steward program and ensuring the consistency of these programs statewide.



The invasion curve highlights the path of an invasive species once it's introduced, including feasibility of control and where awareness of general public and managers fall along that path. The longer a species is able to persist, the greater the area infested and the cost of control becomes.

Impact Overview: Why Should We Care About AIS?

Economic Impact: As illustrated by the invasion curve, the federal, state, and local costs to manage AIS increase each year populations continue to grow and spread. Infestations of AIS that limit recreation by forming dense mats of vegetation, making it difficult or impossible to boat, swim, or fish, clog waterways, reduce navigable waters for commercial operators, and obstruct water pipes may impact the value of public and privately-owned property.

Ecological Impact: AIS can out-compete and displace native species, thus disrupting food webs and altering native aquatic species population abundance and composition. These ecosystem changes may make once suitable habitat less favorable for native aquatic animals such as sport fish and macro invertebrates.

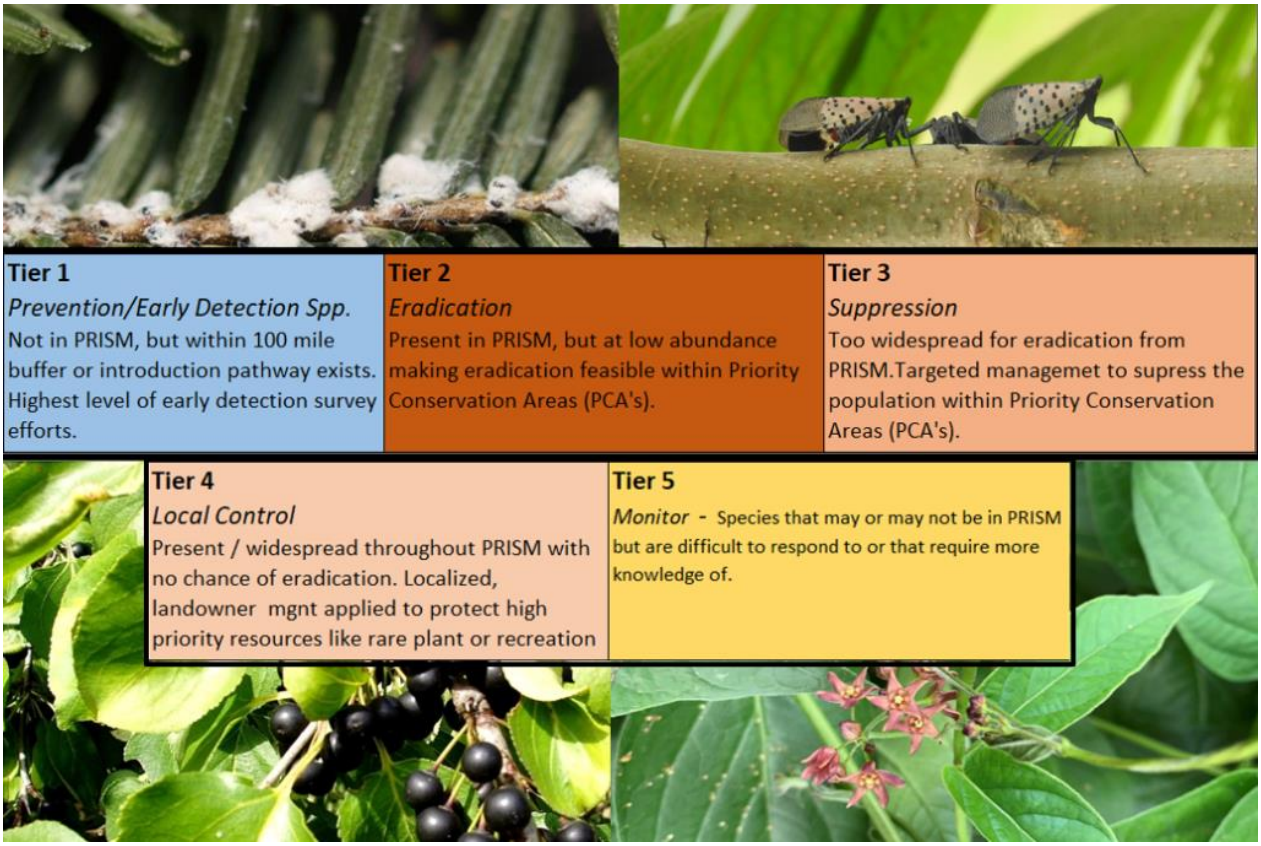
Impact on Human Health: AIS can carry pathogens and parasites that are harmful to native species and potentially to human health. For example, Botulism (type E) is a bacterial disease transferred to invasive round goby by consumption of mussels which that has caused die offs in goby predators such as fish (e.g., freshwater drum, smallmouth bass, lake sturgeon) and waterbirds (e.g., ring-billed gulls, common loons, long-tailed ducks) that consume round goby in NY's Lakes Erie and Ontario. The excessive growth exhibited by invasive plants can also lead to decreases in dissolved oxygen and subsequent die-offs of fish and release of excess nutrients, like phosphorous, that contribute to harmful algal blooms. Some species even pose a direct physical risk, with shells or seeds sharp enough to penetrate skin.

Tier Species List

Due to limited resources, eradication is not feasible for every project, species, or location. Economic and ecological cost may outweigh the benefits of a control project. The New York Natural Heritage Program (NYNHP) and invasive species programs across NYS worked together to develop an invasive species prioritization tool to help managers decide which invasive species management efforts will have the best outcomes. This resulted in the invasive species tier list, which uses a standardized approach based on the invasion curve, categorizing species with current distribution data and expert input. The tiers define the greatest priority species as those with the lowest abundance and highest impact. Tiers were created using a combination of:

1. Abundance estimates from invasive species data observations sourced from online databases
2. Ecological and socio-economic impact assessments
3. NYS invasive species staff provided input and adjusted based on local knowledge

These tiers have important implications on the resource allocation. The tiers inform how



Tiers of invasive species.

contracts are awarded for eradication projects, the statewide horizon scanning operations that search for incoming species, and the work of national invasive species organizations operating across states. Having standardized, data-informed, replicable tiering methods improves the prioritization process at all levels.

These invasive species tier rankings aren't uniform across NYS, varying slightly by geography. With more than 180 non-native and invasive aquatic species with self-sustaining populations in the Great Lakes Basin alone, stewards are not expected to know all the AIS that exist in or are approaching NY but should be familiar with the regional PRISM Tier Species Lists and major AIS threats in the region of which they work.

For more information on the tier species list visit the NYNHP Story Map:
https://www.arcgis.com/apps/MapJournal/index.html?appid=c7af93ee62314f789b2bfc1802a5cc4a

AIS as Threats to New York State

While many AIS share similar characteristics and the same potential risk of impacts, several species are of major concern to New York State and are considered a high priority for early detection and spread prevention through interception by watercraft inspection stewards at boat launches.

Example Species a Steward May Encounter

* indicates a marine species

Aquatic Invasive Plants

- Curly-leaf pondweed *Potamogeton crispus*
- Eurasian water-milfoil *Myriophyllum spicatum*
- European frogbit *Hydrocharis morsus-ranae*
- European water chestnut *Trapa natans*
- Fanwort *Cabomba caroliniana*
- Hydrilla/Water thyme *Hydrilla verticillata*
- Starry Stonewort *Nitellopsis obtusa*
- Water hyacinth *Eichhornia crassipes*
- Water lettuce *Pistia stratiotes*
- Watercress *Nasturtium officinale*
- Parrot's feather *Myriophyllum aquaticum*
- Brittle naiad *Najas minor*
- Variable leaf milfoil *Myriophyllum heterophyllum*
- Dasy – *Dasysiphonia japonica**
- Red algae- *Gratalupia turuturu**

Water hyacinth plants.

Aquatic Invasive Animals

- Silver carp *Hypophthalmichthys molitrix*
- Bighead carp *Hypophthalmichthys nobilis*
- Grass carp *Ctenopharyngodon Idella*
- Black carp *Mylopharyngodon piceus*
- Asian clam *Corbicula fluminea*
- Northern snakehead *Channa argus*
- Quagga mussel *Dreissena rostriformis bugensis*
- Round goby *Neogobius melanostomus*
- Rusty crayfish *Orconectes rusticus*
- Spiny waterflea *Bythotrephes longimanus*
- Zebra mussel *Dreissena polymorpha*
- Tench *Tinca tinca*
- Red Swamp Crayfish *Procambarus clarkii*
- Chinese mystery snail *Cipangopaludina chinensis*
- Japanese mystery snail *Cipangopaludina japonica*
- Fishook waterflea *Cercopagus pengoi*
- Tubenosed goby *Proterorhinus semilunaris*
- Chinese mitten crab *Eriocheir sinensis**
- Asian shore crab *Hemigrapsus sanguineus**
- New Zealand mud snail *Potamopyrgus antipodarum*
- Asian swamp eel *Monopterus albus*
- Bloody red shrimp *Hemimysis anomala*
- Bryozoa *Tricellaria inopinata**
- Sea anemones *Aiptasiogeton eruptariantia**
- Carpet tunicate *Didemnum vexillum**

A bloody red shrimp.

High Priority Species Examples

Hyrdrilla (*Hydrilla verticillata*)

Hydrilla is a submersed aquatic plant included on the federal Noxious Weed List and is prohibited in New York (Part 575). It was first reported in New York in the early 2000s with introductions and spread into the Erie Canal, Cayuga Lake, the Croton River/New Croton Reservoir, and throughout Long Island. The species is unique from other submersed plants in both growth and reproductive habit. It can withstand extremely low-light conditions, allowing it to colonize deeper waters, and has three distinct methods of reproduction: fragmentation and the production of tubers and turions (Langeland 1996). The species poses a direct threat to New York's recreational fisheries, as it can interfere with fish spawning areas, decrease the size of popular sportfish like the largemouth bass, and deplete available dissolved oxygen in the water (Foltz and Kirk 1994). In reservoirs that provide drinking water, hydrilla can reduce the flow of water and impact the taste of drinking water.

A clump of hydrilla.

THE COST OF INTRODUCTION: HYDRILLA IN THE CROTON RIVER

TOP: Oct 14, 2015 – Dense hydrilla topping out at the surface of the Croton River (Photo: SePRO)

BOTTOM: Nov 2, 2017 – Hydrilla almost completely controlled in same location following treatment (Photo: SePRO)

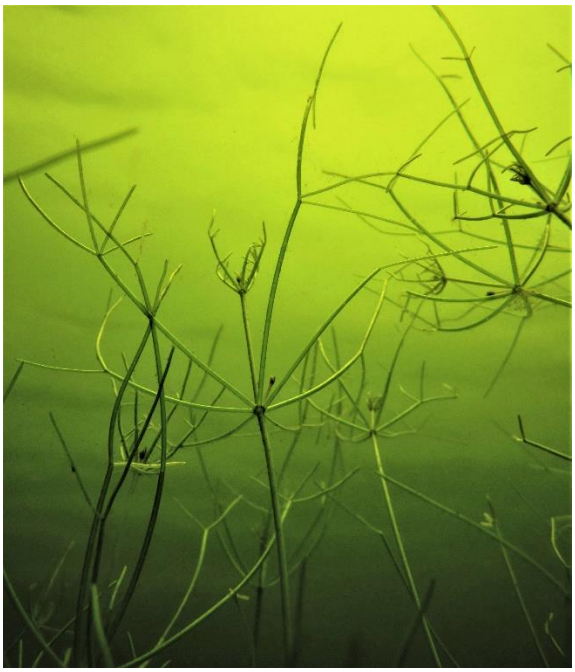
The Croton River proper is a tailwater ecosystem, flowing from the base of the New Croton Reservoir (part of NYC's water supply system) to the Hudson River Estuary. An aquatic plant survey in 2013 revealed Hydrilla verticillata had infested portions of both the reservoir and river. We suspect the hydrilla introduction resulted from an aquarium release. The next two years were spent consulting with experts and local stakeholders to develop hydrilla management plans for the Croton River (led by NYSDEC) and New Croton Reservoir (led by NYC Department of Environmental Protection) and to launch respective control projects by utilizing public meetings, consulting with municipalities, initiating permitting processes, and finally hiring contractors. Able to grow an inch per day, and lacking any local predators, by 2016, hydrilla had formed large mats and spread throughout most of the New Croton Reservoir and Croton River. Herbicide treatments, water quality monitoring, and extensive aquatic plant surveys are all components of the respective control projects. So far, DEC and DEP combined have spent over 4 million dollars on their respective control efforts. The herbicide treatment has been extremely effective at controlling hydrilla and once treatments have been completed several years of monitoring will be required to ensure project success.

Water Chestnut *(Trapa natans)*

One of the oldest invaders into New York's waterways is water chestnut, which was first reported in the late 1800s. This floating plant is easily recognized by its characteristic rosettes and sharp, four-horned nutlets, and tends to grow rapidly and form dense mats of vegetation once introduced. Its exponential growth is attributed to prolific seed production; once germinated, each seed produces a single stem that can host up to 20 rosettes, which in turn can produce 20 more seeds for the following season. Because of its invasiveness and severity of impacts (localized decrease in dissolved oxygen, sharp spines on nutlets that can injure recreationists), water chestnut is listed in federal regulations prohibiting interstate sale/transportation. It is also listed as a prohibited species in NYSDEC's regulations listing of prohibited and regulated invasive species. Water chestnut poses a prominent threat to recreational tourism in New York state. In some areas, like the Hudson River, Mohawk River, and Lake Champlain, water chestnut has reduced the number of accessible areas for boaters and anglers. Water chestnut also shades out important native plants such as water celery (Vallisneria americana), which is critical habitat for the American eel (Anguilla rostrata).

A water chestnut plant.

Starry Stonewort (*Nitellopsis obtusa*)



A starry stonewort plant.

While it may look morphologically like a vascular plant, starry stonewort is actually a macroalgae, similar in appearance to native muskgrass (Chara sp.) and other stoneworts (Nitella spp.). It is made up of internodal segments, which act as a stem, and whorls of 5-7 branchlets at each node. The species can be most easily identified by the presence of star-shaped bulbils, reproductive structures found beneath the sediment. The species can form thick, pillowy mats along the bottoms of slow-moving lakes and ponds and can easily spread through fragmentation by hitchhiking on boats and trailers. Starry stonewort was introduced into the St. Lawrence River in 1978 and has since spread to and impacted many waterbodies throughout the Great Lakes Basin and beyond. While the species

THE COST OF INTRODUCTION: WATER CHESTNUT IN LAKE CHAMPLAIN

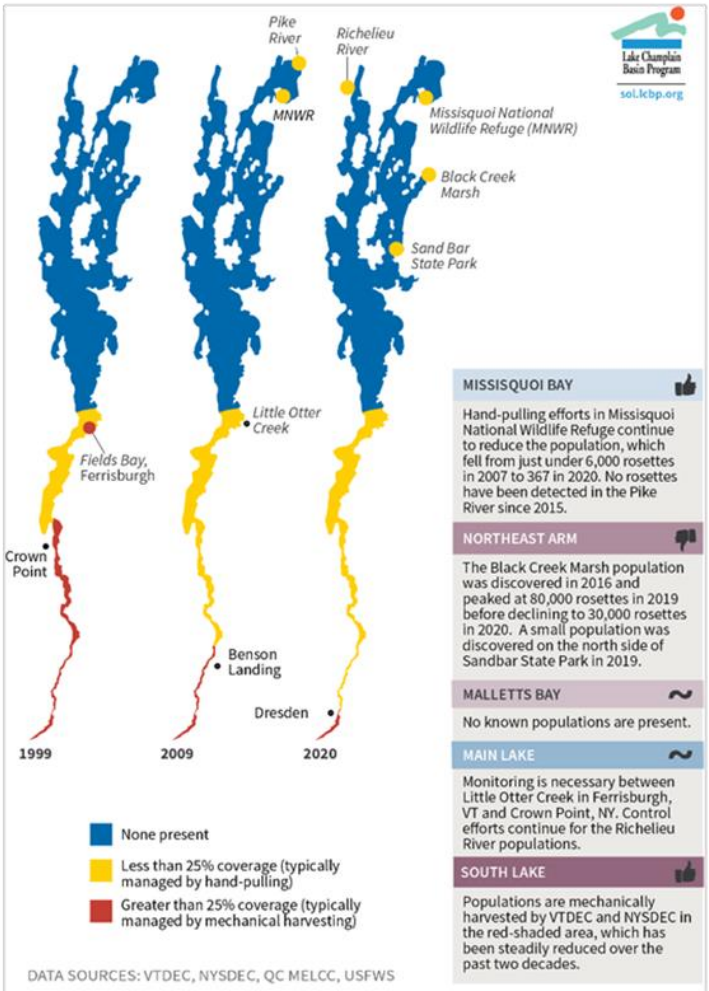


Figure 19 | Invasive water chestnut coverage in Lake Champlain

Water chestnut is thought to have arrived in South Lake Champlain via the Hudson River – Champlain Canal sometime prior to 1940. It quickly established itself as the dominant aquatic vegetation species in the south end of the lake, forming dense mono-culture mats. Twice in the history of water chestnut management in Lake Champlain, water chestnut was thought to have been controlled. A control program instituted in Lake Champlain in the 1950s proved successful, resulting in only eight bushels of water chestnut being hand pulled from the lake in 1967. The control program was terminated in 1971 because water chestnut was thought to have been eliminated from southern Lake Champlain and, therefore, funding for the program ended. By 1982, the water chestnut population had rebounded. An estimated 300 acres of water chestnut existed over a range of approximately 20 miles of southern Lake Champlain. In 1982, the Vermont Department of Environmental Conservation, with funding from the Army Corps of Engineers, reinstated a water chestnut management program for Lake Champlain. During the first nine years of the program, adequate funds were available and significant headway was made in reducing the extent of water chestnut in the southern end of the lake. From 1991-1996, State of Vermont matching funds for water chestnut management were severely reduced, and the significant headway made in Lake Champlain in the 1980s was entirely lost. Water chestnut had since re-infested all the areas where it had previously been controlled and by 1997 it had expanded to a range extending 52 miles north or Whitehall. Water chestnut has also been confirmed in smaller areas in other lakes/ponds in Vermont and in the northern end of Lake Champlain at locations in Quebec and Vermont. These smaller infestations are being managed under other programs concurrent with the efforts in South Lake Champlain. A renewed management program by Vermont in 1998 with average annual budgets of $500,000 has greatly reduced the extent of water chestnut growth in South Lake Champlain. In the past few decades, the continued dedicated partnership of NY, VT, Quebec, USFWS, Lake Champlain Basin Program, and other nonprofit efforts are successfully managing water chestnut populations in Lake Champlain.

has been generally understood to favor deeper waters typically not utilized by native macrophytes, one study of four lakes in the Finger Lakes region found that starry stonewort biomass exceeded that of other macrophytes, suggesting that it directly outcompetes native plants in the littoral zone (Brainard and Schulz, 2016). This can potentially impact spawning habitat of bass and other sunfish, as they will not use starry stonewort for reproduction.

Zebra and Quaga Mussels (*Dreissena spp.)*

Zebra mussel on a fishing lure.

Zebra and quagga mussel are Eastern European bivalves were introduced to the Great Lakes in the late 1980s via ballast water and have since become one of the most familiar aquatic invasive species throughout the United States. Although they only grow to the size of a thumbnail, these sessile invertebrates have cost an estimated $500 million in management costs in the Great Lakes due to their ability to attach to hard surfaces (including each other and native mussels) resulting in impaired industrial power and water facilities and encrusted recreational structures like boat docks. Zebra mussels pose a multi-billion dollar to New York's lakes including Lake George, where they were introduced in 1999. The substantial risk to outdoor recreation, tourism, municipal water supply led to the creation of the Lake George Invasive Species Task Force and the Lake George Mandatory Boat Inspection Program to prevent further spread and reintroduction of the species. Dreissenid mussels also have severe ecological impacts, as illustrated by their invasion into the Hudson River and the subsequent drop in phytoplankton available as food for native species. Their introduction has also severely impacted native freshwater mussels and caused large die offs or extirpation in many NY waterbodies.

Spiny Waterflea (*Bythotrephes longimanus*)

The spiny waterflea is a predatory aquatic zooplankton from the Ponto-Caspian region introduced into the Great Lakes through ballast water. While it prefers cold, freshwater habitats, it can survive in warmer and/or brackish waters as well, and despite being New York's smallest invader at just over 0.5 inches long it can severely influence food web dynamics and decrease survival of young-of-year planktivorous fish through direct competition for food resources. The species has been found in several popular lakes in New York State including Lake Erie, Lake Ontario, Lake George, Great Sacandaga Lake, Piseco Lake, Saratoga Lake, and Lake Champlain, where it is believed to have contributed to the decline in native alewife. Spiny waterflea also cause additional problems for anglers, as their spined tails catch on fishing line and can create clumped masses and interfere with gear operation.

Spiny waterflea.

Round Goby (*Neogobius melanostoma*)

Round goby (Photo: USGS)

The round goby is a small, benthic fish introduced into the Great Lakes in the 1990s that has not only established in the St. Lawrence River, but also slowly made its way across New York via the Erie Canal, with the first Hudson River report occurring in 2021. It can be distinguished from other gobies by its fused pelvic fin that act as a suction cup for stability on the benthos, as well as a prominent black spot on the second dorsal fin. It prefers hard substrate, such as cobble or boulder, in shallow water but will occupy macrophyte beds in absence of preferred habitat. The round goby is a severe threat to New York's recreational fisheries. It is aggressive and territorial with a generalist diet, competing with native sculpin, logperch, and darters for spawning and feeding grounds in the Great Lakes. Its diet consists of benthic invertebrates, small fish, and fish eggs, but most of its diet is zebra mussels, which are generally attributed to the facilitation of the round goby invasion.

Northern Snakehead (*Channa argus*)

The northern snakehead is an aggressive, predatory fish originally brought to the United States to be sold in fish markets and in the aquarium trade. It was subsequently introduced into natural waterways. This species can get up to 3 feet long and is a fierce competitor with native species, not only through direct competition for food and space, but also predation. It has a wide-ranging diet that spans across taxa, with adults eating crustaceans, reptiles, fish, and even small birds and mammals. The northern snakehead is currently confirmed in two connected ponds in Queens County. The impact this fish has had in other United States infestations is cause for concern. In rivers of the Chesapeake Bay watershed, where the snakehead was introduced in 2004, 17 native species declined up to 97% as revealed in a 2019 study (Newhard and Love, 2019). There was an additional population of the species in Orange County, NY that was eradicated in 2008 using pesticides, but the lake is still regularly monitored to ensure snakeheads have not returned. In 2020 northern snakehead was confirmed in the Callicoon area of the Delaware River. In the fall of 2021, a single snakehead was caught by an angler in Sullivan County's Bashakill Wildlife Management Area. The full extent of their spread is not yet known, but NYSDEC and CRISP will continue to monitor the region.

Fisher holding a Northern Snakehead.

Asian Carp (Silver and Bighead Carp, *Hypophthalmichthys sp*.)

Silver and bighead carp were introduced from Eastern Asia to the United States in the 1970s by means of aquaculture and for phytoplankton control. They are not currently found in the New York State or the Great Lakes. The silver carp has an upturned mouth without teeth, a keel that extends forward past the pelvic fin base, and a silvery color. The bighead carp can be identified by a smooth keel between the anal and pelvic fins that does not extend anterior of the base of the pelvic fins, and dark coloration on its sides. Both fish lack scales on the head and have eyes that point downward. After introduction to the United States, Asian carp escaped into the Mississippi River Basin and have developed self-sustaining populations. Ecological risks and impacts of Asian carp introduction into New York include rapid range expansion leading to a decrease in the abundance of native mussels, invertebrates, and fishes. Silver carp and bighead carp can grow very fast compared to native fishes in New York and have potential to cause damage to fisheries because they feed on plankton that is required by larval fish, mussels, and larger planktivorous fishes, such as gizzard shad. The decline of native fish populations could degrade multiple fisheries and negatively impact communities that benefit from these fisheries (DeBoer et al. 2018). In addition, silver carp are known to jump ten feet into the air when motorized vessels pass by, resulting in injury to boaters (https://pubs.usgs.gov/fs/2010/3033/pdf/FS2010-3033.pdf).

Fisher holding Silver and Bighead Carp.

Section 3: Components of a Watercraft Inspection

What is Watercraft Inspection?

Watercraft inspection consists of visually inspecting all areas of boating and recreational equipment (i.e., boat, trailer, motor, livewell, anchor, personal floatation devices (PFDs), fishing gear, etc.) before and/or after each use. Inspection includes visually checking all areas that contact or hold water; removing all visible plants, animals, and mud; and draining water from all compartments and containers. These practices reduce the risk of movement of all organisms from one body of water to another.

Purpose of Watercraft Inspection

Recreational boating is identified as a key pathway in the spread of aquatic invasive species (AIS) across the Great Lakes Basin including inland waterbodies (Rothlisberger et al., 2010). Educating boaters on the importance of watercraft inspection can reduce the chances of AIS spreading in New York State (NYS) waterbodies through this key pathway.

Organisms, such as the spiny waterflea, Eurasian watermilfoil, hydrilla, and zebra mussel, can be transported on anything that is in contact with the water, including boats, trailers, and other recreational equipment. Early life stages of many plant and animal species, as well as pathogens and bacteria, are often difficult to detect with the naked eye and can be transported in spaces that hold water such as bilge water, livewells, and bait buckets. Thus, completing watercraft inspection before and/or after every use is integral in preventing the spread of AIS.

Boaters can help prevent the spread of AIS from one body of water to another by checking boats, trailers, and equipment for aquatic hitchhikers and draining their boats and all other areas that can hold water before entering or leaving a waterbody.

The purpose of watercraft inspection is to...

- Limit or prevent the spread of AIS by containing infestations to current locations
- Reduce the impacts of AIS on native aquatic organisms and ecosystems.
- Increase boater awareness about ways they can help prevent the spread of AIS.

Although more prevalent on motorized and/or trailered boats, AIS can be transported on or in any type of watercraft. Therefore, all watercrafts should be inspected whenever possible. Specific examples include but are not limited to fishing boats, house boats, cabin cruisers, ski boats, sail boats, row boats, personal watercraft, canoes, kayaks, paddleboards, and inflatables. Recreational equipment can also harbor aquatic hitchhikers and should be inspected regularly. Specific examples include fishing equipment, waders, anchors and lines, inflatable fenders, PFDs, floats, and paddles. Watercraft inspection steward programs exist across NYS to protect the integrity of New York's waters and prevent the spread of aquatic invasive species. These programs demonstrate and educate boaters on how to help control the spread of AIS through proper watercraft inspection practices and care of recreation equipment.

Steward-demonstrated watercraft inspection is an effective way to:

- Increase boater awareness about the threats of AIS and ways they can help prevent the spread
- Instill a sense of responsibility and empower boaters to protect the NYS waters they love
- Encourage responsible recreational boating practices as they pertain to AIS spread prevention
- Teach boaters how to intercept potential introduction and establishment of AIS
- Help reduce the spread of AIS
- Change boater behavior and perspectives

Expectations of Stewards During Watercraft Inspections

During each interaction with boaters, stewards are expected to provide a positive, hands-on educational experience. Stewards should teach boaters how to look for and remove aquatic hitchhikers and drain all water from the vessel and compartments; collect visual data; ask survey questions; and provide AIS information to boaters.

During a watercraft inspection, stewards:

- Inform boaters about the importance and reason for watercraft inspection
- Engage boaters in the inspection process and demonstrate how to look for aquatic hitchhikers/debris on boats, trailers, and other boating and recreation equipment
- Inform boaters of the importance of draining water from all compartments, including bilge, bait buckets, livewells, motor, ballast tanks, and any other areas that may hold water
- Inform boaters on properly removing and disposing of any aquatic organisms and/or debris encountered
- Collect inspection data from boaters, e.g., if the boater takes any measures to prevent the spread of AIS, the last body of water the vessel was in during the prior two weeks, and any organisms detected during the inspection
- Distribute AIS educational materials, and
- Respond to boaters' AIS-related questions

Stewards should emphasize the Clean, Drain, Dry educational message during the inspection process and encourage boaters to follow the easy-to-remember procedures every time they launch and retrieve their boats without a watercraft inspection steward present. A positive experience with a steward can lead to the adoption of responsible boating practices as it pertains to AIS spread prevention.

Inspection Station/Safety

Boat launches can be dangerous places with vehicles moving rapidly in unexpected ways. Always exercise caution.

Always be in contact with the boater of whose boat you are inspecting. Let the boater know what you are doing and what the boater needs to do to keep both parties safe.

It is safest to perform your inspection when the boater has stopped their vehicle and exited. If the boater remains behind the wheel during inspection, ask them to put their vehicle in park. Never walk behind the boat unless the boater knows you are there.

Never crawl underneath a boat unless the vehicle is in park, the boat owner is out of the vehicle, and you have verbally told them that you are going underneath their boat. It is also only recommended to do this when the boat is on flat ground.

Be especially aware of your surroundings at double-ramp launches where several vehicles may be in motion simultaneously.

Supplies Needed to Complete Watercraft Inspection

Data Collection Tools

To ensure the proper collection of data during inspections, the following items are recommended for use:

- Fully charged tablet - GPS enabled for best usage (the WISPA data collection app supported by NYNHP operates on either iOS or Android tablets)

- Back-up paper data forms (for use only when a tablet is inoperative)
- AIS sample receptacles
- Zip-lock bags with labels
- Tupperware containers (clear or white)
- 5-gallon bucket to collect standing water
- Scrub brush and plastic scraper tool to assist with AIS removal

Educational Materials

To provide additional information on AIS during before/after the inspection process, the following items are recommended at each steward location:

- AIS related educational handouts (Protect Your Waters rack cards, fact sheets, stickers, etc.)
- AIS specimens or samples
- Table to display education materials/handouts
- Tupperware containers can also be used for displaying fresh samples of AIS or native plants found in the waterway.

Personal Protective Equipment (PPE)

To ensure the safety of stewards at boat launches, the following items are recommended for use:

- High visibility vest (blue Clean Dry Drain vests can be requested from NYSDEC)
- Program uniform
- Closed toe shoes
- Sun protection
- First aid kit
- Hand sanitizer and disinfectant
- Fully-charged cell phone (or radio if location has no cell signal and NYSDEC has radios available for loan)
- Emergency Contact List: program related and law enforcement contacts.

Signage

While launches may have permanent AIS educational signage posted on information boards or another place near the launch, additional signage is recommended while a steward is on duty. Durable sandwich board signage that a steward can transport in their vehicle and position at the optimum spot for boater viewing is useful. The sign should incorporate "Clean Drain Dry" language and advertise that a steward is on duty for boat inspection.

How to Conduct Watercraft Inspection

NYS watercraft inspection programs strive to change the behavior of boaters through instructional demonstration of watercraft inspection designed to encourage boaters to self-inspect boats, trailers, and equipment in the absence of stewards.

Approach

- Approach boaters as they prepare to enter (launching) and exit (retrieving boat) the water.
- Identify your name, your organization, and why you are there.
- Initiate conversation with boaters on or near launch ramp. Ask if the boater has time to answer a few questions and participate in a short watercraft inspection. Inform the boater the inspection and associated questions will take only a few minutes.

Sample Steward Introduction Script

"Good morning, my name is Gretchen. I am a lake steward with the Lake George Association. We are here to help prevent the spread of aquatic invasive species in New York's waters.

Aquatic invasive species spread from lake to lake by hitchhiking in water containing compartments and attaching themselves to boats, gear, and trailers. Do you have a few minutes to answer some questions and participate in a quick inspection for hitchhiking organisms? Please join me and I will point out some common places where these organisms collect."

Delivery

- Traffic levels vary at most boat launches. Adapt the length of your message to the traffic level to minimize delays and boat ramp congestion.
- Invite boater to walk around the vessel with you during the inspection. Assisting you in the inspection process makes boaters more likely to conduct inspections on their own. Hands-on participation by the boat operator during the inspection provides stewards with the opportunity to ask valuable survey questions, helping to minimize inspection time.
- Point out the places aquatic hitchhikers are typically found (Section 6:15).
- Collect visual and boater survey data.
- Ask if the boater has any questions. (Also see Appendix E.)
- Give the boater a Clean Boats, Clean Waters rack card.
- Thank the boater for his/her time and participation and emphasize as your final prevention message: "Remember to ***Clean-Drain-Dry*** your equipment to prevent the spread of aquatic invasive species."

Physically Inspecting a Boat

Although the duration of each inspection will vary depending on the size and type of the boat, conversation with the boater, the amount of hitchhiking debris present, and the level of launch traffic, most inspections generally take about three minutes.

- Do not board watercraft. To inspect interior compartments, ask the operator if they will assist you by boarding the boat and inspecting livewells and bilge compartments for standing water.
- If any aquatic materials or water are found, ask the operator to drain the water and remove and properly dispose of the materials. Offer to use your bucket to catch water draining from internal compartments. Ask that the operator move motors to vertical position. Place your bucket underneath to catch water draining from the lower unit of inboard/outboard motors.
- While moving through the inspection, refer to the Inspection Checkpoint List.

To inspect a boat, it is recommended to use the acronym H.E.A.D:

H stands for **Hull and Trailer.**

E stands for **Engine or Motor.**

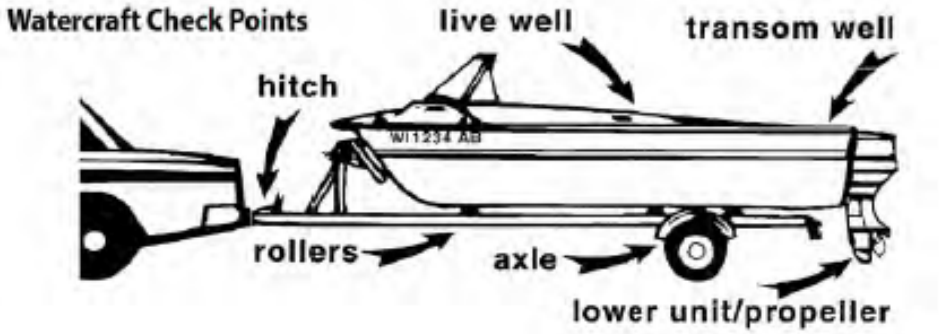
A stands for **Anchor and Equipment.**

D stands for **Drain Bilge and Check Interior Compartments.**

What to Do When Observing Water and Hitchhiking Organisms/Debris

If you encounter water and non-AIS debris during an inspection, dispose of water and aquatic debris as instructed.

If you discover an aquatic species that you cannot identify or suspect may be an invasive species, follow AIS identification and specimen collection protocols as designated by your program (see below) and refer the boater to additional Clean-Drain-Dry details at https://stopaquatichitchhikers.org/.



Inspection Checklist for Thoroughly Inspecting Boats, Watercraft, and Water Gear

BOATS

- ❒ Motor
  - ❒ Prop
  - ❒ Intake pipes
- ❒ Trailer
  - ❒ License plate
  - ❒ Taillights/wiring
  - ❒ Wheels and axels
  - ❒ Frame
  - ❒ Rollers
- ❒ Boat
  - ❒ Floor
  - ❒ Hull
  - ❒ Livewell
  - ❒ Transom well
- ❒ Accessories
  - ❒ Anchor
  - ❒ Bow Line
  - ❒ Ladder
  - ❒ Life jackets
  - ❒ Tow ropes
  - ❒ Water skis, wake boards, tubes
- ❒ Recreational Gear
  - ❒ Swim fins
  - ❒ Scuba/snorkeling gear, including BCDs: buoyancy compensator devices
- ❒ Fishing Gear
  - ❒ Bait bucket
  - ❒ Landing net
  - ❒ Tackle
  - ❒ Fishing reel/rod
  - ❒ Waders
  - ❒ Boots

PERSONAL WATERCRAFT (PWC)

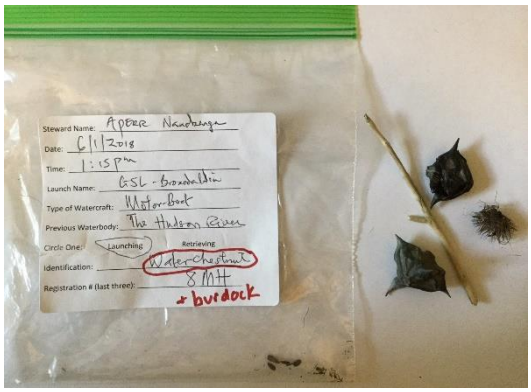
- ❒ Trailer (at left under BOATS)
- ❒ PWC body
- ❒ Intake
- ❒ Propulsion
- ❒ Life jacket

KAYAKS & CANOES

- ❒ Boat
- ❒ Paddles
- ❒ Life Jacket

In general, a "bag and tag" specimen collection approach is followed:

- Using the provided waterproof permanent marker, write the date; time; collector's name and contact information, name of waterbody, name of launch site or, if the specimen is found aboard a boat, the boat name; and any ID numbering/lettering system your program uses on a ziplock bag provided as part of your steward supplies.
- Follow your program instructions for placing and sealing specimen in bag for delivery for identification. Keep it cool per your program instructions.
- Follow your program's specimen delivery and reporting protocol developed for:
  - where the specimen goes,
  - how the specimen gets there,
  - who (contact information) will receive the specimen, and
  - how the expert notifies the program (steward, coordinator, both, etc.) of specimen identification results.
- Update data records and iMapInvasives.org database when results are received.



Water chestnut sample bag

Setting up Working and Inspection Stations

The program coordinator has worked with property owners to determine the best location to set up your stations. Follow instructions for locating work stations: table, chair, cabana, sign and/or banner, display materials, etc.

In general, your inspection station should be located in an area close to the launch area, but in a place that does not create congestion on a semi-permeable dirt or gravel surface. Whenever possible, set up far enough away from the water and launch ramp that drained water and removed debris cannot flow back into the waterbody.

WNY PRISM Inspection Station

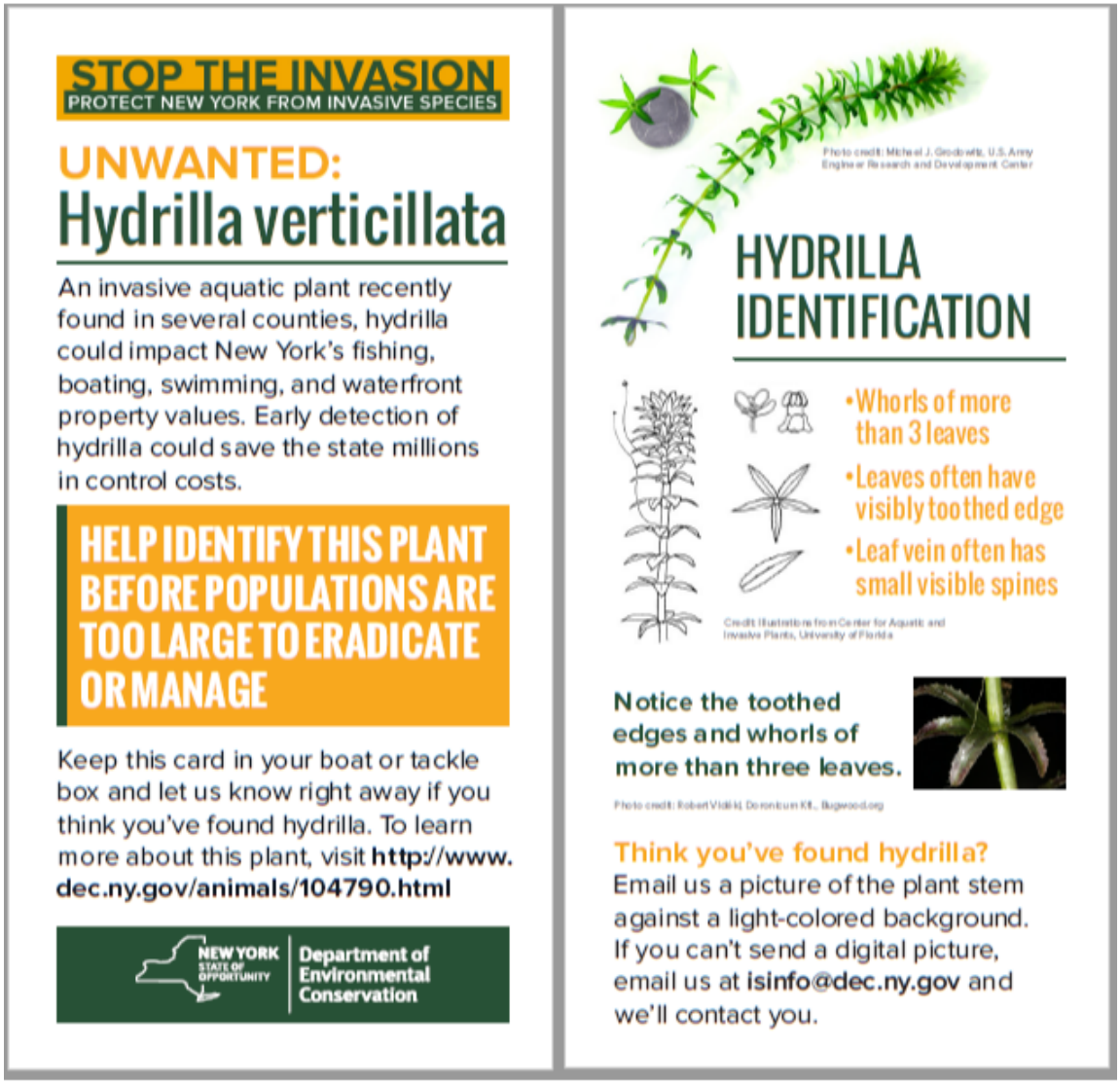
Removed debris, including plants, should be bagged and trashed, or placed in an approved AIS disposal facility, e.g., Aquatic Invasive Species Disposal Stations at New York State Department of Environmental Conservation-managed launches.

Boat inspections, bilge draining, and removal of visible organisms and debris should all occur in one location. This helps limit unnecessary visitor movement and enhances your ability to inspect boats quickly and correctly.

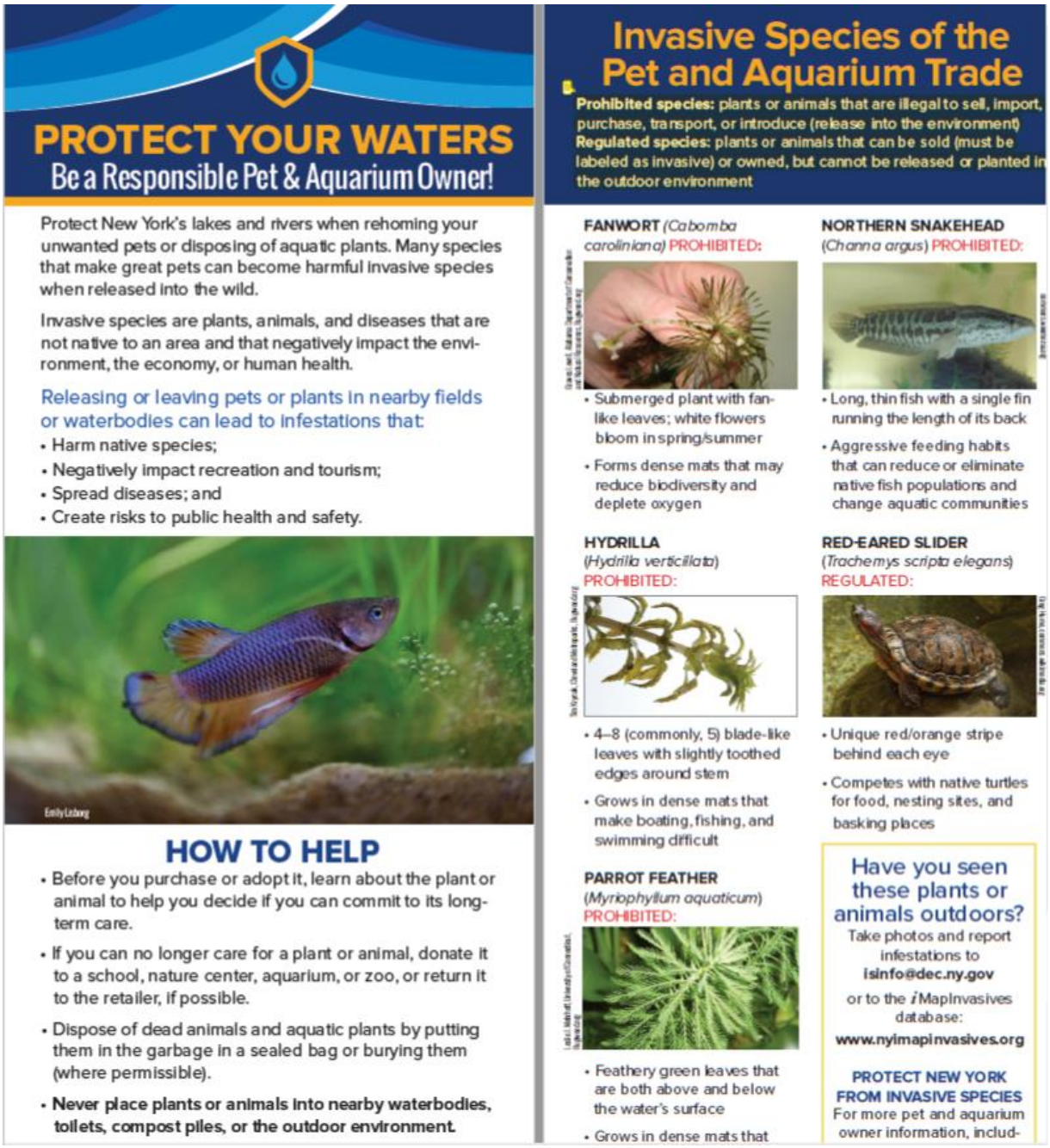
Recommended Distribution and Display Materials

Select distribution and display items based on the needs of your area/region:

- AIS tip strips
- Pet trade tip strips
- Hydrilla ID cards
- Aquatic Gardener's Guide
- Species-specific AIS fact sheets, e.g. water chestnut, aquarium owners
- Display copies of AIS-related regulations and safety guides, e.g., NYS fishing regulations, NYS boating safety guide, firewood transport restriction notice, spotted lantern fly information, etc.
- Laminated/preserved specimens to illustrate AIS vs. native look-a-likes
- Local Partnership for Regional Invasive Species Management (PRISM) information with upcoming AIS education outreach events, brochure, newsletter, etc.



Waterproof hydrilla ID card



Pet and aquarium owner tip strip.

PROTECT YOUR WATERS

Clean. Drain. Dry.

Boating and Fishing Equipment

Aquatic invasive species (AIS) are non-native plants and animals that interfere with boating and fishing, threaten native plants and animals, and destroy habitat. They are difficult and costly to remove, so let's help prevent their spread!

New York State regulations require you to:

- CLEAN, DRAIN, and DRY your watercraft, trailer, or docks before use in any public waterbody.

Additional recommendations include:

- Disinfect your boat's bilge area, all water-holding compartments, and other equipment (boots, waders, fishing gear) with hot water (140˚F) for at least 30 seconds;
- Dump unused bait in trash cans and bucket water on dry land (not back in the water); and
- Avoid weed beds when boating.

More about preventing the spread of AIS:
www.dec.ny.gov/animals/48221.html

NEW YORK STATE | Department of Environmental Conservation

Examples of AIS in NY

Water chestnut

- Fan-shaped leaves with toothed edges
- Sharp-edged seeds can cut feet
- Dense floating mats impede boating, fishing, and swimming

H. Smith, APIPP

Zebra mussel

- Tiny striped oval- or D-shaped shells
- Can cover hard surfaces like docks and mooring lines
- Shells can cut feet

A. Benson, USGS, Bugwood.org

Eurasian watermilfoil

- 4-6 feathery leaves around stem, blunt-tipped, as if snipped off
- New plants sprout from fragments
- Dense plant growth impedes boating, fishing, and swimming

Graves Lovell, ADCNR, Bugwood.org

Spiny waterflea

- Tiny crustacean with long, barbed tail
- Competes with small fish for food
- Can clog guides of fishing rods

E. DeBolt, LGA

Hydrilla

- 4-8 blade-like leaves with slightly toothed edges around stem
- Dense plant growth impedes boating, fishing, and swimming
- Tolerates both fresh and brackish water

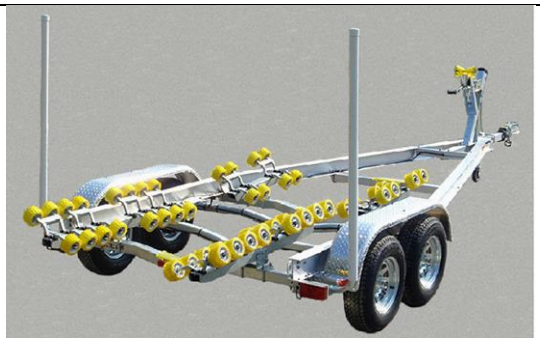
Tim Krynak, Cleveland Metroparks, Bugwood.org

More information about AIS: www.dec.ny.gov/animals/50121.html

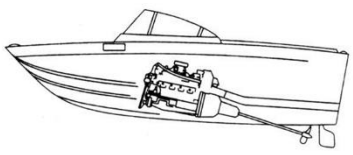
Aquatic invasive species tip strip

A VISUAL GUIDE TO BOAT ANATOMY

Types of Boat Trailers

Bunks	*Rollers*
	

Types of Boat Engines

Outboard	*Inboard*	*Inboard/Outboard*
		

Section 4: Communication

A Professional Approach to Stewardship

Watercraft inspection stewardship programs exist across New York State (NYS) to protect NY's waters and prevent the spread of aquatic invasive species. These programs provide many opportunities to engage the public about aquatic invasive species and spread prevention practices.

New York State's watercraft inspection stewards are "ambassadors" for the New York State Aquatic Invasive Species Program. Stewards educate water recreationists, from within and outside of New York State, at launch sites, fishing tournaments, and other public events to increase public awareness of AIS and provide information about how the recreating public can help control the spread of AIS through proper watercraft and equipment inspection and cleaning practices. In some cases, stewards may even assist with surveying, monitoring, and removing AIS populations. The goal of this training manual is to provide stewards with the tools and resources to help them to interact in a professional manner with the public and program staff.

Each steward is joining and strengthening an existing network of educators and people interested in natural resource protection. The steward's actions represent the steward, , the supervising organization and program partners, and watercraft inspection programs in New York State and elsewhere. Each steward and volunteer conducting the watercraft inspections is "the face" of the respective programs and represents New York State to residents and the thousands of visitors who come to New York to enjoy our water resources.

The steward's demeanor while conducting inspections impacts the effectiveness of the program as a public education tool and an AIS prevention method. Professional delivery of the watercraft inspection and the AIS messages encourages the public to take an interest in implementing best management practices to support the program's ultimate mission of protecting New York's waters and preventing the movement of AIS into and out of each region. Interacting with the public can be both rewarding and challenging. Five key elements of being a watercraft inspection stewards are:

- Appearance
- Time and Attendance
- Safety
- Interaction with Public and Staff
- Documentation

Appearance

All stewards throughout the state are issued turquoise vests with reflective stripes for high visibility at busy boat launches. These standardized vests make stewards instantly recognizable.

Group of stewards wearing "Clean, Drain, Dry" vests.

Program-wide clothing recommendations are as follows:

Program Boat Stewards are required to wear the Program T-shirt (provided), Clean Drain Dry vest (provided), neutral-colored shorts or pants (no tears or stains), socks and close-toed, slip resistant shoes. Hats are optional. Stewards should not wear or have visible logos or promotional materials outside of those provided by Program. Sweatshirts and/or hoodies are allowed over the T-shirt, but the Clean Drain Dry vest must be worn on top. Decontamination stewards are required to wear PPE provided in addition above requirements.

The uniform helps the public visually identify each steward as an official representative of the watercraft inspection program. It may draw people to the steward, creating educational opportunities. When stewards approach boaters to offer an inspection, the uniform lets the boaters know that they are being approached by someone working in a professional capacity for a legitimate reason.

Most host organizations supply a uniform or uniform components: shirt, jackets, caps, etc. Steward clothing should be clean and unwrinkled. Neat personal grooming is expected. Maintain good posture; do not lounge or lay down on duty. Stay alert.

Time and Attendance

Supervisors will provide site and work time information to stewards in advance of each work week. All stewards are expected to report to their assigned location at their designated time and to remain at that site until the end of their workday (except for meal break/bathroom break).

If provided by individual programs, stewards are expected to check in upon arrival using the timekeeper application on their tablets which has a time and location stamp and check out during breaks and at the end of the day.

Remember, you must notify your supervisor if you…

- are unable to work that day
- will arrive late
- need to leave your site due to illness
- are leaving a site due to safety concerns

Safety

The steward's safety and the safety of those around the steward is top priority. Boat launches and ramps are typically active places with frequent movement of watercraft, people, vehicles, animals, children, etc. The boaters and visitors are there to relax and may be eager to launch their vessels or load watercraft to leave after a fun day on the water. *The steward is there to work.* To protect public and personal safety, follow these steps:

- When setting up the work area, assess the safety hazards and take all appropriate measures to eliminate risks.
- Ask boaters to turn off vehicle engines during inspection.
- Be alert to surroundings and aware of where the boat owner and others are at all times, particularly those with moving watercraft.
- While checking around wheels, motors, trailers, etc., the steward will sometimes be out of the direct line of drivers' vision during inspections, so must keep those around boats and trailers alert to his/her/their location.
- Stewards should always plan for a personal exit path should a boat/vehicle start moving. Be especially aware of trailer wheels, propeller, and hitch.

- Have a charged cell phone and a key contact list that includes the program coordinator or immediate supervisor, launch manager, and local law enforcement.
- Avoid dangerous situations and confrontations with the public.

Special Risks and Circumstances

Special safety concerns may occur spontaneously. Keep in mind that stewards may be called upon to communicate observations as a witness of an incident. Be a good observer and record as much detail about the occurrence as possible.

If the steward must leave the launch site for safety reasons, notify the designated supervisor/contact person upon arrival to a safe location. Follow the program's specific protocol when dealing with the following risks and circumstances. In all circumstances, maintain composure.

Storms/Lightning/High Winds: Storms can approach quickly without warning when on or near water. The steward must determine if shelter can be found in a vehicle or a nearby building. If the storm is sudden do not hesitate to leave the table and materials to seek safety.

Potentially Dangerous Facilities: If the assigned launch is unsafe because of facilities in disrepair, potentially dangerous people or wild animals notify the supervisor, and, when appropriate, the launch manager. In such cases a location re-assignment may occur.

Nuisance/Potentially Dangerous Wildlife Encounter: Do not approach or feed the animal. Make others aware of the animal and notify property manager. In extreme cases, calmly leave the site to enter the vehicle or a nearby building, contact Wildlife Control (phone number will be provided?) or appropriate local authority, and notify the supervisor.

Environmental Quality Incident: gas/toxic spill, litter, sewage/head release, dumping of materials into water, etc.: Contact property manager and New York State Department of Environmental Conservation (NYSDEC) regional headquarters (phone number will be provided). If the incident occurs after regular business hours, call NYSDEC 24-hour tip line: 1-800-TIPP DEC (1-800-847-7332).

Rude/Threatening Public Behavior: Do NOT confront people acting in a rude/threatening way. If personal safety is threatened, retreat to a vehicle and lock the doors. Leave the site, record as much information about the individual and location as possible and relay that information to a supervisor, designated contact person, or, if appropriate, law enforcement. Remember that you are not an agent for law enforcement; your role is to educate the public.

In case of emergency, be prepared and equipped to call 911. Stewards working in areas with limited cell phone access should know the locations of the nearest accessible landlines.

Lost Person: Call 911 immediately. Record as much information about the lost person as possible, e.g., age, gender, height, weight, complexion, clothing, distinguishing characteristics (scars, tattoos, piercings, etc.), and last known whereabouts. Notify the program supervisor or designated contact person. Complete and submit an incident report as instructed by the program coordinator.

Public Injury: Assess the situation and person's condition; work within the limitations of steward training and level of comfort. Call 911. Call a supervisor. Complete and submit an incident report as instructed by the program coordinator.

Public Fatality: Assess the situation and call 911. Call a supervisor. Keep the area as secure as possible to prevent contaminating potential evidence. Record observations as soon as possible.

Uncomfortable/Unwanted Communication

In some cases, stewards may encounter uncomfortable and unwanted interactions. Each host organization provides training that includes a session about how to handle situations that may involve racist and sexist comments, sexual harassment, and requests for personal steward information. The bottom line is that stewards' health and safety are more important than data points.

In the case of racist or sexist comments the steward can re-focus the conversation to the task at hand – providing information about AIS and AIS spread prevention. If the steward is not comfortable re-directing the conversation the steward can opt out of interacting with the person.

Note that stewards should not be sharing personal information about programs, schedules, and steward's names and phone numbers, etc. Stewards are working in a public area and need to be aware of protecting other employees and not sharing any information.

Please note that each organization that hosts a Watercraft Inspection Steward Program has its own protocol and policy with regards to sexual harassment. Please talk with a supervisor for more details.

Interactions with the Public and Staff

Communicating Professionally

Communicating effectively and efficiently with boat launch users, managers, program coordinators, and fellow stewards increases the opportunity to actively engage the public in controlling the spread of AIS and protecting uninfested waters.

Boat steward interacting with two boaters.

In some cases, this will be the first time a recreationist interacts with a steward. Make it count and keep communication clear and informative. Be positive and encouraging. The tone and message could potentially change behavior and reduce risk of AIS spread.

- Maintain a professional but pleasant manner appropriate to the working environment, i.e., a recreational setting for the public. Recreationists are more willing to participate in activities when they feel comfortable.
- Be polite and respectful to all recreationists and other people at launch sites.
- Stand up to address the public.
- Be respectful if a boater has misinformation or a different point of view. Do not challenge to "prove your point," rather offer to inform them of other details/resources.

- Be punctual for duty; this is especially important at launches where inspection hours are posted at launch facilities.
- If working with other stewards, treat one another with respect. Racist and sexist comments and discussions about politics do not create a safe or professional work environment.

Communicating with recreationists who have limited English proficiency

New York State endeavors to provide information and services to all residents and visitors regardless of their language affiliation by working closely with a translation service, Language Line. All DEC-owned launches will have "DEC Speaks Your Language" signs posted. Stewards can point to the sign which has "Point to your language. An interpreter will be called. The interpreter is provided at no cost to you" in 36 languages. In addition, the aquatic invasive tip strips are available in Spanish, French, Chinese, and Russian. Stewards will also be given Quick Reference Guides for their wallets and Right to File a Complaint: Language Access sheets to place on their tables. More information about the NYSDEC Language Access Plan can be found here:
https://dhr.ny.gov/sites/default/files/pdf/lep/DEC-LAP-2021.pdf

Communicating with the hearing impaired

Stewards in several programs have interacted with the hearing impaired. Language Line does translate into American Sign Language, but a visual display would be required for the person to see the translation. If that is not an option and no one in their party is able to interpret, stewards can provide sheets with Frequently Asked Questions and/or have a white board and markers nearby to have an impromptu conversation.

Behavior Change

Part of the mission of the New York State Watercraft Inspection Steward Program is to promote behavior change. We would like all water recreationists to understand that their choices have consequences for not only themselves, but for everyone who uses New York waters and all the native plants and animals that inhabit aquatic habitats. The goal is for all water recreationists in New York to take AIS spread prevention measures no matter where they are launching and retrieving.

Why is behavior change important in relation to our goal?

In order to protect our waters from the spread of aquatic invasive species, we rely heavily on the participation of boaters and other watercraft users. However, simply providing information about invasive species and the importance of spread prevention measures does not ensure that boaters will then take action and perform Clean~Drain~Dry. People may have the desired awareness about aquatic invasive species as well as the desired attitude about preventing the spread. However, despite the awareness and attitude, they still may not take the spread prevention measures that we encourage. In behavior psychology, this phenomenon is known as the intention-action gap. To protect our waters, we need to work to bridge the gap between intention and action, so that boaters will do their part in stopping the spread of invasive species without stewards telling them to do so.

The commitment question and its importance

One way that we can help bridge the gap is through commitments. There are three different types of commitments, with public commitments being strongest, followed by written commitments, and finally verbal

commitments. In our boat steward programs, our goal is to receive a verbal commitment from boaters to Clean~Drain~Dry their boats, even when a boat steward is not present. This verbal commitment is a part of our survey. The last question on the survey asks "Can we count on you to clean, drain and dry the watercraft even when there is no boat steward present?"

In giving a verbal commitment, several things will happen for the boaters. First, people feel badly when they don't do something that they said they would do. Second, giving a commitment changes their perception about themselves: they now see themselves as someone who does help protect our waters and who does Clean~Drain~Dry their watercraft. Both of these will encourage the boater to take the action they committed to.

It is important to note that in order to bridge the gap and get commitments, we must identify and remove barriers that prevent people from completing Clean~Drain~Dry.

WISPA Survey

The final question of the watercraft inspection steward program application (WISPA) survey asks water recreationists to make a commitment to cleaning, draining, and drying their watercraft at all locations where they launch and retrieve. Stewards will need to figure out how best to phrase this question so that they are comfortable asking it. Some suggestions include the following:

- Can we count on you to clean, drain, and dry even when there aren't any stewards around?
- Would you consider helping us protect New York waters from AIS and cleaning, draining, and drying no matter where you launch and retrieve?
- That inspection wasn't so hard. Would you do it even if there are no stewards around?
- Now that you understand the importance of cleaning, draining, and drying, can we count on you to do this on your own?

Boat steward conducting an inspection.

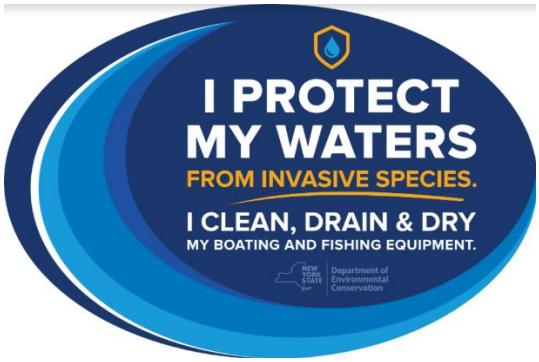
The importance of swag and their reminders

While swag may seem like just fun, free items to give out, they serve to remind boaters of their commitments! These complimentary promotional items are given to boaters by stewards and different items are available among programs. Swag often has Protect Your Waters and Clean~Drain~Dry messaging on them. Swag is designed to be used and shown while boaters are getting ready to enter the waterbody and when they are exiting the waterbody to remind the boater to take action to prevent the spread of AIS.

The reminder for a commitment must be given in the right place at the right time. For example, a reminder to Clean~Drain~Dry will not be effective if it is on a magnet on the refrigerator in a person's home. It needs to be where a boater will see it at the time when they are preparing watercraft for use. Examples of swag that support commitments include: small towels for drying, floating keychains for boat keys, stickers for truck windows or trailer hitches, and more.

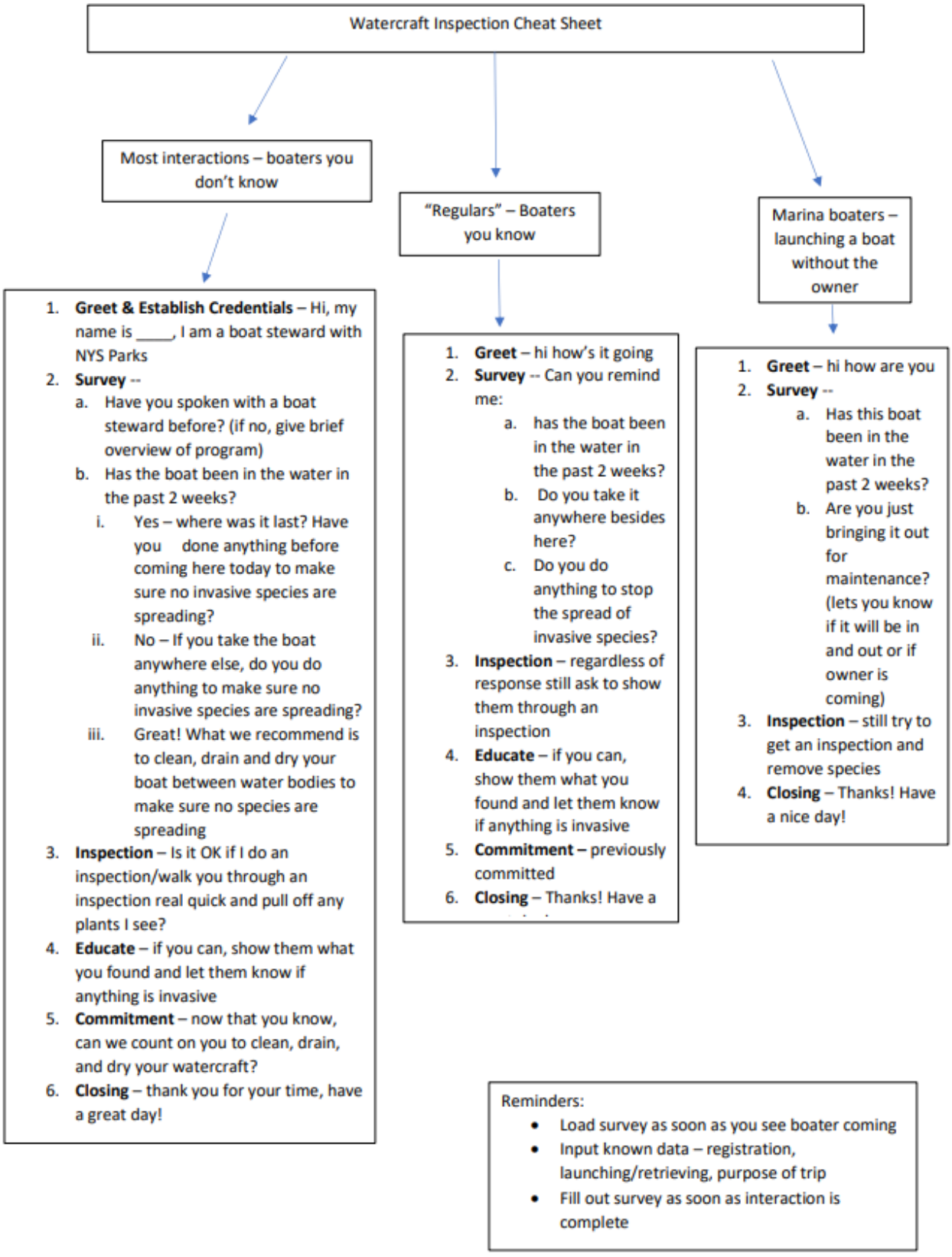
Branded swag helps us create recognition for Clean~Drain~Dry. If everyone at the launch is taking these actions, boaters are showing off or using the swag, and there are reminder signs around the launch, then other boaters are more likely to follow suit. Breaking a social norm makes people uncomfortable, which can be used in our favor at the boat launches to encourage boaters to adopt the desired behavior.

"Clean, Drain, Dry" sticker



NYS "I Protect My Waters" sticker

"Clean, Drain, Dry" towel


Watercraft Inspection Cheat Sheet
Most interactions – boaters you don't know
"Regulars" – Boaters you know
Marina boaters – launching a boat without the owner
1. Greet & Establish Credentials – Hi, my name is ____, I am a boat steward with NYS Parks
2. Survey --
a. Have you spoken with a boat steward before? (if no, give brief overview of program)
b. Has the boat been in the water in the past 2 weeks?
i. Yes – where was it last? Have you done anything before coming here today to make sure no invasive species are spreading?
ii. No – If you take the boat anywhere else, do you do anything to make sure no invasive species are spreading?
iii. Great! What we recommend is to clean, drain and dry your boat between water bodies to make sure no species are spreading
3. Inspection – Is it OK if I do an inspection/walk you through an inspection real quick and pull off any plants I see?
4. Educate – if you can, show them what you found and let them know if anything is invasive
5. Commitment – now that you know, can we count on you to clean, drain, and dry your watercraft?
6. Closing – thank you for your time, have a great day!
1. Greet – hi how's it going
2. Survey -- Can you remind me:
a. has the boat been in the water in the past 2 weeks?
b. Do you take it anywhere besides here?
c. Do you do anything to stop the spread of invasive species?
3. Inspection – regardless of response still ask to show them through an inspection
4. Educate – if you can, show them what you found and let them know if anything is invasive
5. Commitment – previously committed
6. Closing – Thanks! Have a
1. Greet – hi how are you
2. Survey --
a. Has this boat been in the water in the past 2 weeks?
b. Are you just bringing it out for maintenance? (lets you know if it will be in and out or if owner is coming)
3. Inspection – still try to get an inspection and remove species
4. Closing – Thanks! Have a nice day!
Reminders:
• Load survey as soon as you see boater coming
• Input known data – registration, launching/retrieving, purpose of trip
• Fill out survey as soon as interaction is complete

Establishing Credibility

The most successful stewards are those that the public view as responsible, credible, and helpful, and those with the ability to engage and make the public feel comfortable.

Identify yourself verbally

Always introduce oneself as working as a steward for the host organization and state the purpose of the program. Boaters should be completely clear about why a steward is approaching them. For example, once the steward is close to the boater, he/she/they can calmly say: "Hi, I work for the Adirondack Watershed Institute's Stewardship Program and am here to demonstrate ways to prevent the spread of aquatic invasive species between waterbodies. Are you familiar with aquatic invasive species? Do you mind answering a few questions and participating in a watercraft inspection?"

Use an upbeat approach

Maintain a respectful attitude in all situations. Try approaching boaters with a smile! People are more likely to engage in conversations with polite, pleasant, and confident stewards. Although rare, some conversations can become negative, especially if a boater arrives already irritated about something. It is vital in these situations that the steward to be positive during and at the close of the conversation. The steward may choose to end the conversation early and that is an acceptable method for dealing with an irritable and impolite person. Thank the boater for helping to protect New York's waters and move on to the next boater.

Be knowledgeable, honest, and realistic

One of the best ways to achieve credibility with boaters is to be knowledgeable, honest, and realistic when responding to their questions. Inevitably, stewards will be asked questions that he/she/they cannot answer or cannot answer correctly; in those instances, consult the educational materials that are provided to stewards. If no answer is found there, please take the person's contact information so that an answer may be found and sent to the person.

Form a relationship with boaters

Often times boaters frequent the same launch and stewards will interact with them many times throughout the season. It is important to form a positive relationship with boaters to continue to have positive interactions throughout the season. Stewards may attempt t to remember some of their survey answers and kindly ask them for reminders about others. Ask these boaters how fishing was, the lake was etc., to keep interactions positive despite being repetitive.

Relate messaging to boaters' interests

People are more passionate about issues when they impact activities and places that they care about. In order to utilize this, when giving boaters information about invasive species, tell them about species that may impact the activity they are there to do. An example of this would be telling kayakers about the threat of Hydrilla and how it makes waterways incredibly unpleasant to paddle through.

Framing the Message to Inform Boaters

Each time a steward engages a recreationist in conversation about AIS, communicate the Clean~Drain~Dry message, why it is important to limit the spread of AIS, and the benefits of recreationists practicing watercraft and equipment inspection. Because recreationists typically want to protect their access to recreational opportunities, most are likely to

listen and implement the simple AIS spread prevention practices a steward recommends.

When provided with the appropriate educational messages, boaters will quickly understand that their action, or inaction, can spread AIS and threaten their ability to boat, fish, or otherwise enjoy the water resource. To maintain consistent educational messaging within the program and across the state, use the primary message: Clean~Drain~Dry. See Section 3 for more details.

Steward standing next to "Clean, Drain, Dry" sign.

CLEAN: Remove and properly dispose of any visible mud, plants, fish, or organisms from boats, trailers, equipment, clothing, dogs, etc. in the provided AIS disposal station or above the high-water line outside the launch traffic area. Have the operating steward wash your boat with the decontamination pressure washer when applicable. If no decontamination station is present at the launch, the steward can recommend the recreationist wash watercraft with a garden hose at home.

DRAIN: Before leaving the launch, empty all water from spaces (i.e., bilges, buckets, livewells, ballast tanks, etc.) that can hold water. Dump live bait at bait disposal sites or in an approved trash receptacle. For more information, see NYSDEC Baitfish Regulations:

https://www.dec.ny.gov/permits/25004.html.

DRY: Dry boat, trailer, and anything that comes into contact with water. Drying time varies greatly with localized environmental conditions. The minimum recommended drying time before launching in new waters is no less than 5 days in the sun or three days at sub-freezing temperatures (NYCRR 6 Part 576). If 5 days is not an option, you may use a towel to wipe down the watercraft.

Additional information about spread prevention measures can be found here: https://www.dec.ny.gov/animals/48221.html

Communicating with Boaters: When Recreationists Don't Want to Participate

When a recreationist does not want to participate in an inspection, respect the recreationist's wishes. Depending on the circumstance and receptivity of the recreationist, you might ask-

"May I share this information card with you with tips to limit the spread of unwanted aquatic hitchhikers? Aquatic invasive species grow quickly and have the ability to outcompete native species. Once established, the invasive species can disrupt the food web, change species composition, limit or prevent recreational activities such as swimming and boating, and lower property values."

Offer recreationists an AIS tip strip and thank them for helping to protect New York's waters.

SUMMARY: KEY POINTS

- How stewards represent themselves reflects on them, the program, the supervising organization and program partners, and all watercraft inspection programs, and impacts how well your message is received. Know the proper watercraft inspection protocol from approach to exit.
- Make personal and public safety a priority at inspections sites.
- Maintain professional conduct and composure at all times.
- Stress the boater education message of Clean~Drain~Dry.

Boat Launch Scenarios: Role Playing

In order to prepare boat stewards for the many different interactions they may have, it is important to do role-playing exercises. Once new boat stewards are comfortable with a basic "smooth sailing" inspection, more difficult scenarios should be practiced. Boat stewards will encounter many different types of people who vary in age, background and understanding of our goals. Having experience answering difficult questions, dealing with different perspectives, and understanding how to tailor the survey and inspection process for different visitors will improve the success of boat stewards.

There are several types of boaters that a boat steward will have at the launch, each with a different take on the inspection process.

Those who embrace stewards: These boaters support the program and are excited about what the stewards are doing. They will happily go through the survey and inspection with you and often clean, drain, and dry on their own. They may have a lot of knowledge on the topic of AIS and may want to talk longer than stewards are able to.

Those who tolerate stewards: These boaters may support the program but are less enthusiastic about it. They will allow stewards to inspect the boat and ask survey questions, but likely will not be overly friendly. These boaters will sometimes respond to the introduction with "as long as it's quick!"

Those who avoid stewards: These boaters are not interested in completing the survey or inspection for a variety of reasons. They may be overtly unfriendly, or they may simply do their best to prepare their boats ahead of time/drive away after retrieving as to not be available to speak with a steward. It is important to give people the benefit of the doubt and attempt to communicate multiple times in case they were simply having a bad day or in a rush, however it is important not to be pushy and respect a boater's wishes to not participate.

Those who don't know about stewards*:* Some boaters, especially those new to boating or coming from out of state, may not know about the watercraft inspection programs or the purpose of boat stewards. This is a perfect time to give a brief explanation of the program and walk the boaters through an inspection, pointing out where to look for AIS and specifically how to perform CDD. Remember that their first interaction with a boat steward will set the tone for their willingness to participate in the future, so be friendly, educate about the program, but keep the interaction somewhat brief.

Practice Scenarios

Scenario 1: "Invasives are already in our waterways. You should have been out here 40 years ago. What is the point in doing this now?"

Visitors POV: Understands that invasive species are an issue and has seen the impacts they have caused over time. Does not understand how stewardship is going to help the problem now and is upset that organizations are only stepping up now that invasives have become a nuisance.

Stewards POV: Was potentially not even alive around 40 years ago and is unsure what the visitor is wanting from them. Recognizes that the visitor's anger is related to the fact that they care about the water and conservation. Feels there is value in the program and stewardship.

Solution: Steward acknowledges that there are many invasive species present in our waterways. Steward points out that while we all wish the problem never happened, we can't go back in time. Instead, our program/stewards focus on educating others about the issues related to invasive species and the impact they can have on our waterways. Steward explains that there are many much more harmful invasive species that have the potential to be much more impactful on the activity they are at the waterbody to enjoy (think hydrilla). Steward explains that stewardship (Clean, Drain, Dry) is still important in order to prevent more invasive species entering the waterways and encourages visitor to help us protect the waterways for future generations.

Scenario 2: Visitor is agitated and says they don't have time for this and they just want to get out on the water.

Visitor POV: Is in a rush to get out on the water for the day. Is annoyed that they woke up late, got stuck in traffic, had to wait to launch, etc. Does not want to deal with this official looking person trying to ask them questions.

Steward POV: Notices that the boat has plants hanging off the trailer and would really like to inspect the boat before it goes into the water. Knows they can get a lot of the information they need without asking the boater anything (purpose, state, number of people, etc.)

Solution: Steward remains friendly and tells the boater that they understand they are in a hurry. Assures the boater that the inspection will only take a few minutes, and that it can be completed while the boater unties/prepares, asks if it is OK. Inspects the boat as best as they can, asks survey questions if it feels OK to do so. Completes survey as much as possible depending on boater attitude. Steward could also offer the boater some educational materials for them to read at their leisure.

Other possible scenarios to practice:

- Boater is an elderly man who has been fishing on this lake for 35 years and would love to tell you everything he knows about it.
- Boaters have been out on the boat drinking all day and find the inspection process to be very humorous.
- Group of boaters are intoxicated and making inappropriate comments to the boat steward.
- A family is launching their boat for the first time this year and seem stressed. Their baby is crying and the other 2 children are bickering.
- Boater thinks the inspection program is a waste of time and does not care about invasive species.
- Boater has misinformation about our program and believes you will be issuing tickets for finding species, etc.
- Boaters believe invasive species are great for fish and love how much habitat aquatic invasive plants provide.
- Boater does not want to chit chat but is open to an inspection as long as it is quick.

Angler Surveys

The Target Audience: Many of NY's public boat launches offer areas for recreational fishing from shore as well as access for anglers wading into waterways. Angler's gear is a known vector of AIS spread. In order to educate these anglers who are not associated with a launching watercraft, we utilize our angler survey.

Goals: The goal of the angler survey is to begin to build relationships with patrons using the launch specifically for fishing without a watercraft. The survey allows stewards to gauge angler awareness of AIS spread, and to educate them about their responsibility to protect our waters.

The Approach: Ideally, anglers would be approached by a steward before they begin fishing, similar to the way a watercraft would be approached before launching. Stewards would go through a survey and inspection process specific to angler equipment and bait to ensure anglers are taking proper precaution to stop the spread of AIS between waterways.
If an angler begins fishing before they can be reached, stewards are still able to go through the survey and educate the angler on protocol.

Framing the Message: Different angler equipment can spread different invasives. For example, spiny and fishhook waterflea may get caught up on fishing line, while aquatic plants may get stuck in fishing nets. Stewards should educate anglers on the AIS spread risk specific to their equipment.
In the same way that the steward could relate specific AIS information to boater types, the steward can relay angler specific AIS impacts to anglers. For example, if the steward is speaking with an angler hoping to target nearshore bass that day, he/she/they can educate the angler on the impacts of Hydrilla and how that could devastate nearshore fish habitat.

Walk-Up Surveys

The Target Audience: Patrons at the boat launch will often approach steward outreach tables. In most cases they either approach out of curiosity as to what the steward is doing, or with specific questions about invasive species. The walk-up survey is for these patrons who are enjoying the area at your boat launch but are not launching a watercraft or fishing. The walk-up survey helps to guide stewards through an educational conversation and captures the number of patrons the stewards are educating.

Goal: The goal of these interactions with patrons at the waterbody is to educate the general public on aquatic invasive species and to stress the importance of taking spread prevention measures where applicable.

Framing the Message: While these patrons are not using the water in the same way as boaters and anglers, they likely are enjoying the intrinsic value of the water and nature whether it be by taking a walk, having a picnic, etc. Again, the steward can relate specific species impacts on patrons. For example, the steward could discuss the water chestnut nutlets that get washed up on shore and are painful to step on, or discuss zebra mussels that may clog drain pipes or cut swimmer's feet.

Along with Clean, Drain, Dry, this is a good time to mention other initiatives to stop the spread of invasive species, especially if patrons mention they spend a lot of time recreating on land. These initiatives include Play, Clean, Go for terrestrial outdoor equipment. Patrons can also

be encouraged to report any invasive species they find using the iMapInvasives application.

Swag/handouts: Many of our branded freebies, specifically the bobbers, keychains, and whistles, are attractive to children who may visit the steward table. Getting children involved with preventing invasive species in helpful to encourage parents. Informational handouts can be helpful in providing more information to interested patrons, as well as useful tool in starting a conversation regarding AIS.

Steward conducting a walk-up survey.

FAQs and Myths

I thought Zebra mussels were good because they clean the water and make it clear?

It is true that zebra mussels are filter eaters, however they filter the water of everything, including the food that other organisms need to survive. They have a negative impact on the food chain from the bottom all the way to the top. The top of the food chain in our water bodies is often the game fish that humans aim to catch and eat. The clarity of the water may be improved by zebra mussels and the water may be perceived as cleaner, but that means there is little food for the native creatures we value that live in the waterbody.

What is being done about Asian Carp?

The U.S Army Corps of Engineers (USACE) is doing everything they can to prevent Asian Carp from entering the Great Lakes. They have three electric barriers positioned between the Mississippi River and the Great Lakes, and frequently check for eDNA of Asian carp throughout the Great Lakes and Tributaries. As of 2019, only 3 occurrences of eDNA were found, and no live Asian carp were found in the Great Lakes. In 2021 USACE were working to set up multiple deterrent technologies at Brandon Road Project in Illinois.

Why is Hydrilla so bad?

Hydrilla grows quickly (up to an inch a day) in even low light conditions, can overwinter, and is difficult to get rid of (Langeland 1996). This plant will outcompete native plants that provide food and shelter to native animals, can completely clog waterways, and even impede water flow. When it decomposes in the autumn is uses up a lot of the dissolved oxygen in waterways that is important for fish. This causes detrimental effects on the ecosystems, and the affected areas lose a lot of their recreational and property value. In Florida, an estimated $30 million is spent annually just to manage Hydrilla infestations to a level where some waterbodies are still navigable. New York currently spends about $2 million a year on its control.

How do we stop these invasives from harming our waterways?

The best method is prevention, which means Clean, Drain, and Dry.

Shouldn't we just let the invasives win, isn't that just survival of the fittest?

This is not the same as survival of the fittest. What is happening with invasive species is not a

natural occurrence, it is caused by human involvement. Invasives can reduce biodiversity at a rapid rate by changing ecosystem conditions. Some of the species lost may be keystone species that are the foundation of ecosystems. What this means for humans is loss of sport fishing, tourism dollars, property values, recreational sites, and much more.

Round gobies are great bait fish and bass love them, why should I kill them? Also, don't they eat the zebra mussels?

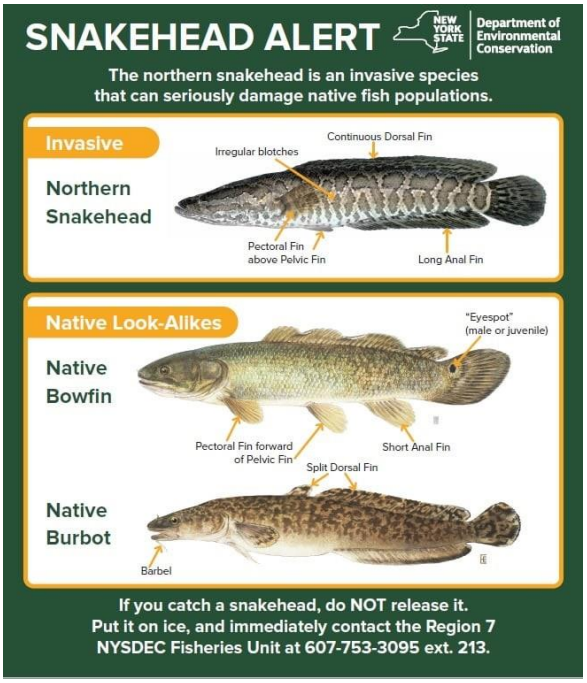
It is illegal to use round gobies as bait fish. Bass may love juvenile round gobies; however, gobies often grow quickly and aren't small enough long enough for bass to eat them and control their population size. Round gobies also eat bass eggs, therefore decreasing the bass population. They are very aggressive and can empty a nest of bass eggs in seconds. It is true that gobies eat zebra mussels, however, they don't eat nearly enough to provide population control. When you catch or see a round goby, please kill it or throw it on land.

Why should my tax dollars fund programs like this?

This program is focuses prevention which is the most effective way to address invasive species. If you look at this invasion curve , you will see that it is much more cost effective and safer to promote and implement prevention measures like this program, rather than to leave invasions unchecked and allow them to spread until management and control are needed. .

Is it true that we are supposed to kill snakeheads if we see them?

Yes, this is true, however there are not as many snakeheads in New York as you may think! Snakeheads are currently confirmed in the Queens, the Delaware River and the Bashakill Wildlife Management Area. Please be absolutely sure that what you have caught is in fact a snakehead, and not the commonly confused native fishes, the bowfin or burbot.



Northern snakehead and its native look-alikes.

Do I have to CDD if I'm just putting my boat into storage for the winter or taking it out of storage from the winter?

It is highly recommended. During the colder months (and often darker, as boats in storage are not in direct light), organisms can survive longer periods of time if left in enough water. For example, microscopic zebra mussels or water flea larvae can survive months in a stored boat that still contains water, meaning that if the boat is launched the next season in an uninvaded waterbody, there is the potential for a new spread of the species. Note that if the boat is kept at subfreezing temperatures for more than three days it should be launchable.

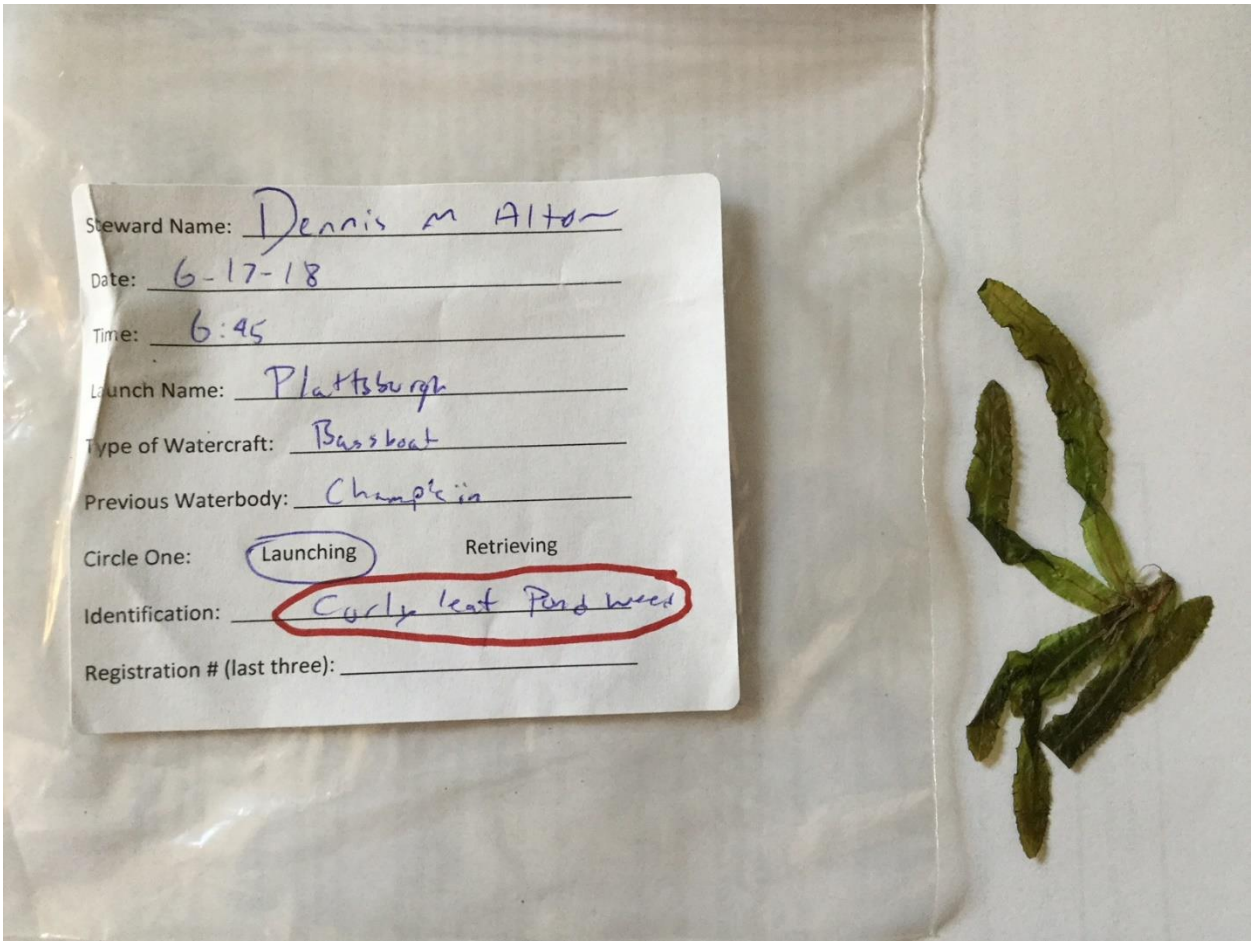
Do I have to CDD if I visit the same body of water?

It is recommended you always Clean, Drain, Dry (CDD), no matter what. Visiting the same body of water without conducting
CDD poses a much lower risk than visiting a new body of water without conducting CDD. However, especially when it comes to invasive species, it is likely that a species may grow or reside in one area of the waterbody and not another. This is the case with the aquatic invasive plant hydrilla on Cayuga Lake. It is best to make a habit of CDD by practicing each time you use your watercraft.

Fish love the habitat that Eurasian Water Milfoil and Curly Leaf Pondweed provide. Why are we trying to keep it out of waterbodies and harvest it?

Fish do love weedy habitat to hide and feed in – however, curly leaf pondweed and the invasive watermilfoils and hydrilla only provide habitat on their edges. They create such dense populations that fish cannot live within the vegetation mats and they decrease dissolved oxygen in and around them, which is also detrimental to fish.

Section 5: Data Documentation



WISPA Data Overview

The Watercraft Inspection Steward Program Application (WISPA) was developed to collect real-time data of invasive species through the trained eyes of stewards throughout boat launches in New York State using Esri's Survey 123 application. The WISPA database is made available to partner organizations and state and federal agencies to track and analyze invasive species through a standardized collection method. The WISPA Project is a collaborative effort utilizing participation of numerous public and private organizations and is hosted by the New York iMapInvasives Program.

iMapInvasives is an on-line, collaborative GIS-based invasive species database and mapping tool used in several jurisdictions across North America (see NatureServe's iMapInvasives Story Map). In New York State, iMapInvasives is the official state invasive species database used for:

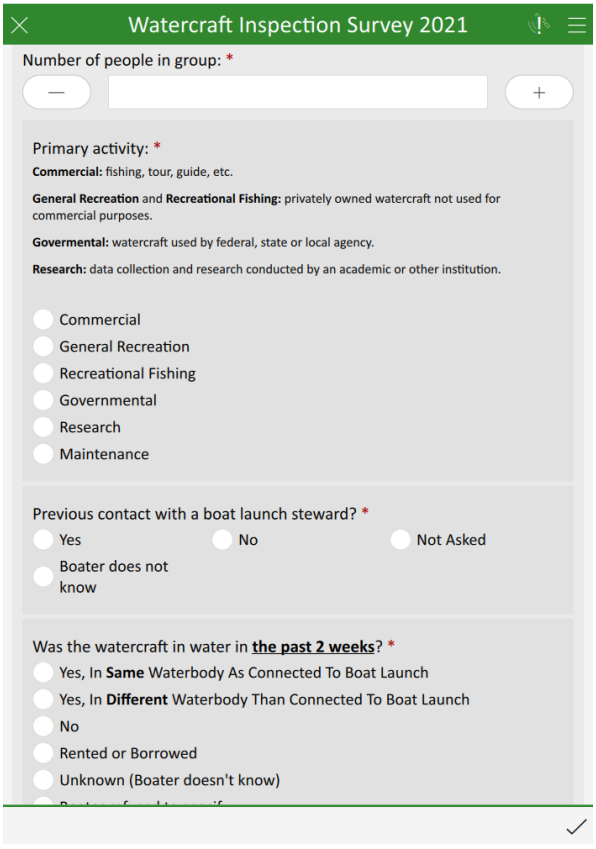
- Reporting invasive species
- Recording treatment efforts and tracking success
- Early detection email alerts
- Mapping invasive species distributions
- Data analysis in the web interface and GIS
- Creating data summaries and reports

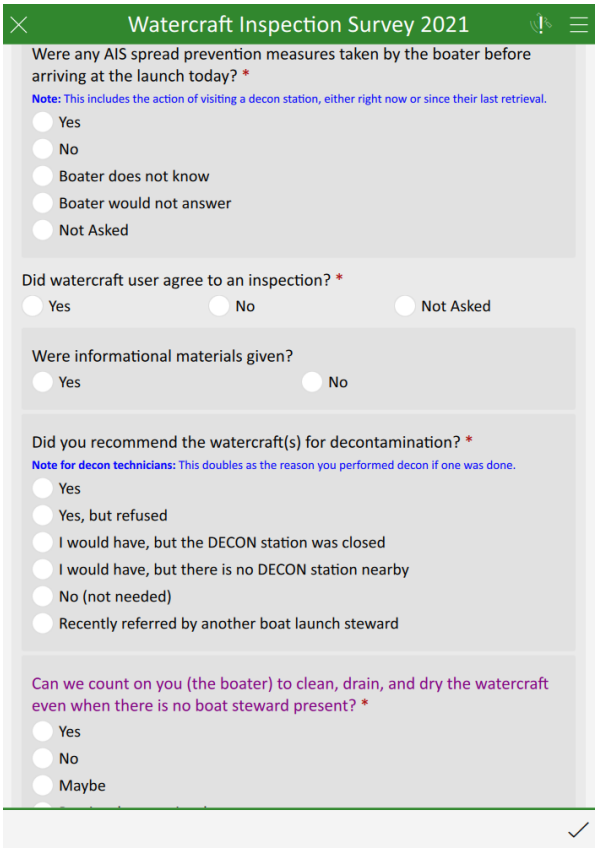
NY iMapInvasives is managed by the Invasive Species Database Program at the New York Natural Heritage Program (NYNHP), which is a partnership between SUNY College of Environmental Science and Forestry and the NYS Department of Environmental Conservation, with funding from the New York State Environmental Protection Fund. The iMapInvasives Network is comprised of organizations across North America that host the iMapInvasives database in their respective state or province. More information about the iMapInvasives program can be found on their website (www.NYiMapInvasives.org)

Through this partnership, standardized data attributes were created and agreed upon by participating programs in NYS. Some programs have slight alterations in what information they collect but most collect the same core information. This includes:

- Steward Name
- Organization
- Date and Time
- Launch Name
- Direction
- Watercraft type and count in group
- Number of people in group
- Primary Activity
- If watercraft has been elsewhere
- AIS spread prevention measures
- Permission to inspect
- If organisms were detected
- Behavior change question

Data collection and reporting are crucial tasks. Data analyses are only as good as the data collected. The use of tools like Survey 123 programs can collect more accurate data that can be analyzed with ease. This also allows the steward to collect information automatically (date, time, location etc.) without having to fill in answers to responses, speeding up process with the boaters. Some questions are enhanced to collect related information. For example, if the boater agrees to an inspection, a new question appears asking what was found during the inspection. If the boater answers no, this question does not show. Another example is when a boater indicated if they have been to another waterbody within the last two weeks and a dropdown menu of locations becomes accessible.





The information gained from data surveys, reports, and analyses is useful to natural resource managers for their AIS control activities. The information also supports requests for steward program funding.

It is essential stewards follow the reporting and data-related protocol provided by program coordinators. This includes meeting established deadlines for reporting and data entry, reviewing your data, and correcting errors. If your program uses paper survey forms as a backup, remember to write legibly; properly completed hard copies of the field survey forms are imperative for quality assurance checks. All programs should be using the most up to date survey form provided to them.

Questions about data collection and reporting can be referred to program coordinators.

Data Quality

The Role of Steward Integrity

Accurate data is one of the most important parts of a steward's job. Steward schedules or locations are often shifted in response to observed patterns for more efficient contact with additional boaters. If a location is determined to have higher traffic than expected or to produce many AIS interceptions, funding requests can be supported to increase coverage at that location. It is therefore critical that stewards perform data collection to the highest possible degree of accuracy.

Stewards must practice consistency in how they ask questions of the boaters. Example: when asking whether each boater took any spread prevention measures themselves, the steward

will only record measures that the boaters are able to volunteer with no coaching. This determines if the boaters have actual previous knowledge of what constitutes a spread prevention measure. If a steward has any uncertainty about the proper way to address a question, they must always ask their program coordinator for guidance.

Stewards must understand the reason for asking each question and how to ask them properly. Previous waterbodies are important for assessing AIS spread risk, and two weeks is the standard window for survivability outside a waterway. While it is best practice to ask most questions the same way each time, there are various good ways to phrase the behavior change question about Clean Drain Dry to connect with different boaters and encourage them to actively practice AIS good spread prevention. ("I understand that you usually stay on Lake Champlain, but if you happen to visit a different lake, would you visit one of our free boat washes to prevent transporting any AIS?")

A survey must be fully completed for each watercraft observed, even if an inspection could not be performed. Lack of data entry makes an encounter nonexistent to your program.

Operational overview

Program coordinators will install Survey123 and the updated WISPA survey on tablets at the beginning of the season. They will establish usernames for each steward; an additional generic program-specific username (i.e. ProgramName1) should also be established for utilization of stewards hired later in the season which will allow them to type their name.

Stewards must ensure that their tablet is:

- Fully charged for each shift.
- Kept in a secure location between shifts.
- Protected from continuous direct sunlight or other damaging weather conditions.
- Never left unattended at the work site due to risk of theft or damage.

The WISPA survey is most effectively completed when the steward has the tablet in their hand during each boater encounter and can enter the data immediately. This provides the most accurate date/time information and avoids transcription errors that inevitably occur when back-entering data from paper logs. If paper must be utilized due to an unavoidable tablet failure, stewards must always adjust the date/time fields properly to reflect when the encounters occurred.

Data will be uploaded (pressing "Send" in the Outbox) once the steward reaches an internet connection.

- This must be done as often as possible, preferably at the completion of each shift.
- Data cannot be quality-checked by program coordinators until it is uploaded.
- Daily upload is highly preferred because if many surveys pile up on a tablet over days or weeks and the tablet is then damaged or stolen, all the data will be lost.
- Program coordinators can assist with locating public WiFi spots if a steward does not have home internet or is unfamiliar with their work region.

Quality standards

Program coordinators should consistently review the WISPA data for items that may indicate problems with job performance. Weekly checks should be performed at a minimum but more frequent checks are recommended at the

beginning of the season when stewards are still learning their jobs.

Data errors will often indicate misunderstandings or accidental training gaps rather than deliberate poor performance. These can include:

- Absence of data could mean that a steward misunderstood the upload procedure or doesn't grasp that the surveys save offline on the tablet and will transmit once they reach an internet connection later.
- Frequent entry of the wrong work location can show that a steward doesn't know how to properly use the "Paste from Favorites" option in WISPA. A simple demonstration will stop the error and also save the steward considerable tablet time during their shift.
- Unusual species reports must be noticed quickly so the coordinator can check any pictures uploaded to WISPA or contact the steward for retrieval of the physical samples.
- Continuous viewing of all pictures will show the coordinator how well the stewards are learning their species identification.
- Frequent checks will enable the coordinator to ask questions while a steward's memory is still fresh if follow-up is necessary for any encounter. For example, they may remember that a boater mentioned an additional previous waterbody which wasn't noted in the survey comments due to a very busy launch day.
- Coordinators can track the frequency of "Not Asked" responses to see whether a steward is having unusual trouble engaging with boaters or possibly misunderstanding the importance of the questions.
- Reviewing all survey comments is critical because it can often show where a steward may be having some trouble handling unusual situations.

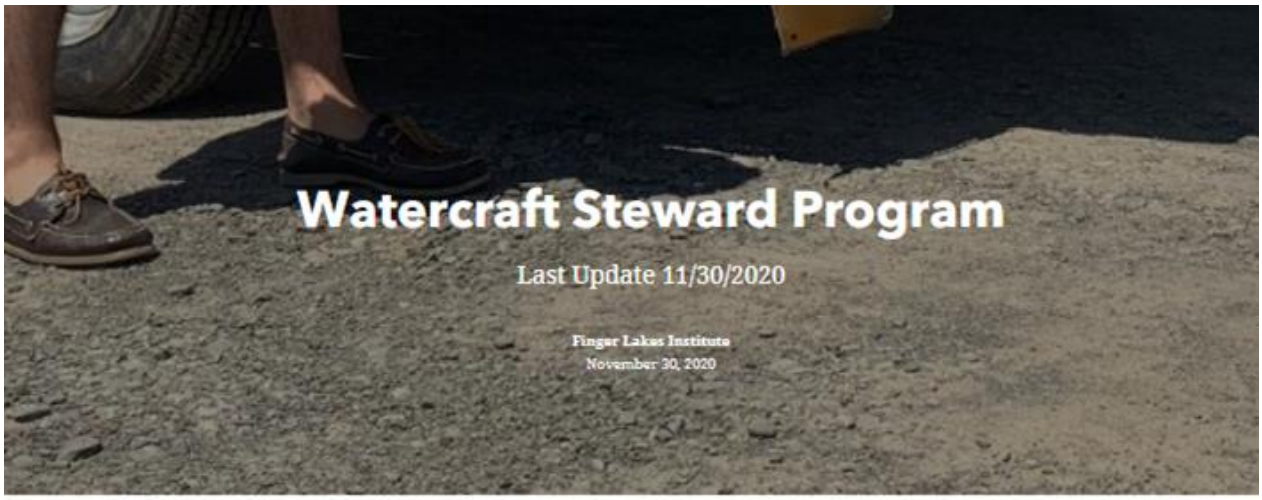
Quality control checks also provide many opportunities to praise stewards for a job well done, such as an important AIS interception with full details recorded or a description of a very successful educational encounter with a new boater.

Data Use and Metrics

There are many ways that WISPA data can be used to the advantage of a steward program. Some managers may look at metrics as a tool for "grading" their steward program and reflecting or communicating the effectiveness of their programs to the public. Some programs will also use data to make meaningful management decisions. Even utilizing simple analysis of WISPA data can yield information to improve on a programmatic level or an individual steward level.

Metrics are helpful for evaluating a program at a macro level across a region or program, or on a micro level within a single launch or waterbody.

Communicating data may be directed at different audiences with difference effects. Communicating WISPA data to stewards can help them understand the work that they are doing every day. Knowing how busy a launch is compared to others across a region or the state can help them understand the importance of using a state-wide database and can put their work into perspective. Stewards equipped with knowledge about common activities, boat types, common sources of boaters, or previous AIS knowledge of boaters at a boat launch can help guide outreach and educational approaches. This information can be communicated in any number of ways from periodic program-wide presentations to simple overview emails or one-on-on conversations.



What is the Watercraft Steward Program?

The Finger Lakes Watercraft Steward Program, managed by the Finger Lakes Institute at Hobart and William Smith Colleges (FLI), has been working to prevent the spread of aquatic invasive species with the public boating community throughout the Finger Lakes region since 2012. The purpose of the Watercraft Steward Program is to spread the message to recreationists: **Clean, Drain, Dry** their vessels, gear, etc. to prevent the spread and impact of invasive species leaving a launch. In fact, per the NYS Department of Environmental Conservation's Regulation Part 576, all vessels leaving a launch must take reasonable precaution to remove invasive species before entering a public roadway. The Finger Lakes Institute program has operated on all of the Finger Lakes, the Erie Canal, the Genesee River, and Lake Ontario.

The role of Watercraft Stewards has three main parts:

- Provide volunteer inspections and role model how to Clean, Drain, Dry to recreationists so they can do it on their own
- Provide outreach and education about the harm and impact of aquatic invasive species
- Collect data on demographics and boat launch use. To evaluate the efficacy of the program & tailor approaches based on the type and frequency of recreationists at each launch.

Stewards can provide the first and last line of defense against the spread of aquatic invasive species. With a physical presence at some of the busiest launches in the State, our stewards are able to physically inspect each boat that passes through their launch for the presence of aquatic invasive species (AIS).

While performing watercraft inspections, stewards deliver important outreach and education to the boating community about how they can ensure that they're not spreading invasive species. Stewards

Figure 1

Providing stewards with a list of species confirmed in their launch's waterbody and in close by waterbodies can help identify high-risk incoming watercraft. For example, a steward on Seneca Lake in the Finger Lakes region might benefit from the knowledge that nearby Cayuga Lake has active hydrilla populations. This steward should be on high alert whenever inspecting watercraft coming from Cayuga Lake. Information for invasive distribution within a program region is available directly from iMapInvasives.

Communication with partners and the public can also be beneficial. This is a great way to communicate achievements of the program, and to spread awareness about the program in general, and of important findings. Some types of communication with this goal include presentations, blog articles, web-apps, and more. While a program manager may have intimate knowledge of their launches and program range, sharing this information can encourage valuable input from partners and the public alike.

Interceptions of high-priority invasives such as hydrilla or starry stonewort can also be valuable to share with the public. These findings help enforce the importance of watercraft stewards. Secondary information collected during these interceptions such as previous waterbody or registration state can also draw attention to common and risky pathways for a particular species.

Below are common metrics for WISPA data. Additionally, we discuss how they are calculated, and how they aid in communicating valuable information with stewards, partners, or other stakeholders:

Number of records: the total number of records entered into WISPA. This does not take into account permission to inspect, or the number of watercraft. This metric communicates the capacity overall of a program, and the contribution to the statewide dataset.

Number of watercraft: The total number of watercraft in a record. This metric takes into account the number of watercraft per records, but does not consider permission to inspect. This metric communicates the amount of boat traffic at a launch, waterbody, or region.

Number of people reached: The sum of group size for all WISPA records. This shows the total number of people to whom a program could have an impact. This metric communicates the capacity for human outreach and education at a launch, waterbody, or region.

Number of first encounters: The total number of records where the "Previous experience with a steward" field was "No". This number represents the amount of people to whom we are introducing our message. This metric is helpful in communicating the impact of stewards at a launch, waterbody, or region.

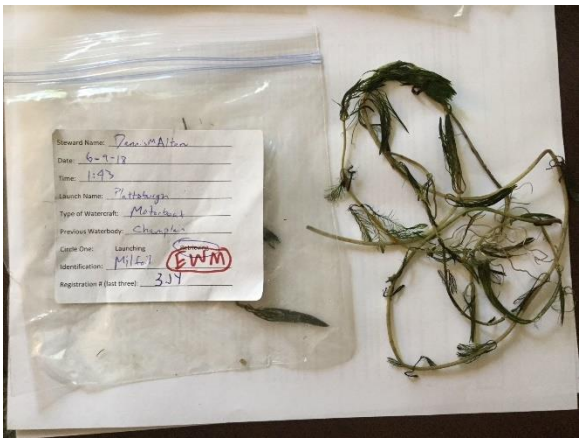
Number of invasives intercepted: Aggregate totals for unique invasive species found during inspections. This metric is helpful in communicating the capacity for stopping an invasive from leaving or entering a waterbody.

Last waterbody and next waterbody visited: Aggregate totals for most common last waterbody or next waterbody visited. This metric will show where people are coming from, and where people are traveling next. This metric is helpful for managers and stewards to identify common sources of watercraft, and ultimately potential riskiness of certain launch users.

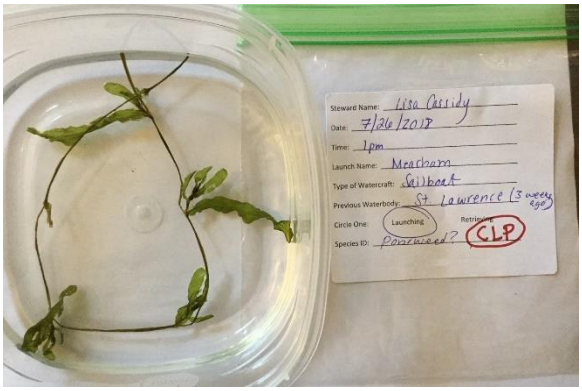
Sample Collection

In many cases, reporting a positive finding of an invasive species requires a voucher to ensure the report is valid and accurate. Without proof such as a photo or physical specimen, we are dependent on the word of the steward. In most cases, clear photos of a specimen and its identifying features (whorls, leaf structure, coloration, etc.) are sufficient. When reporting high priority species or novel invasive species for the waterbody, a voucher specimen should be collected to confirm the new finding. This extra level of verification can aid in initiating and supporting a direct, significant response from managers or stakeholders. Store samples with a small amount of water in a zipped plastic bag. There should be just enough water in the bag to keep the specimen damp. Too much water will cause the sample to deteriorate quickly, and too little water will cause the sample to dry out. When taking a sample specimen, be sure to include the following information on the sample bag:

- Date and time
- Location – launch and waterbody
- Person collecting
- Suspected species
- Direction of boat – launching or retrieving



Eurasian water milfoil sample.



Curly leaf pondweed sample.

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Rothlisberger, J.D., W.L. Chadderton, J. McNulty, and D.M. Lodge. 2010. Aquatic invasive species transport via trailered boats: What is being moved, who is moving it, and what can be done. Fisheries 35(3): 121-132.

Appendix A: Equipment and Supplies

- Tablet with Survey 123 Application (WISPA, WISPA Angler, and WISPA Walk-Up surveys)
- Tablet charger
- Paper data sheets
- Pens/pencils
- Whiteboard with dry erase markers
- Uniform items (shirt, hat, name tag, etc.)
- Steward on-duty sign (sandwich-board design works well)
- Fully-charged cell phone
- Emergency Contact Lists: Program-related emergency and law enforcement contacts
- Chair with awning and table
- Tablecloth (program specific if applicable)
- AIS specimen sample collection materials: zip-lock baggies, waterproof markers to label plant samples, cooler and ice packs
- Plastic bin with distributional materials
- Sunscreen and bugspray
- Hand sanitizer and alcohol wipes
- First aid kit
- Drinking water
- Hand rake with rope for rake tosses
- Optional: Rake to clear launch of aquatic plants/debris, 5-gallon bucket, flashlight, magnifying glass, mirrors on extendable wands

Boat steward at a Watercraft Inspection Station.

Appendix B: Additional Resources for AIS Information

New York State Invasive Species Clearing House: http://nyis.info/

New York State Invasive Species Research Institute: http://www.nyisri.org/

USGS Nonindigenous Aquatic Species Database: https://nas.er.usgs.gov

Appendix C: More Information on Federal/State Regulations

Federal Invasive Species Regulations

The Lacey Act - Current species list: https://www.fws.gov/injuriouswildlife/list-of-injurious-wildlife.html

Implementation of Phase Six of the Lacey Act enforcement schedule will begin on October 1, 2021. Phase Six will require a plant import declaration for additional products such as essential oils and wooden pallets that are imported into the United States. With this requirement, the declaration must contain, among other things, the scientific name of the plant, value of importation, quantity of the plant, and name of the country from which the plant was taken. (https://www.aphis.usda.gov/aphis/newsroom/federal-register-posts/sa_by_date/sa_2021/lacey-act-enforcement)

USDA Noxious Weed Program - Current noxious weed list: https://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/weedlist.pdf

State-Level Invasive Species Regulations

6 NYCRR Section 59.4 Aquatic invasive species control at state boat launching and fishing access sites. Expired October 15, 2020. (https://govt.westlaw.com/nycrr/Document/Idfc02392f31911e3ab560000845b8d3e?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)&bhcp=1)

6 NYCRR Section 576.3 Prohibitions. (https://govt.westlaw.com/nycrr/Document/Ide274bbb20dc11e6bad4db6958f3eb73?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default)

Article 11-0507. Liberation of fish, shellfish and wildlife http://public.leginfo.state.ny.us/lawssrch.cgi?NVLWO

9 CRR-NY 377.1 Regulated Activities in New York State Parks and Historic Sites https://govt.westlaw.com/nycrr/Document/I4f59cd02cd1711dda432a117e6e0f345?contextData=%28sc.Default%29&transitionType=Default

New York State Baitfish Regulations

Change to original document: Can purchase uncertified bait but must use it in the same waterbody it was collected from. (https://www.dec.ny.gov/docs/fish_marine_pdf/fishguide.pdf) pg. 79

6 NYCRR 35.3 Commercial Inland Fisheries (possession, sale, and use of bait fish) https://govt.westlaw.com/nycrr/Document/I21d5a8b5c22211ddb7c8fb397c5bd26b?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=(sc.Default

Appendix D: Protocol for Inspecting and Cleaning Shallow Water Anchors and Trolling motors

New York State Department of Environmental Conservation requests that all watercraft inspection stewards educate shallow water anchor and trolling motor users to carefully inspect and clean their equipment. These devices may harbor invasive species if sediment or vegetation is trapped in their mechanisms.

Shallow Water Anchors

Shallow water anchors are attached to watercraft (boat, kayak, etc.) that are used mainly by sports anglers while fishing in lakes or rivers. They utilize a 'pin' that is driven into the substrate and acts as an anchor that holds a vessel in place against wind and current Some shallow water anchor products have "smart" technology to know how deep to dig into the sediment to ensure the watercraft is anchored and remains in place. Several styles of these devices are produced, and the nature of their design and use may trap invasive species.

Types of shallow water anchors

Manual

Hydraulic

Electric*

***** *Hybrid of hydraulic and manual. With electric you have the flexibility to use any shallow water pin (manual) and have the hands-free capability of setting the pin in like a hydraulic anchor.*

Cleaning shallow water anchors

Example: A Minn Kota Talon power pole base can be prone to trapping sediment or vegetation

As a precautionary measure, anchors should be rinsed and cleaned before moving among waterbodies.

Cleaning Manual: Lay pin on dry ground in designated rinse area and rinse with a hose. After a thorough rinse, take a clean towel or paper towel and dry the pin while at the same time picking up any leftover debris. If mount adapter comes off, repeat the same process as done with pin.

Cleaning Hydraulic: Please follow steps for an extended hose rinse. Lay the anchor down and extend fully. You may need to remove the anchor from the mounting bracket to extend for rinsing. Rinse the sections of the anchor while it is extended. Once rinsing is complete, dry the anchor using a clean towel or cloth, and return it to an upright position.

Cleaning Electric: The process will be very similar to cleaning a manual system. Pull out the pin from the electric motor system and lay pin on dry ground and rinse with a hose. After a thorough rinse, take a clean cloth, towel or paper towel and dry the pin while at the same time picking up any leftover debris. If electric motor system does not detach from watercraft, insert the clean pin and with the controls, bring pin up and down a few times. Take out pin and repeat rinse and clean process. If the electric motor system is detachable, position hose into the hole where the pin goes, and rinse thoroughly in designated rinse area. If possible, dry the inside with a clean cloth, towel, or paper towel.

Trolling motors

Trolling motors are most often attached to motorized watercraft as an aid to boat control while fishing, oftentimes within shallow or vegetated areas. They may also be used by non-motorized watercraft such as rowboats, kayaks, canoes, or motor boats as a form of power. Trolling motors may be mounted at the bow, transom, or engine. Due to their more common use in vegetated areas, trolling motors should be carefully inspected and cleaned of potential invasive species.

Carefully inspect the motor, prop and driveshaft for any debris or plant matter that may be found. Particular attention should be focused behind the prop where vegetation may become wedged. It is recommended that boat owners disconnect power and then remove their props using a suitable wrench to ensure all potential vegetation and debris is removed from the back of the prop and driveshaft. All components should be rinsed with clean water, dried with a clean towel or cloth, and re-assembled.

All these steps can help prevent the spread of aquatic invasive species. If you feel it is needed, please copy these steps and create a handout for stewards to give to users.

Appendix E: Timekeeper Application

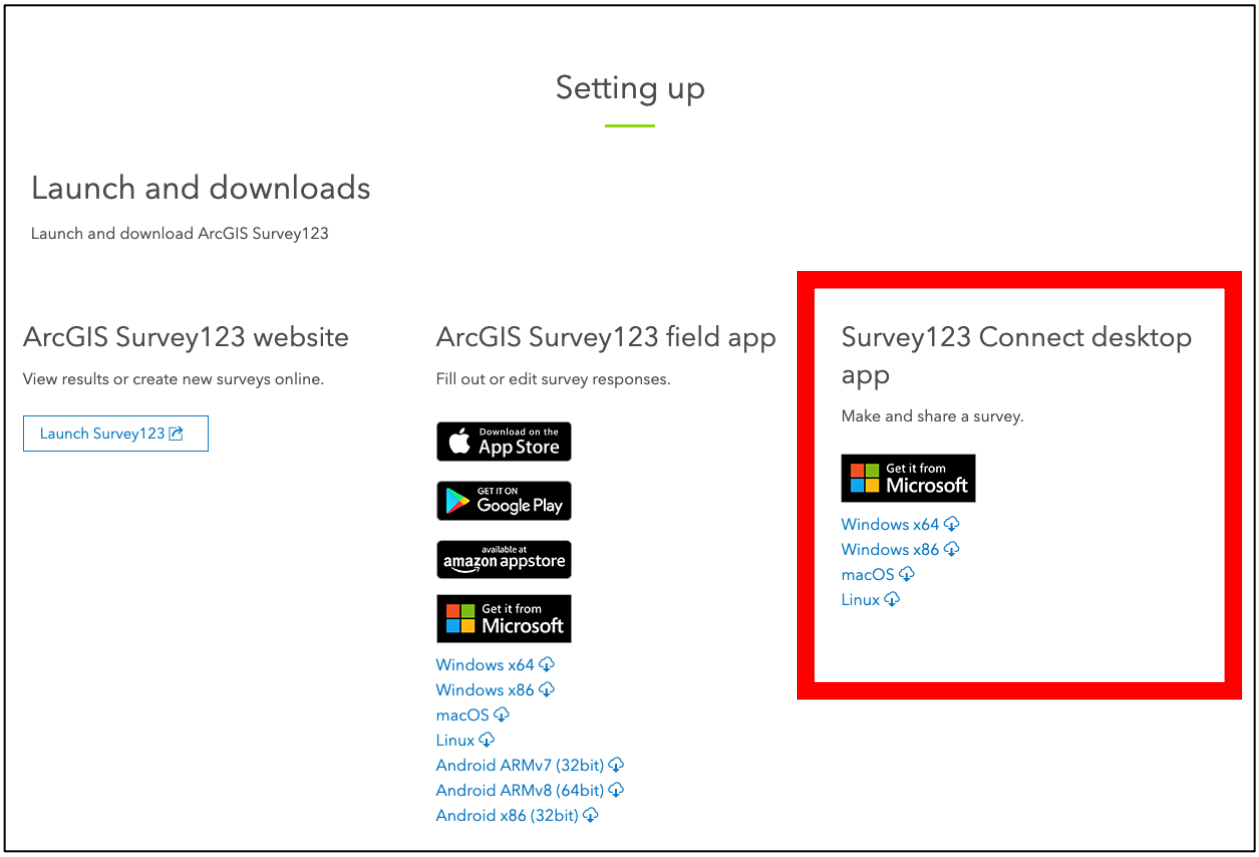
This guide should work for anyone trying to set up a WSP Clock In/Out SurveyTool that has access to ArcGIS Online and Survey123.

- **Phase 1: Generating the Survey**
  - Gather & Install Software & Resources
- **Phase 2: Survey Customization to Your ORG**
  - Making the Survey 'Yours' –entering precise steward & launch names
- **Phase 3: Publishing & Data ConsumptionoHow to access your survey's results**
- **Addendum 1: Titling your New Survey**
- **Addendum 2: Applying Filters to Survey Data Results**
- **Addendum 3: Steward Accountability–Data QAQC**
  - How the FLI verifies their steward's clock in/out data
- **Addendum 4: Making Survey Changes in-season& Providing Updates**
  - IE: Adding some additional stewards to the Team, halfway through the season.

Most Recent Revision: 12/17/2020

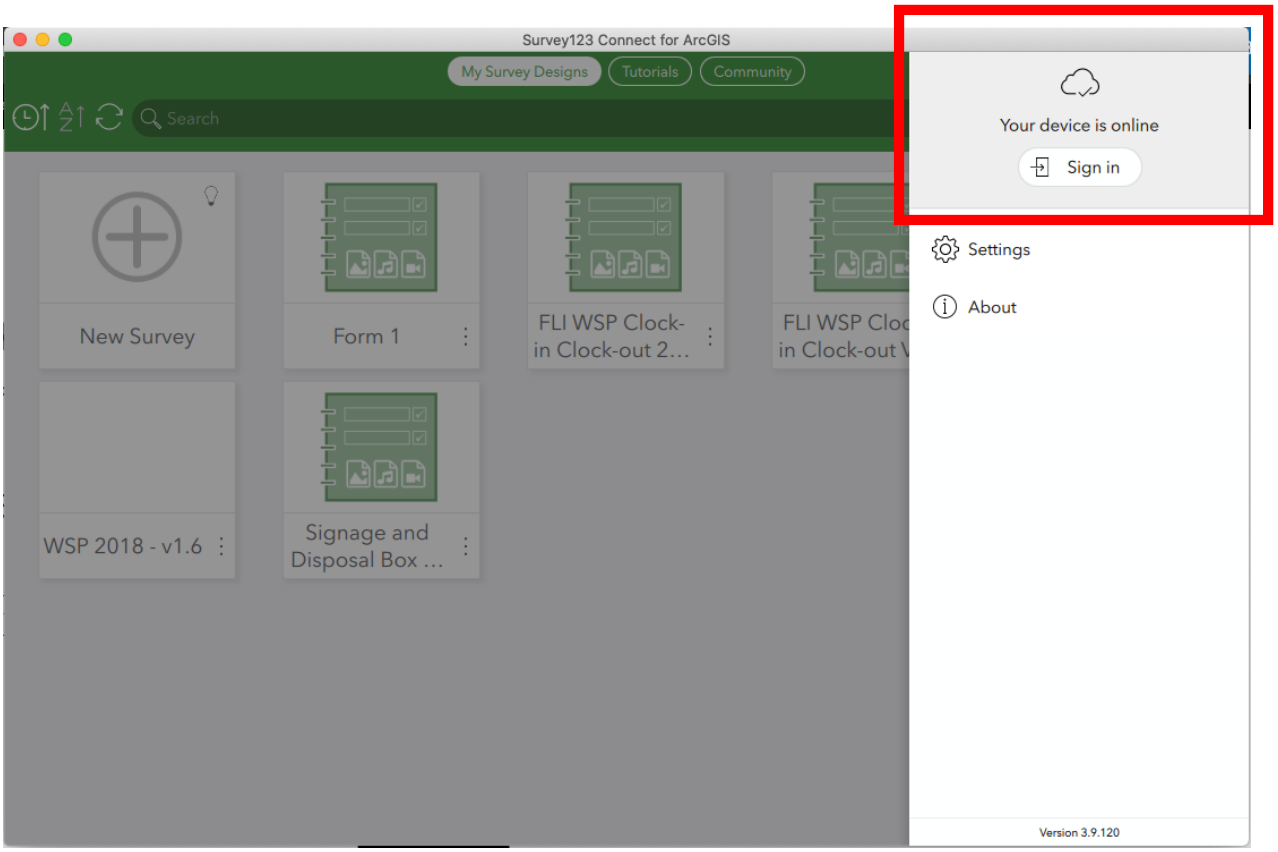
Phase 1: Generating the Survey

1. Download Survey123 connect
    a. https://www.esri.com/en-us/arcgis/products/arcgis-survey123/resources#settingup

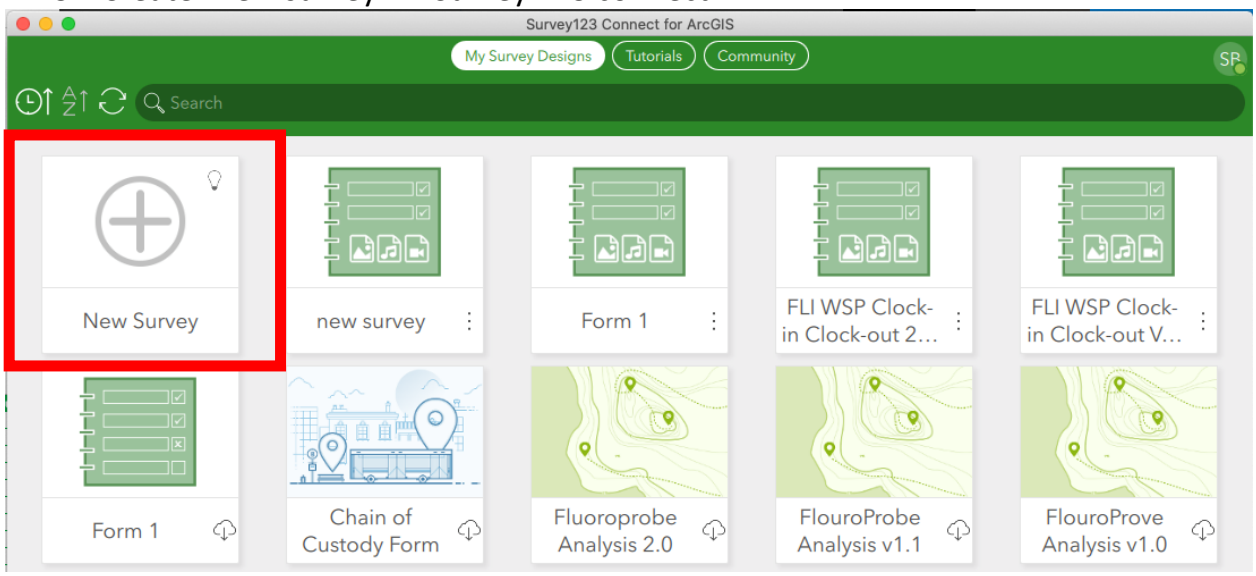


2. Login to Survey 123 Connect using your ArcGIS Online Account Credentials

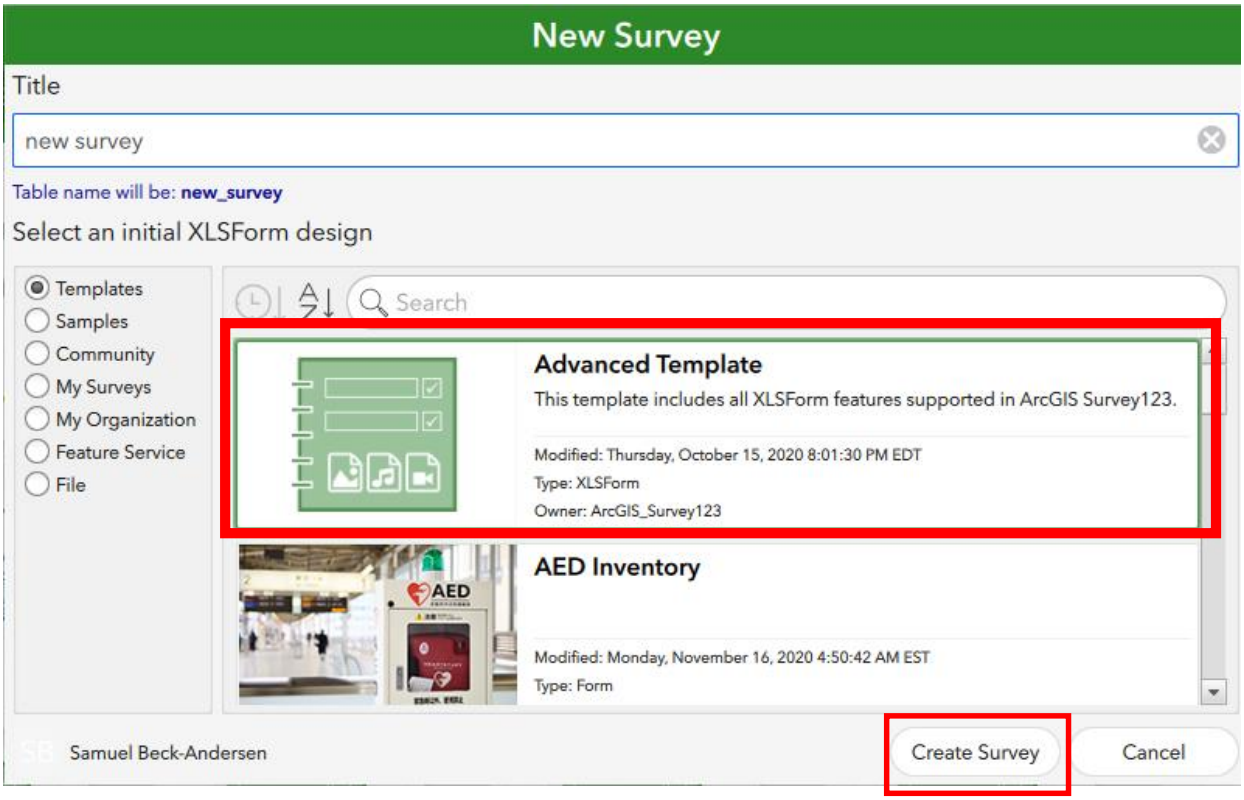
Most Recent Revision: 12/17/2020



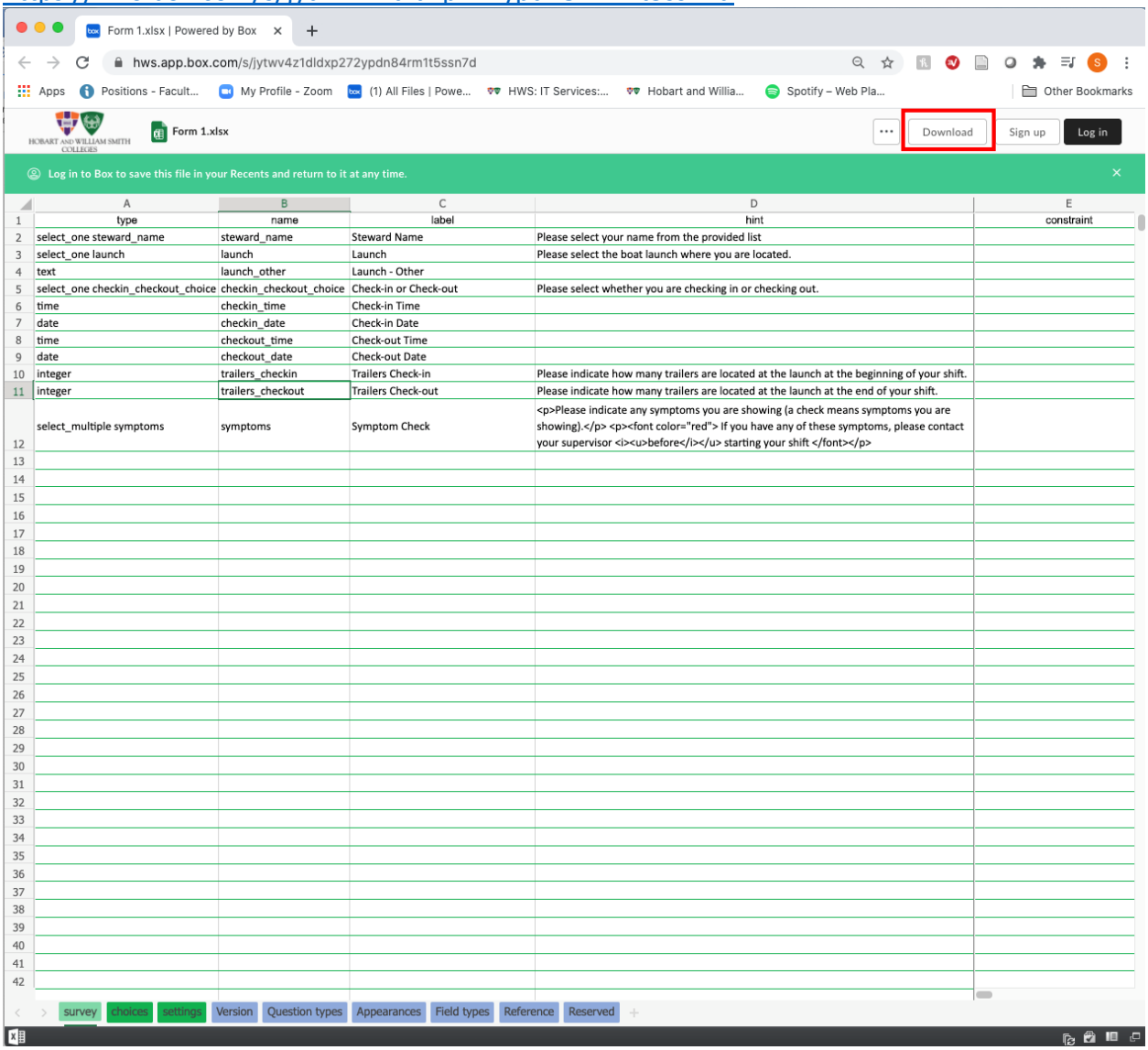
3. Create “new survey” in Survey 123 connect



Most Recent Revision: 12/17/2020



5. Download “Timekeeper Template” from following box.com link: https://hws.box.com/s/jytwv4z1dldxp272ypdn84rm1t5ssn7d



	A	B	C	D	E
1	type	name	label	hint	constraint
2	select_one steward_name	steward_name	Steward Name	Please select your name from the provided list	
3	select_one launch	launch	Launch	Please select the boat launch where you are located.	
4	text	launch_other	Launch - Other		
5	select_one checkin_checkout_choice	checkin_checkout_choice	Check-in or Check-out	Please select whether you are checking in or checking out.	
6	time	checkin_time	Check-in Time		
7	date	checkin_date	Check-in Date		
8	time	checkout_time	Check-out Time		
9	date	checkout_date	Check-out Date		
10	integer	trailers_checkin	Trailers Check-in	Please indicate how many trailers are located at the launch at the beginning of your shift.	
11	integer	trailers_checkout	Trailers Check-out	Please indicate how many trailers are located at the launch at the end of your shift.	
12	select_multiple symptoms	symptoms	Symptom Check	Please indicate any symptoms you are showing (a check means symptoms you are showing). If you have any of these symptoms, please contact your supervisor <u>before</u> starting your shift 	

6. Open “Timekeeper Template” in Microsoft Excel

7. Open “new survey”

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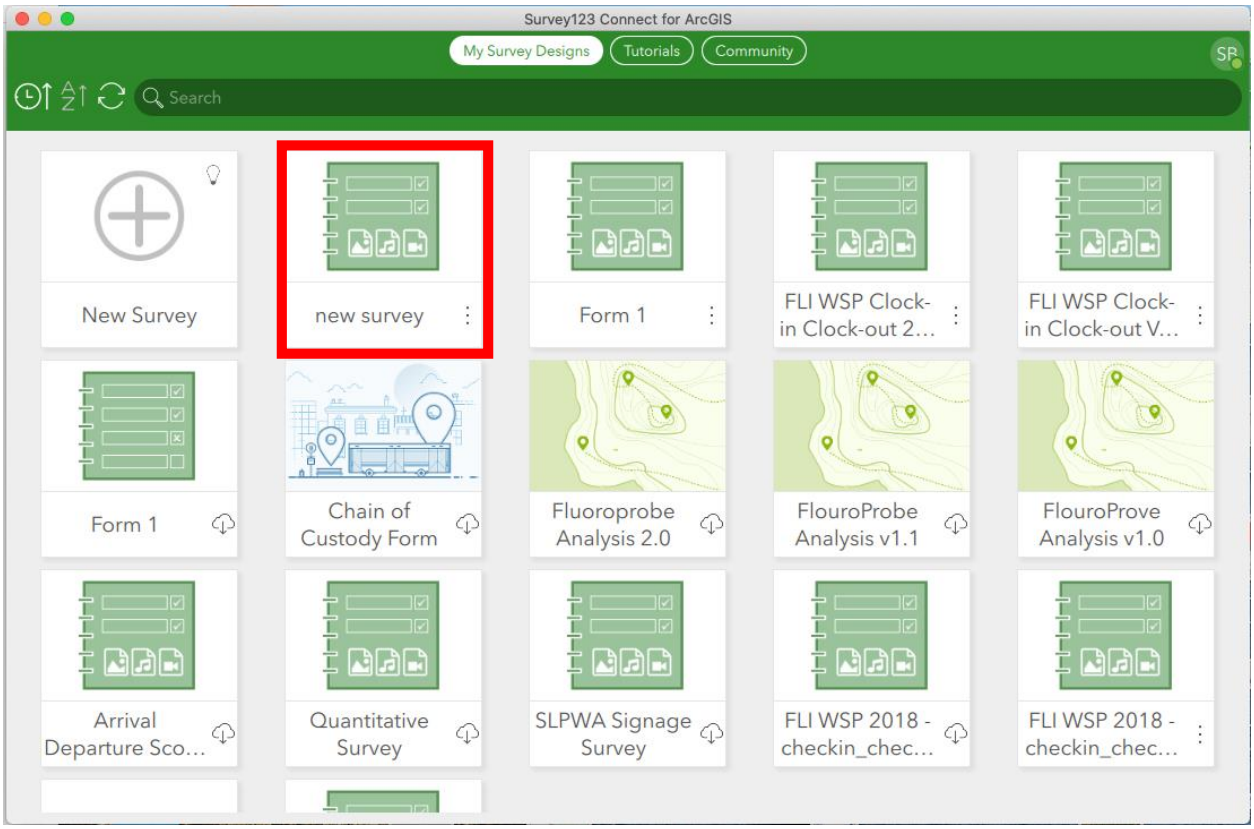
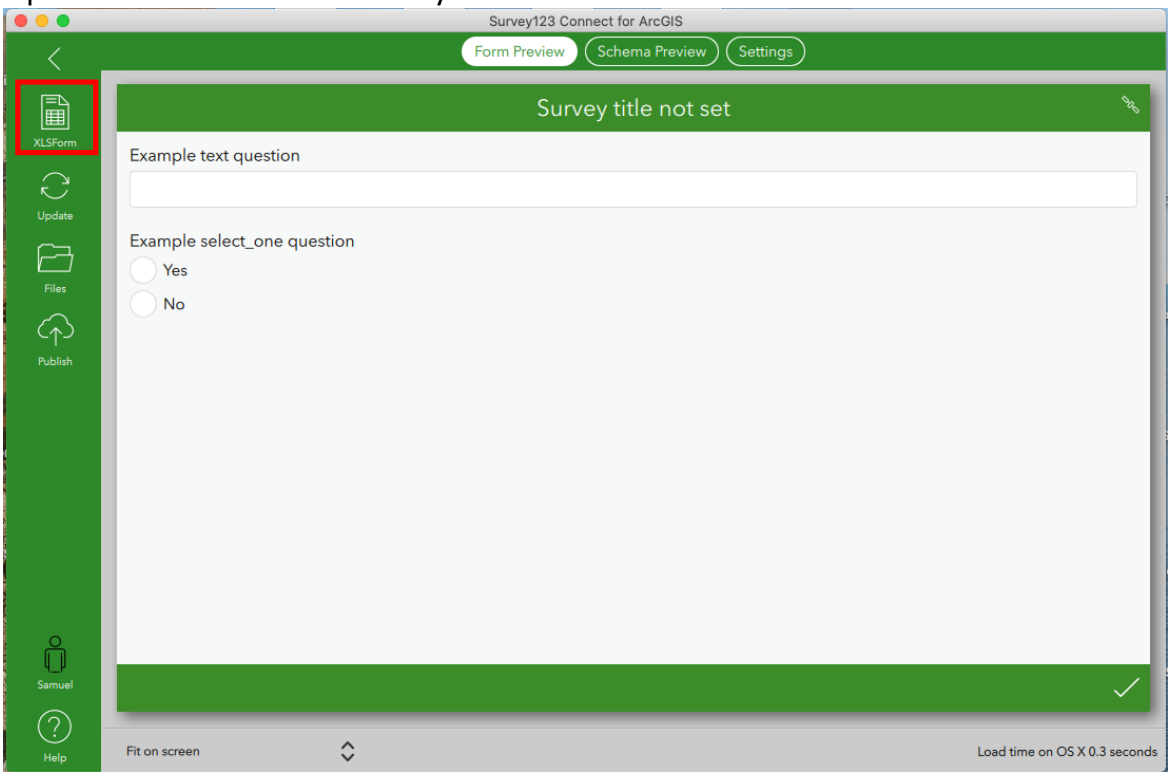
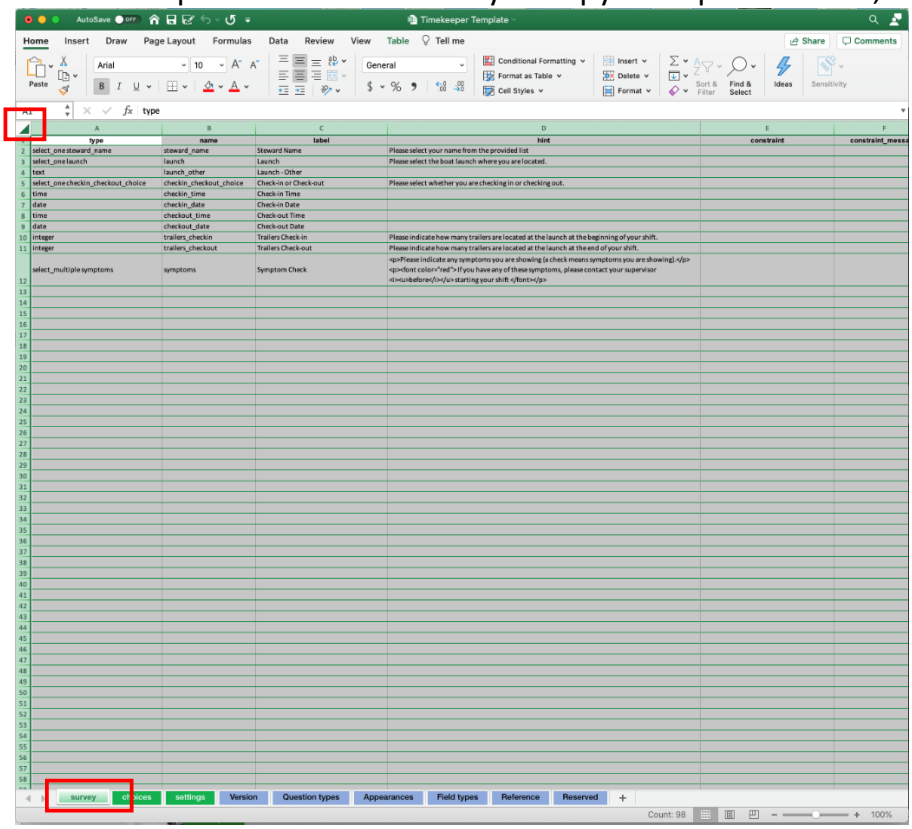


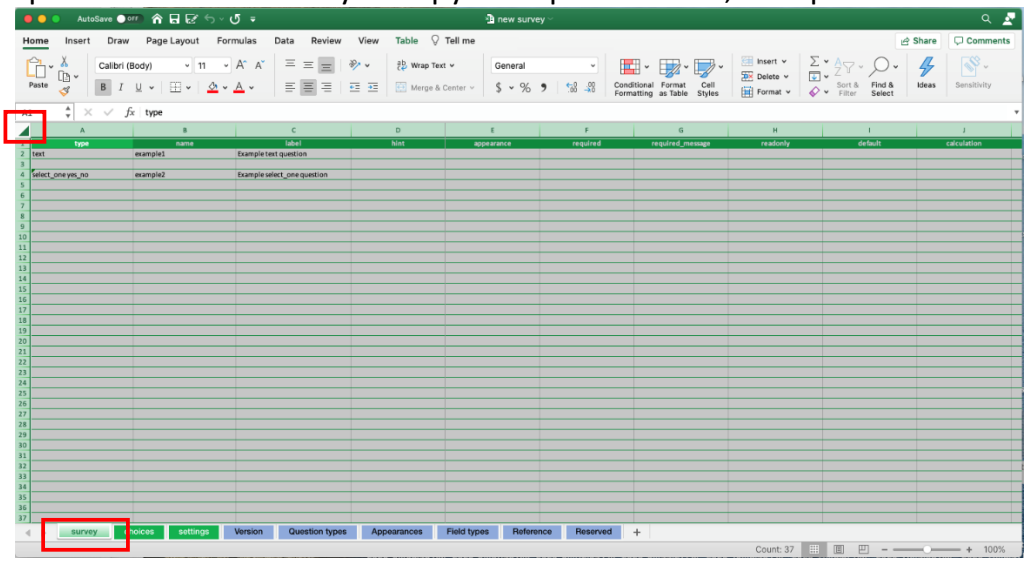
8. Open XLS Form for “new survey”



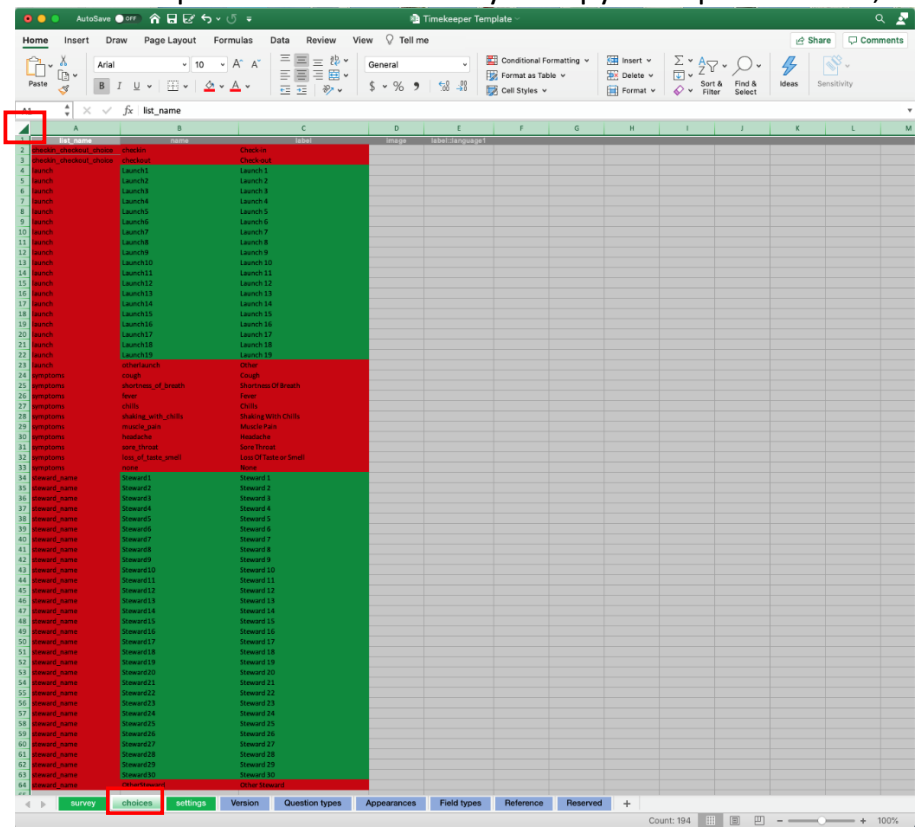
9. Copy all contents of “survey” tab in Timekeeper Template – right click select all button on spreadsheet to ensure you copy all important cells, select “copy”



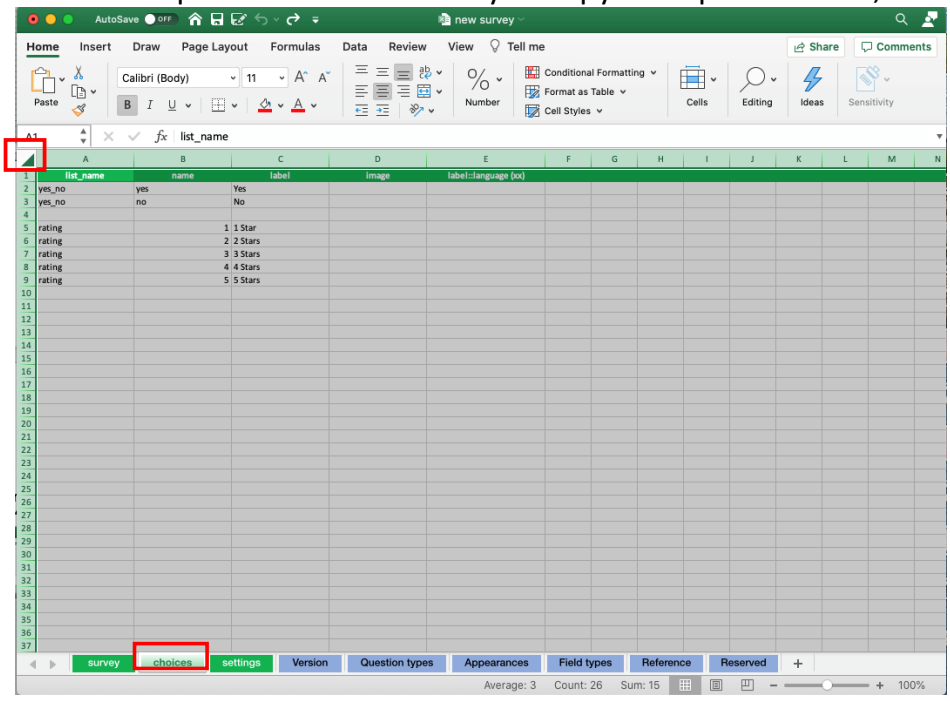
10. Paste to “survey” tab of “new survey” XLS Form – right click select all button on spreadsheet to ensure you copy all important cells, click paste



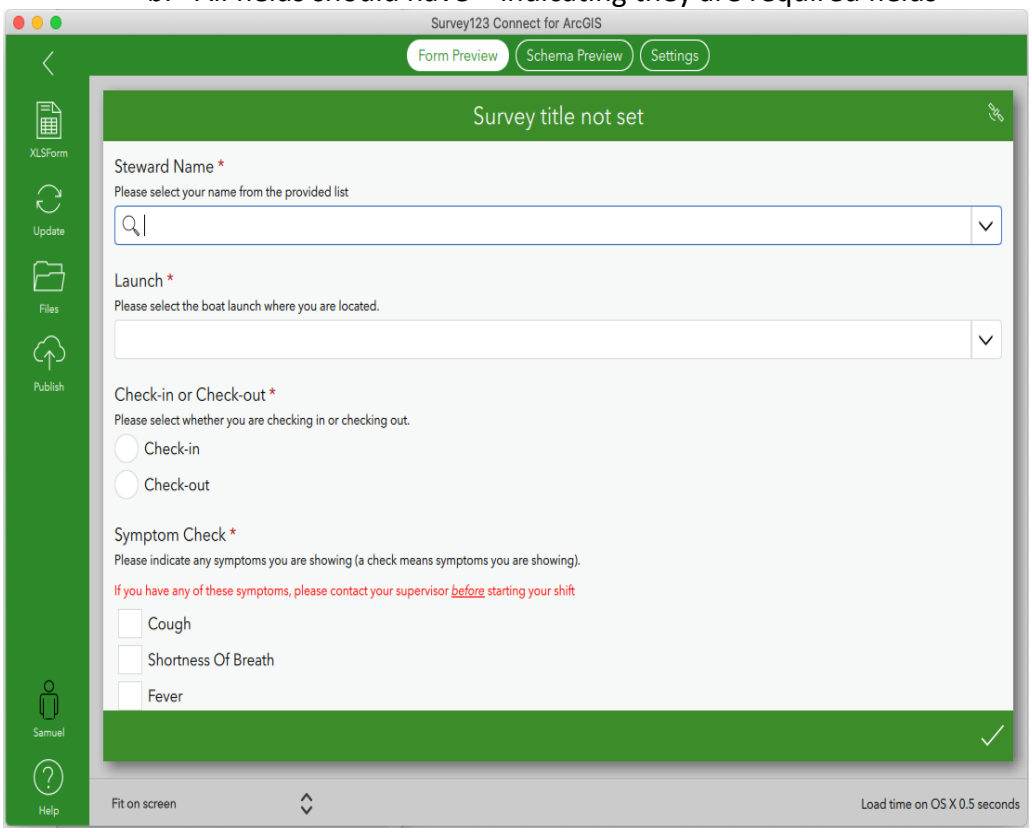
12. Copy all contents of “choices” tab in Timekeeper Template – right click select all button on spreadsheet to ensure you copy all important cells, select “copy”



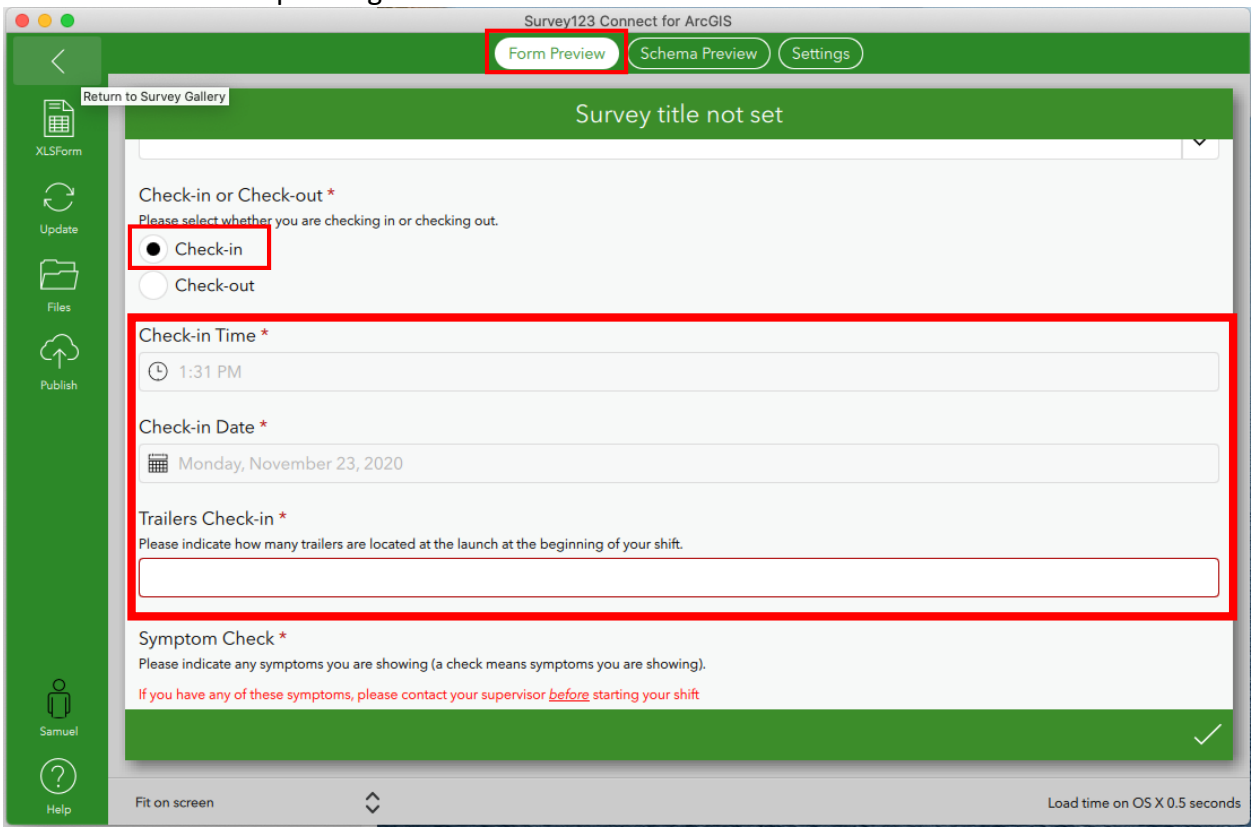
13. Paste all contents of “choices” tab in Timekeeper Template – right click select all button on spreadsheet to ensure you copy all important cells, select “paste”



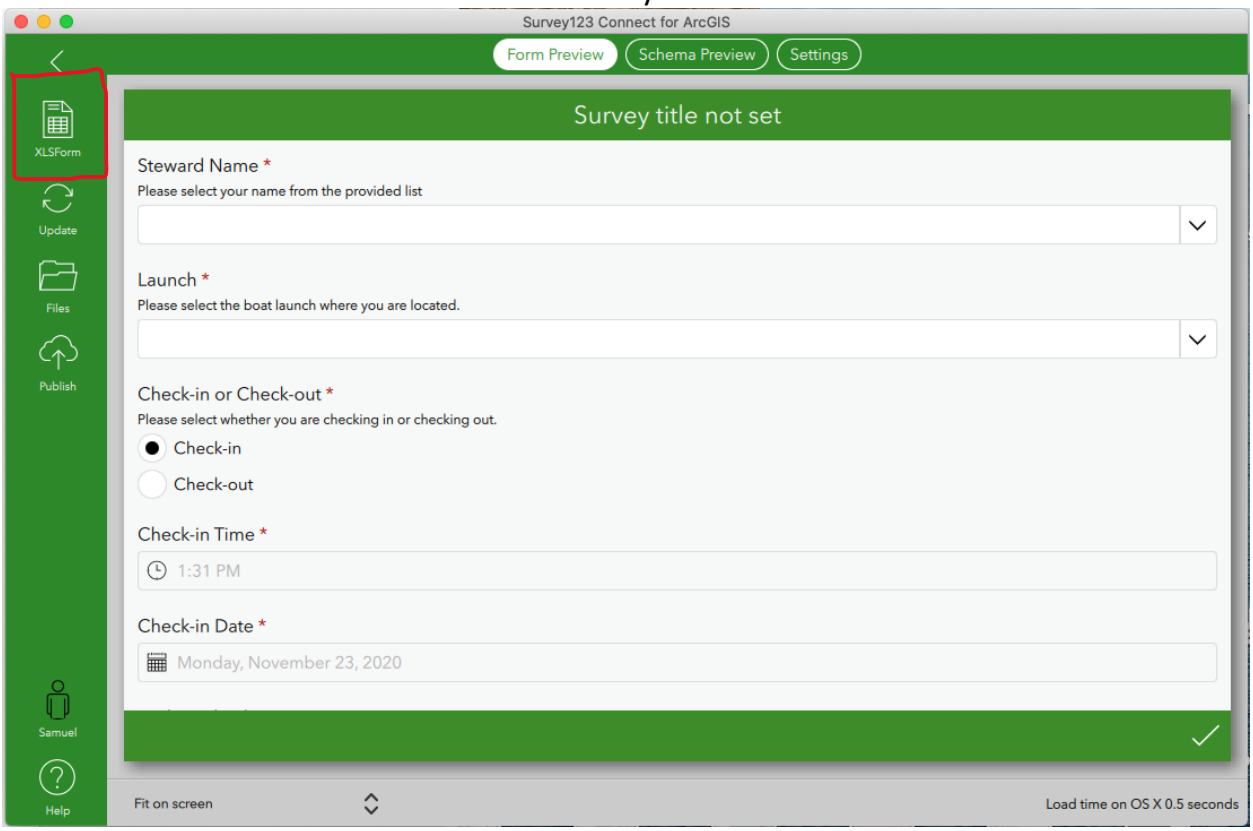
14. Save “new survey” XLS Form in Excel
15. Survey123 Connect should automatically update the Form Preview - make sure all fields work in the “Form Preview”
    a. Fields for Steward Name and Launch should contain placeholder titles Steward 1, 2, 3 etc. and Launch 1, 2, 3 etc.
    b. All fields should have * indicating they are required fields



a. Selecting “Check-in” should reveal “Check-in Date”, “Check-in Time”, and “Check-in Trailers” fields – the same goes for selecting Check-out and the corresponding additional fields

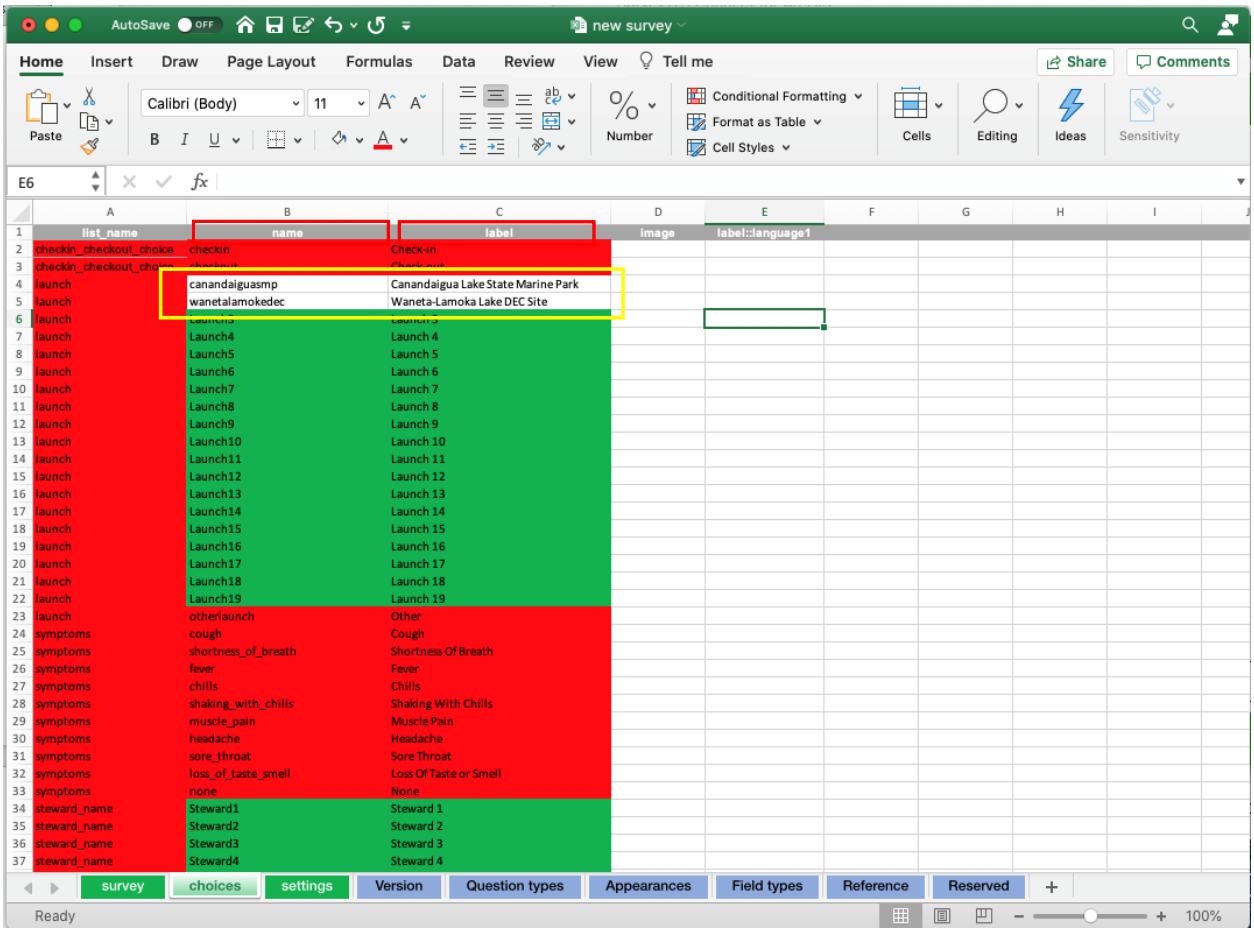


18. Return to the XLS Form for “new survey”



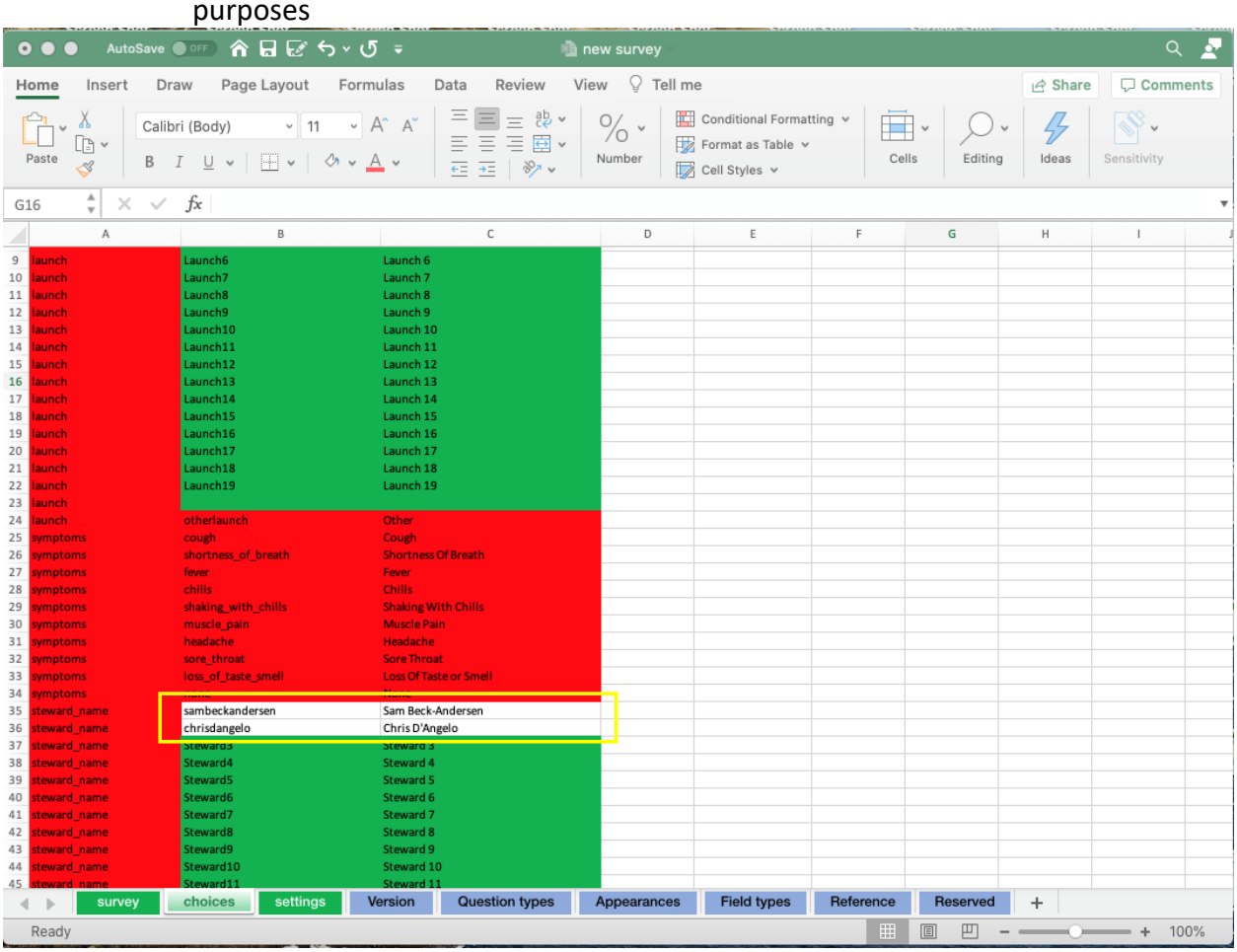
Phase 2: Survey Customization to Your ORG

1. In order to customize your survey to meet the needs of your program, you need to enter steward and launch names to the “choices” tab in the XLS Form.
2. Replace placeholder launch names with the names of your program’s stewards.
    a. The “*name*” column is what will be exported in the final dataset – do not use spaces, apostrophes, hyphens, or any other special characters
    b. The “*label*” is what will appear in the survey app – use whatever characters you want here
    c. Green cells are cells that you can change; red cells are cells that should not be changed; white cells are those that have been changed for demonstration purposes



3. If you need more spaces for additional launches, add rows between your new launches list and the symptoms list
    a. Be sure the “list_name” column contains “launch” for new rows

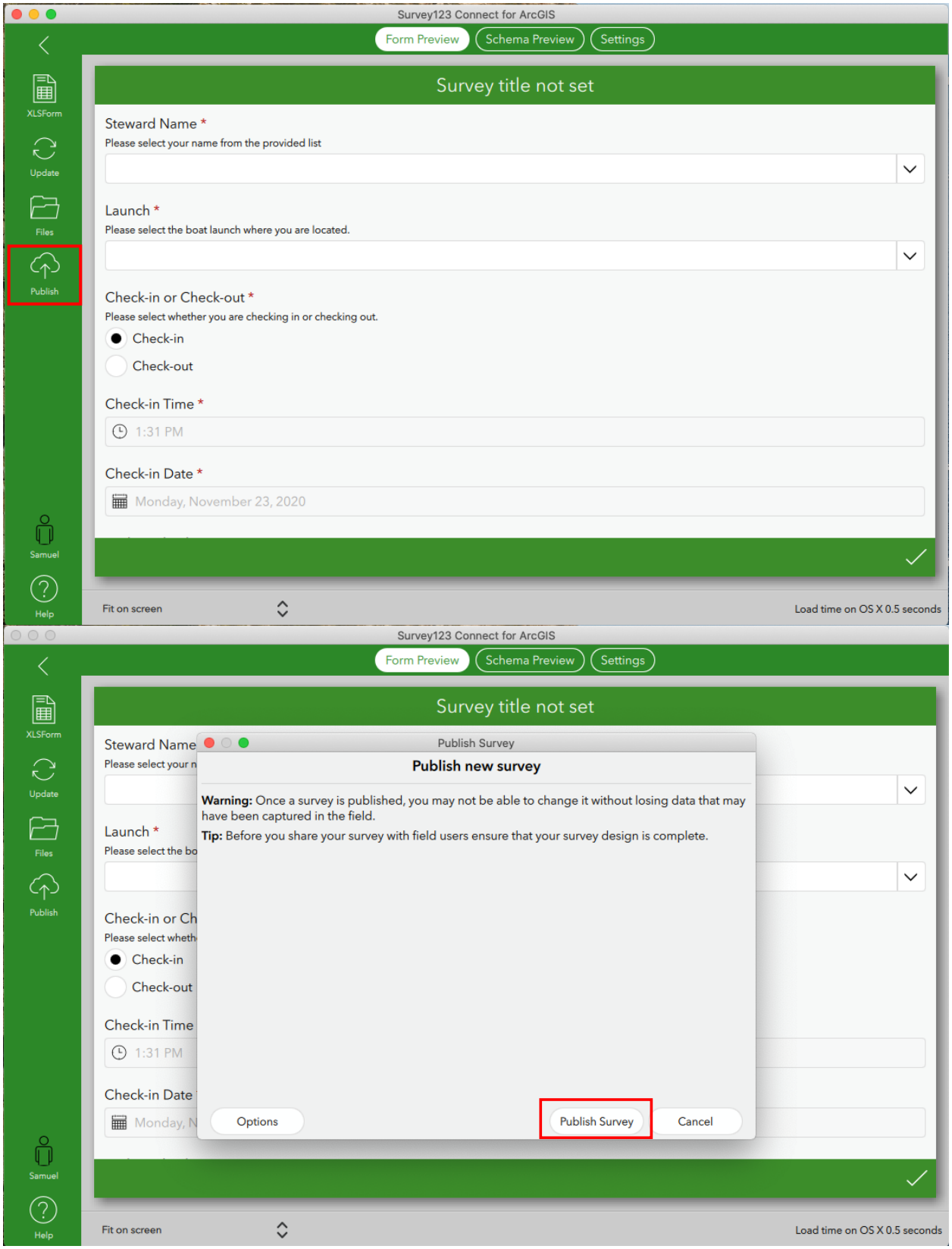
5. Replace placeholder steward names with the names of your program's stewards
    a. The "*name*" column is what will be exported in the final dataset – do not use spaces, apostrophes, hyphens, or any other special characters
    b. The "*label*" is what will appear in the survey app – use whatever characters you want here
    c. Green cells are cells that you can change; red cells are cells that should not be changed; white cells are those that have been changed for demonstration purposes



6. Save "new survey" XLS Form in Excel
7. Survey123 Connect should automatically update the Form Preview - make sure all fields work in the "Form Preview"
    a. Fields for Steward Name and Launch should contain your new steward names ad launch name

Phase 3: Publishing & Data Consumption

1. Publish the "new survey"



2. Your survey is now live, and can be downloaded onto steward tablets, similarly to the way WISPA is downloaded to tablets

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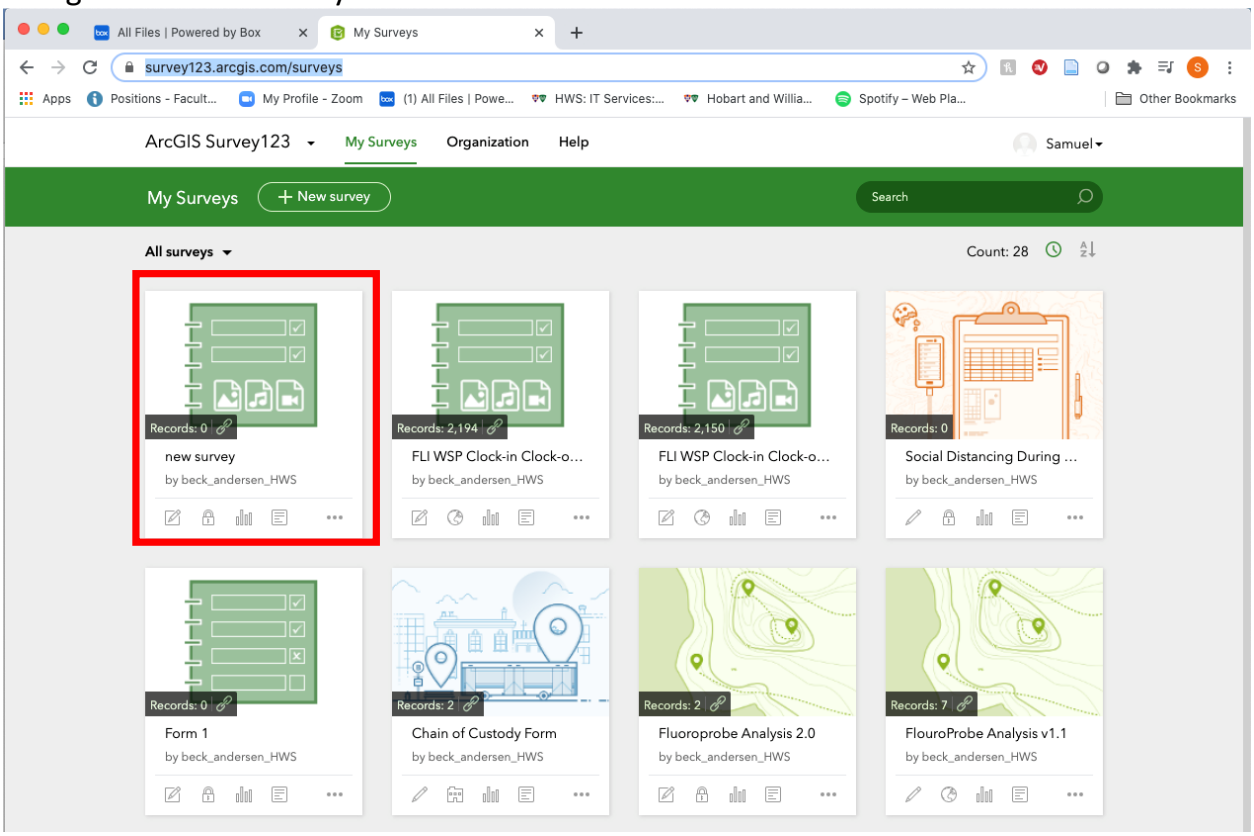
3. Sign into the main Survery123 page: https://survey123.arcgis.com/
4. Navigate to “new survey”



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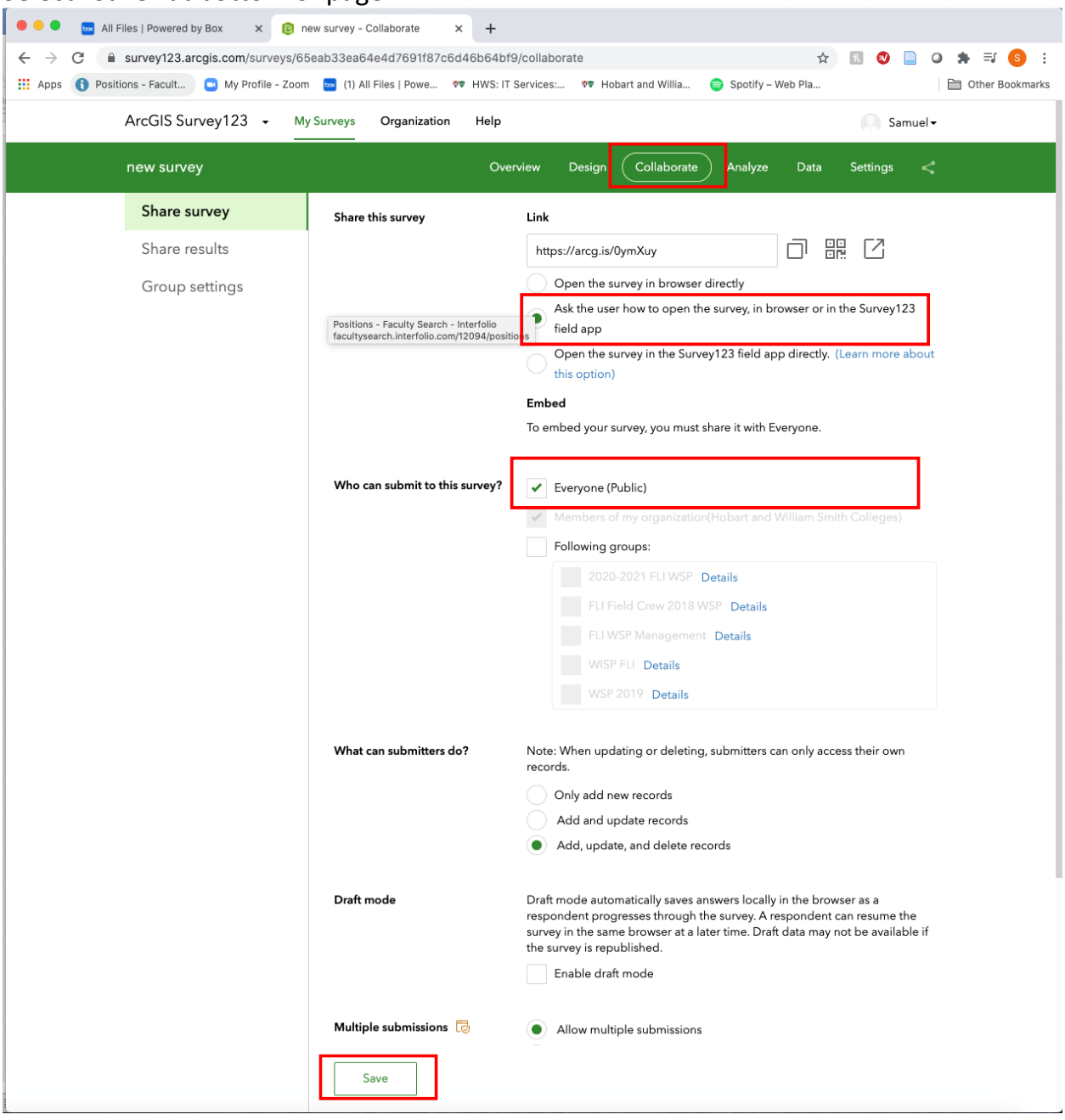
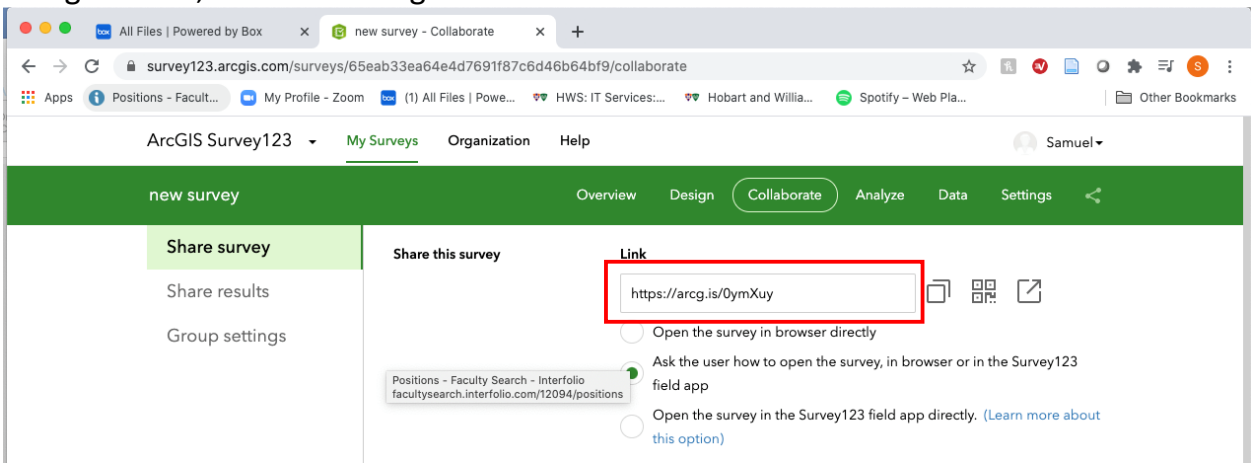
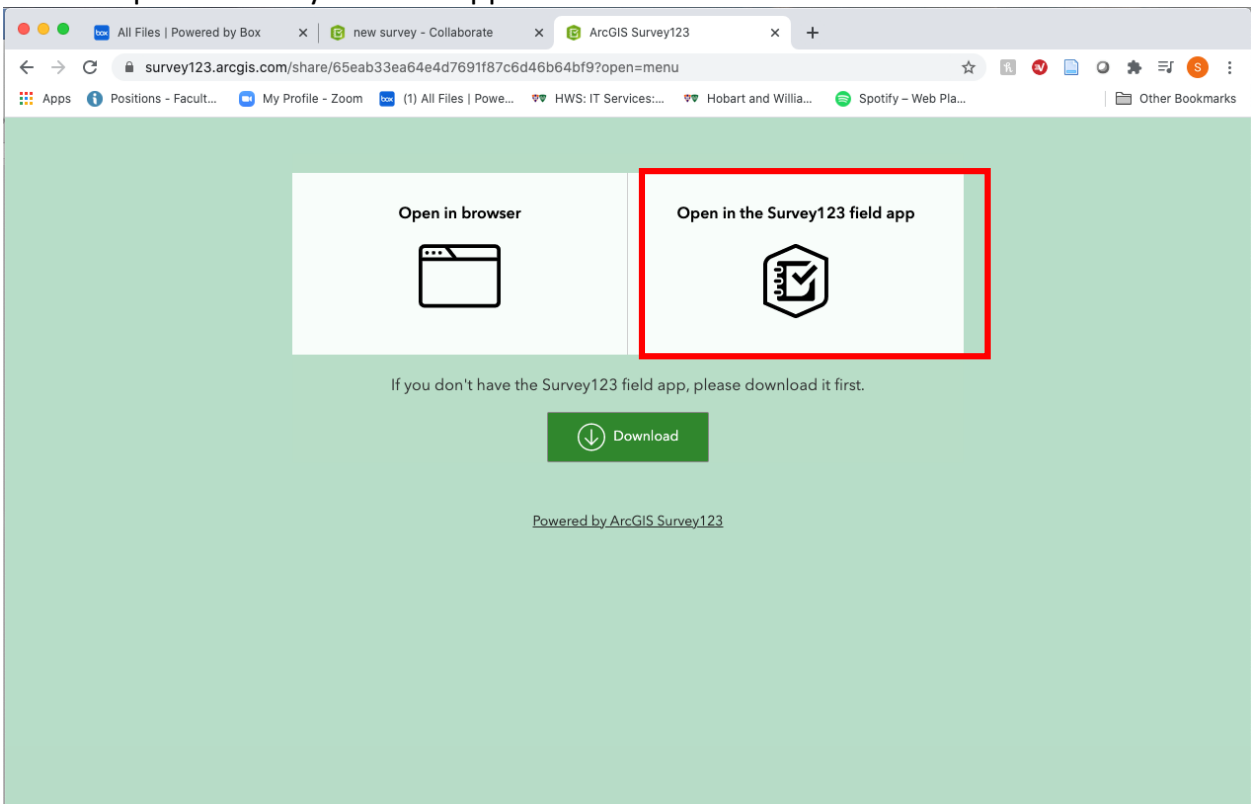
6. Go to the “Collaborate” tab
7. In the “Share this survey” section, select “Ask the user how to open the survey”
8. In the “Who can submit to this survey?” section, select “Everyone (Public)”
9. Select “Save” at bottom of page



11. This survey can now be downloaded onto steward tablets
12. Using a tablet, enter the link generated into a browser



13. Select “Open in Survey123 field app”

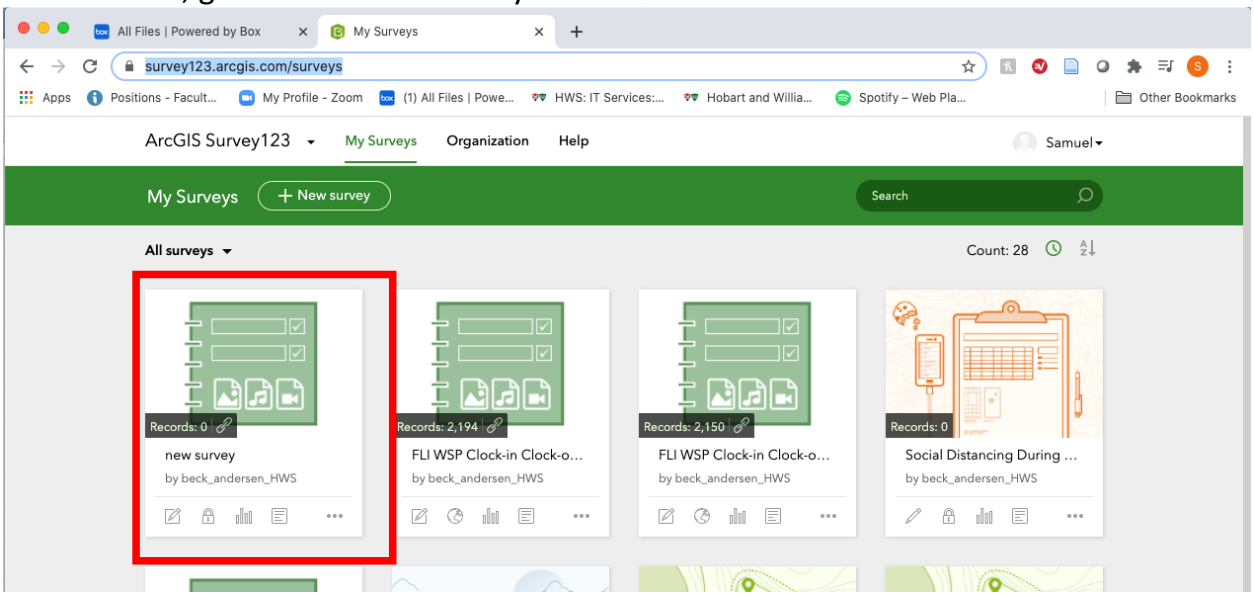


14. The survey should download automatically to the tablet
15. You are ready to start keeping track of your stewards!
16. The following is some language used in instructing stewards about when to use this timekeeping survey and stresses the importance of consistent and accurate completion of this survey:
    a. Fill out the Clock-in Clock-out survey in your Survey123 App. This survey automatically fills in your time, and a geolocation associated with the location of

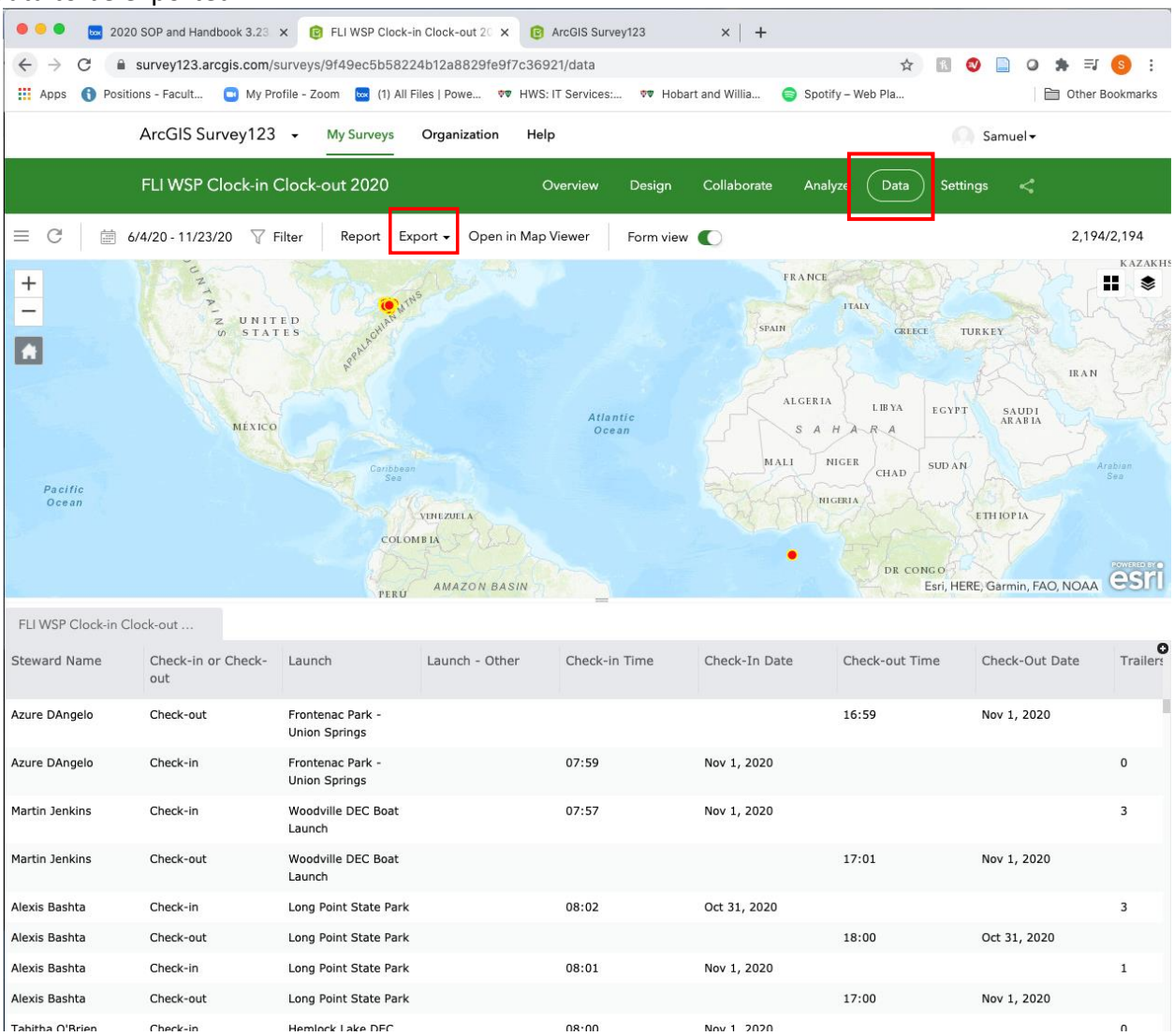
the tablet at the time of entry. Select your name from the list and fill in the number of trailers present at the launch at the beginning of your shift. After completing all fields, save the survey to your outbox for later submission.

b. Fill out the Clock-in Clock-out survey in your Survey123 App. This survey automatically fills in your time, and a geolocation associated with the location of the tablet at the time of entry. Select your name from the list and fill in the number of trailers present at the launch at the end of your shift. After completing all fields, save the survey to your outbox for later submission.
c. Stewards must utilize the Clock-in Clock-out survey at the beginning and the end of each shift. This survey allows us to accurately track your time and ensures that you at your scheduled location. Other than the rare occasion where a coordinator can be on location at the beginning of a steward's shift, this is the only assurance of a steward's accountability.
d. Stewards must submit these surveys daily

17. To view data, go back to "new survey"



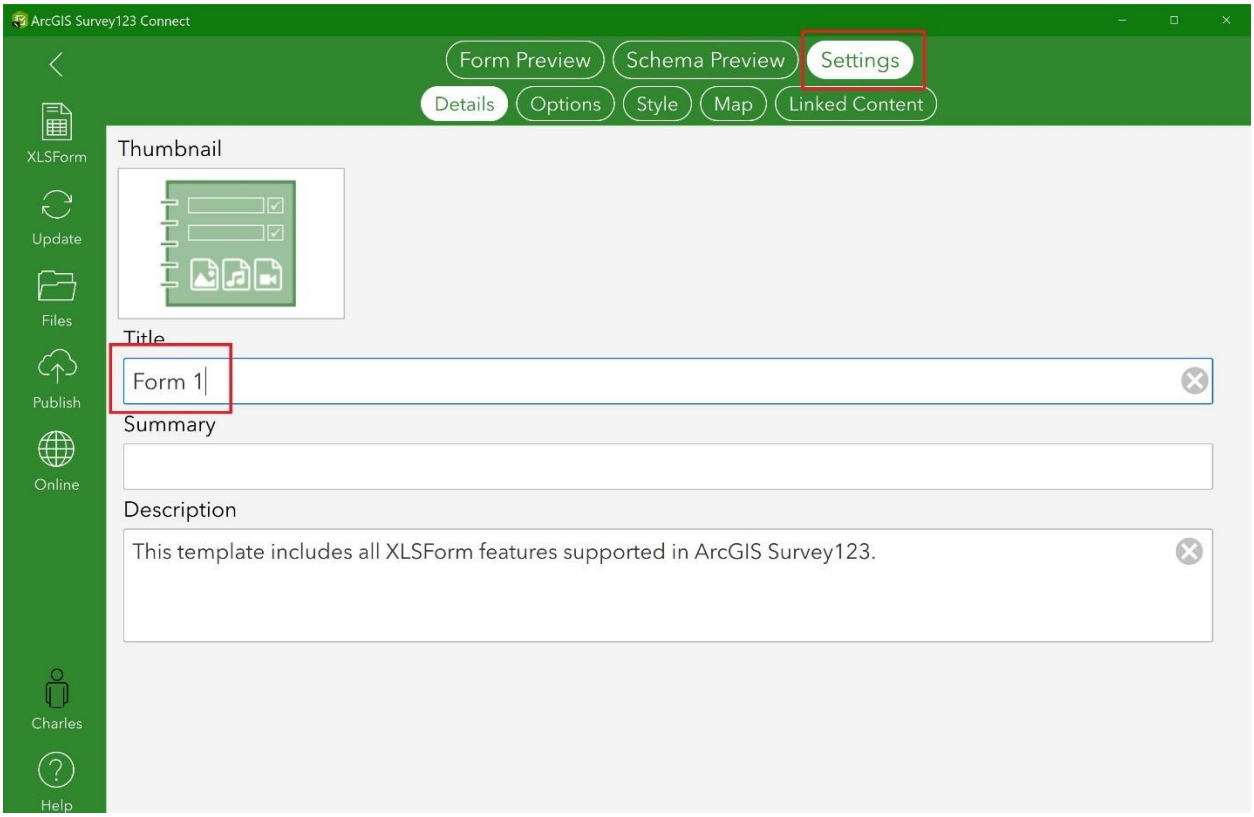
19. Navigate to the “Data” tab
20. To export data, click the “Export” button and select which format you would like the data to be exported



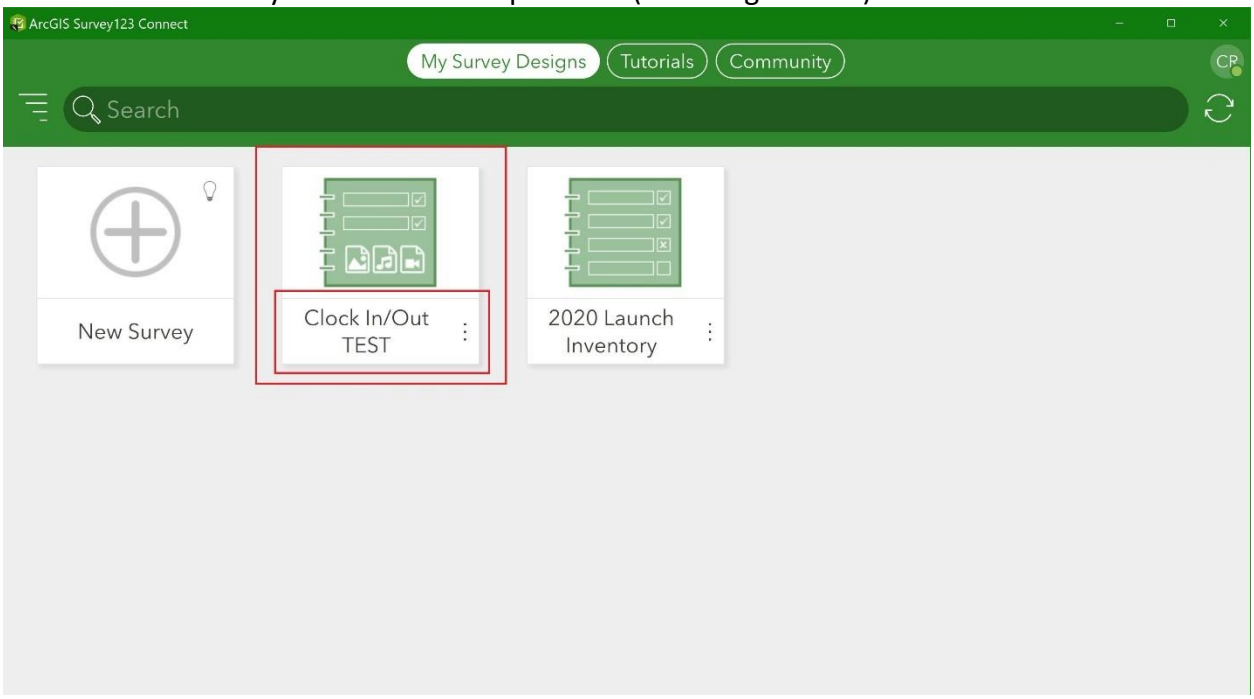
Steward Name	Check-in or Check-out	Launch	Launch - Other	Check-in Time	Check-In Date	Check-out Time	Check-Out Date	Trailers
Azure DAngelo	Check-out	Frontenac Park - Union Springs				16:59	Nov 1, 2020	
Azure DAngelo	Check-in	Frontenac Park - Union Springs		07:59	Nov 1, 2020			0
Martin Jenkins	Check-in	Woodville DEC Boat Launch		07:57	Nov 1, 2020			3
Martin Jenkins	Check-out	Woodville DEC Boat Launch				17:01	Nov 1, 2020	
Alexis Bashta	Check-in	Long Point State Park		08:02	Oct 31, 2020			3
Alexis Bashta	Check-out	Long Point State Park				18:00	Oct 31, 2020	
Alexis Bashta	Check-in	Long Point State Park		08:01	Nov 1, 2020			1
Alexis Bashta	Check-out	Long Point State Park				17:00	Nov 1, 2020	
Tabitha O'Brien	Check-in	Hemlock Lake DEC		08:00	Nov 1, 2020			0

Addendum 1: Titling your New Survey

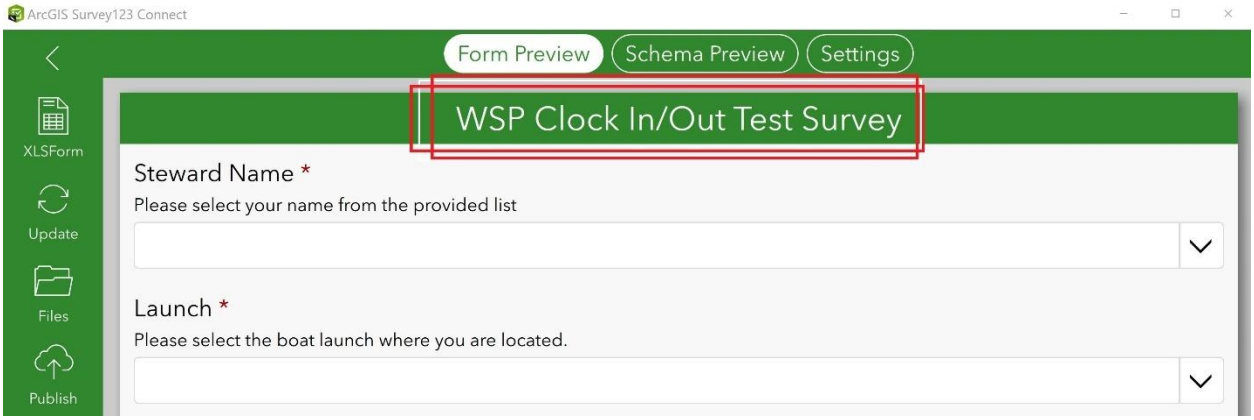
1. In this step we will create the *Survey Title*.
    a. Within Survey123 Connect, go to the settings tab and enter the survey name desired in the ‘Title’ Field.



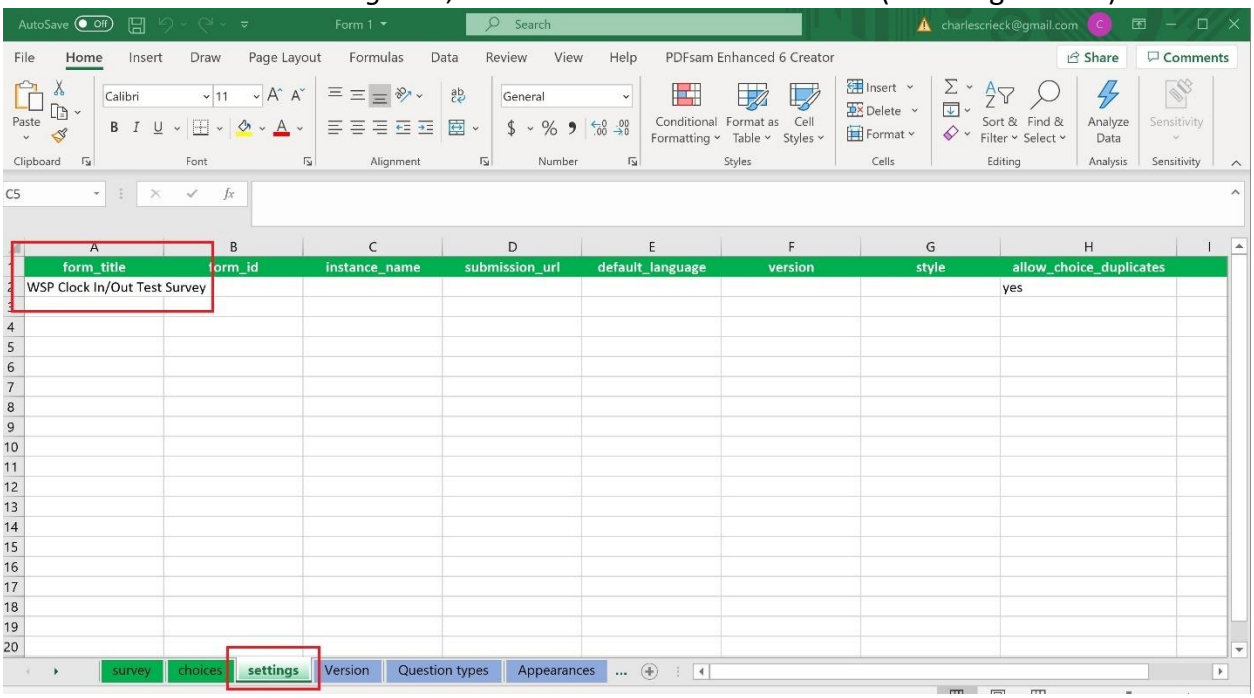
b. This process assigns the Title entered in Step 8.a to Top-level survey name in Survey123 & other ESRI products (See Image below).



2. In this step we will create the *Survey Title* for the running bar at the top of the survey form (See Image below).



a. Using Survey123 Connect, open the XLSForm & navigate to the '*settings*' tab.
b. On the *Settings tab*, enter the desired title in *Cell A1* (see image below).



Addendum 2: Applying Filters to Survey Data Results

There are a couple ways to apply filters to the survey results, select the one of your preference.

Method 1:

1. Go back to "*new survey*", at https:// Survey123.arcgis.com/surveys

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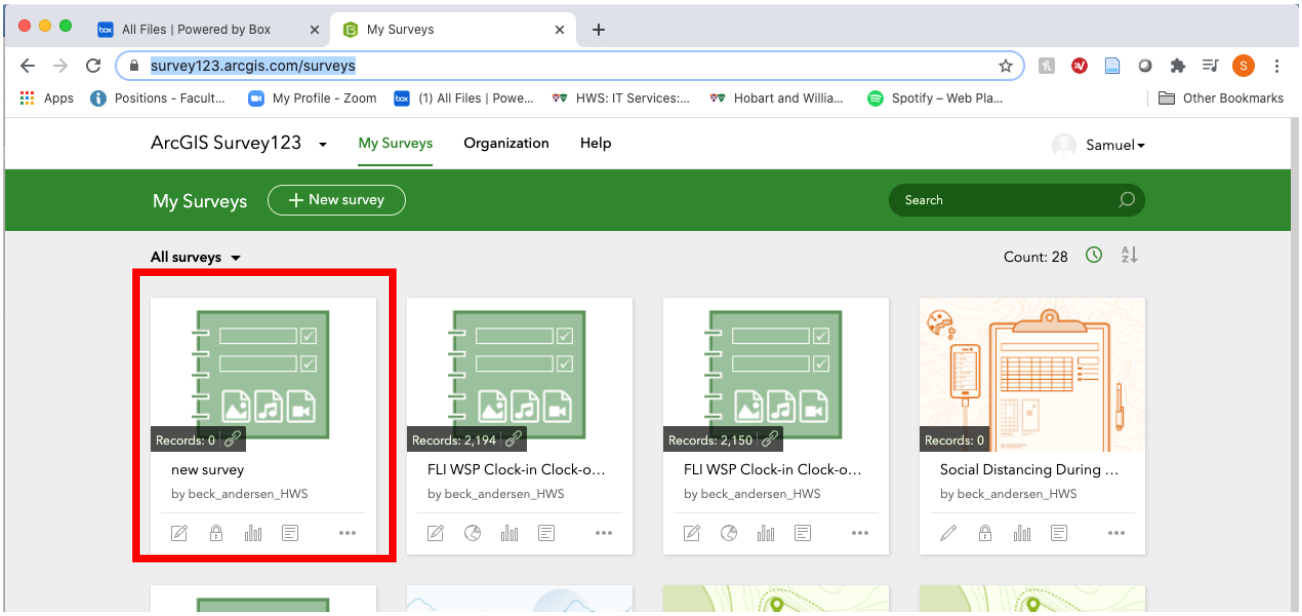
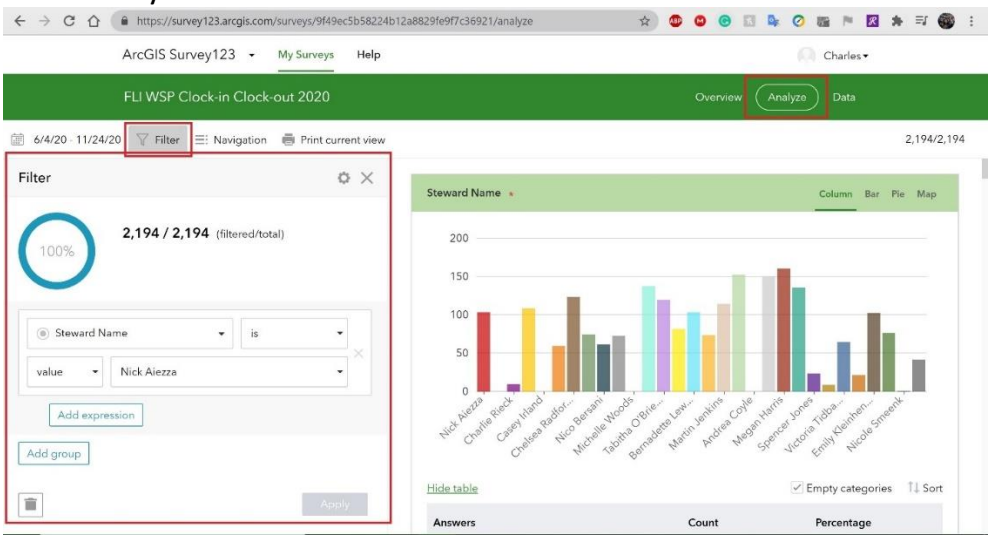


2. Navigate to the "*Analyze*" tab
3. To filter data, click the "*Filter*" button and select attributes you would like to filter the data by.



CONSIDER:

-Filter by Steward

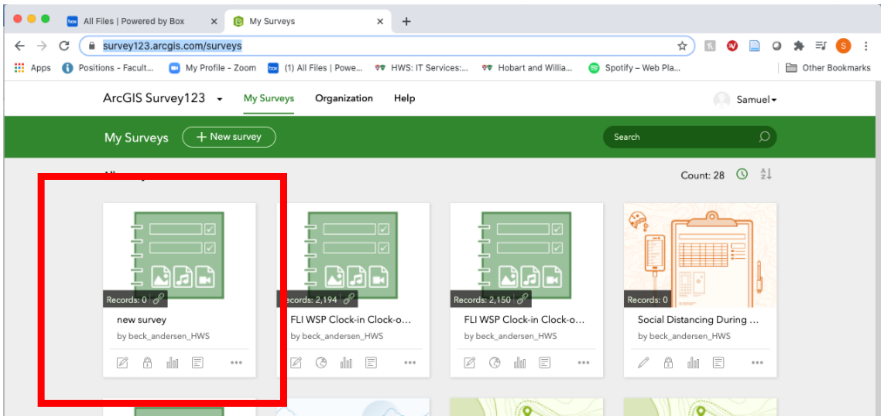
-Filter by Date Range (ie: examine surveys submitted in the past week)

-

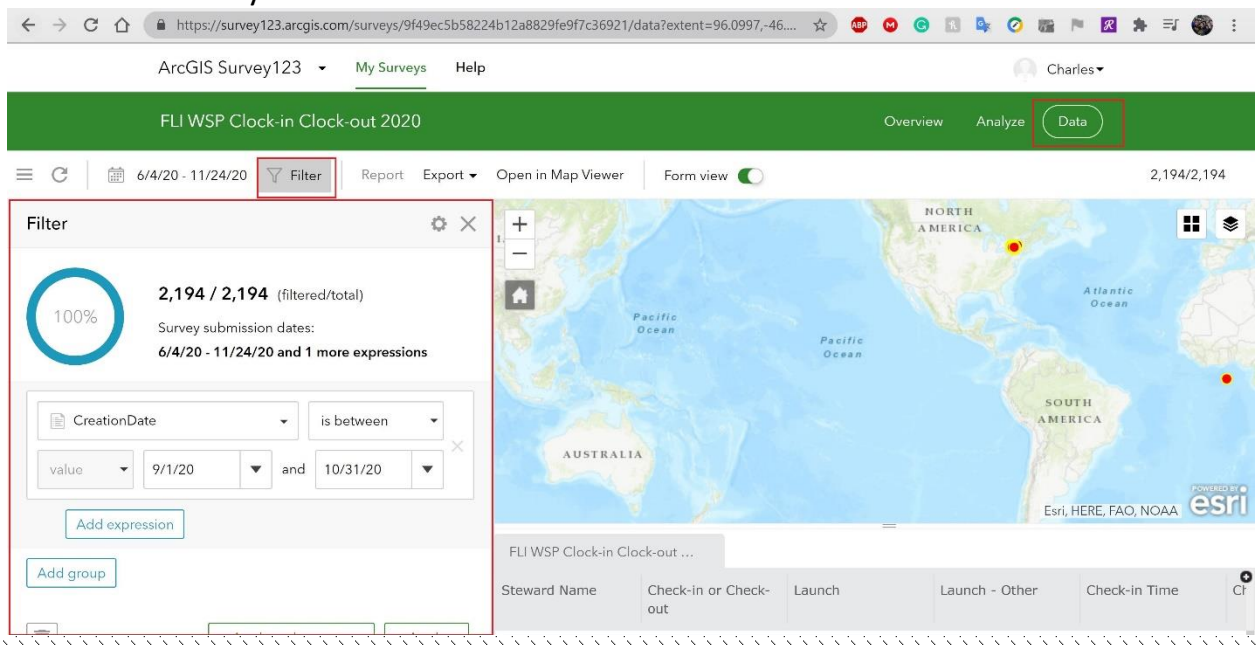
Method 2:

1. Go to "*new survey*", at https:// Survey123.arcgis.com/surveys

Most Recent Revision: 12/17/2020



2. Navigate to the "*<u>Data</u>*" tab
3. To filter data, click the "*Filter*" button and select attributes you would like to filter the data by.



Filtering Example 1:

1. Look at the example image below.

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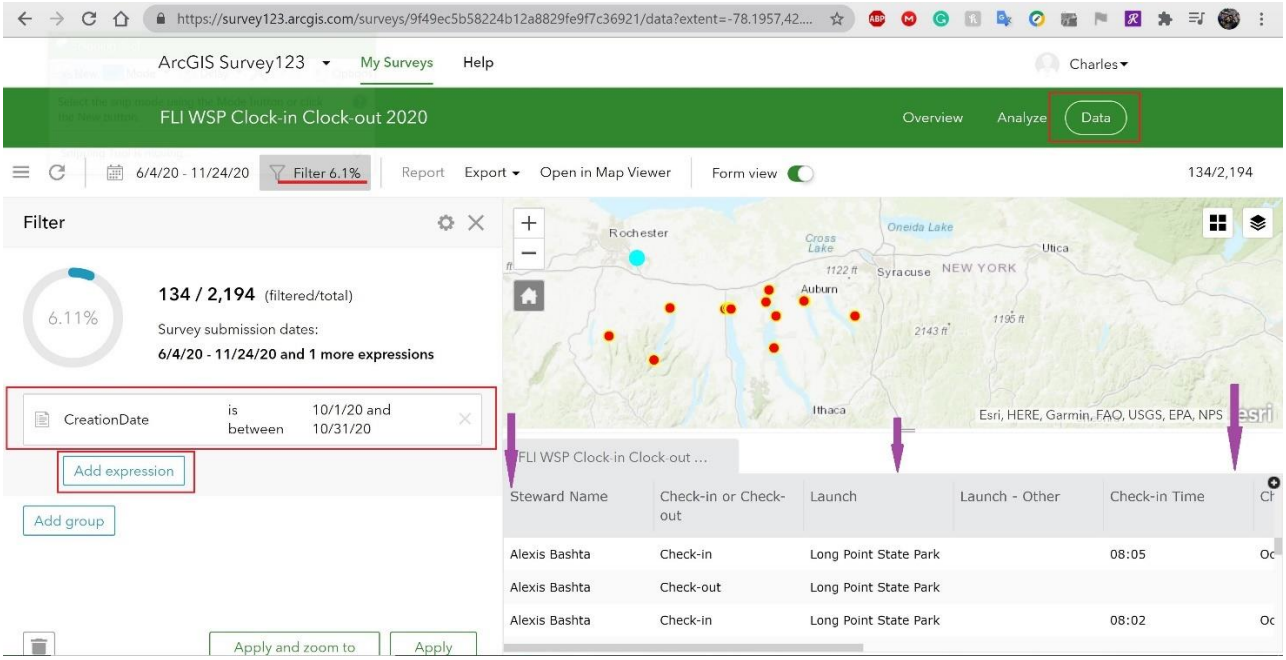
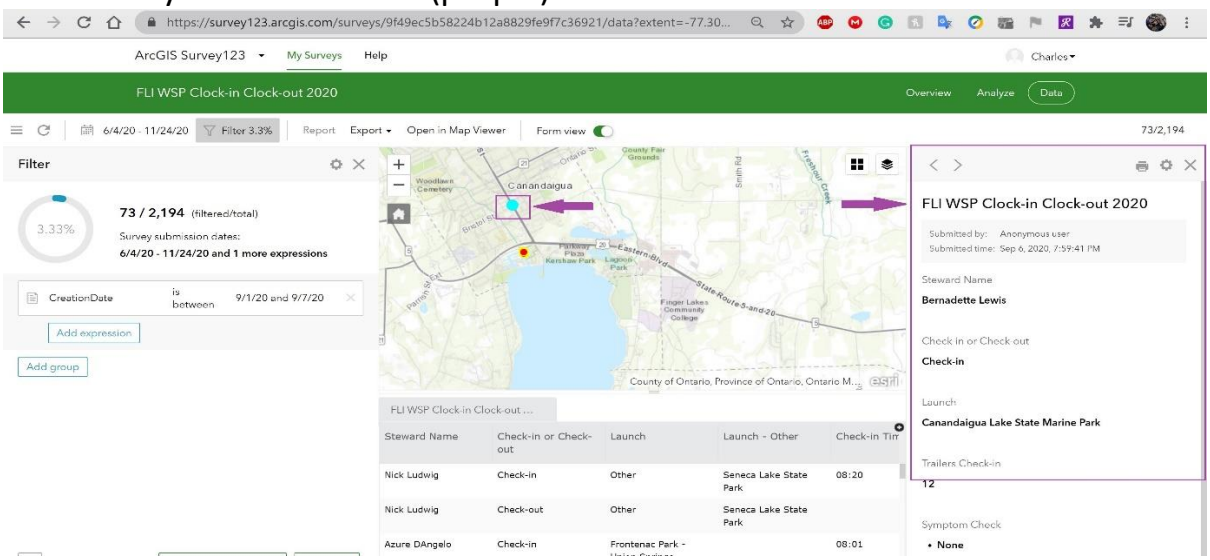


a. Notice the area highlighted by the purple arrows, this is where one can view the dataset's attribute table.
b. Notice how a date range filter of "is between" was used to only see the surveys from the time period of interest.

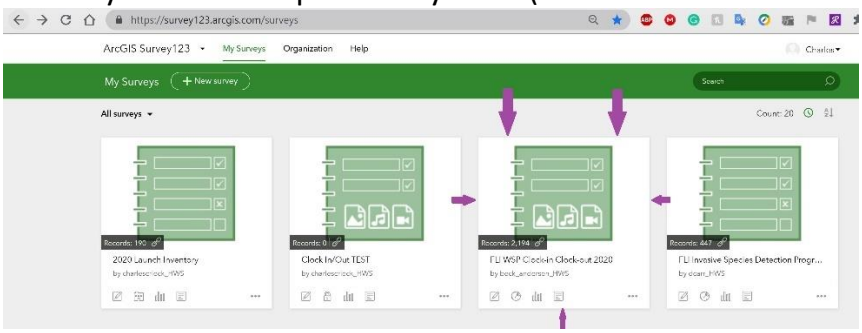
CONSIDER:

- Filter out a week-long time range – allows for a weekly assessment of steward punctuality & reconcile timesheet discrepancies
- Once filters have been applied properly, scan through the map area to see if an points were recorded away from the launch. This can inform management on which stewards may not be completing their entire shift at the launch (arriving late, departing early). *Example Image Below* – notice the steward clocking-in away from the launch(purple).

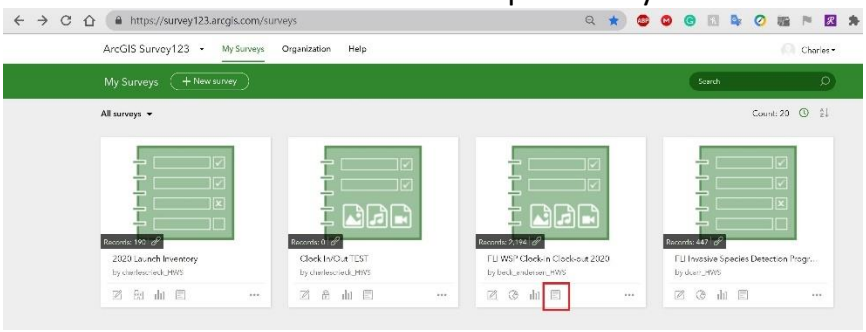


Addendum 3: Steward Accountability – Clock In/Out Data QA/QC

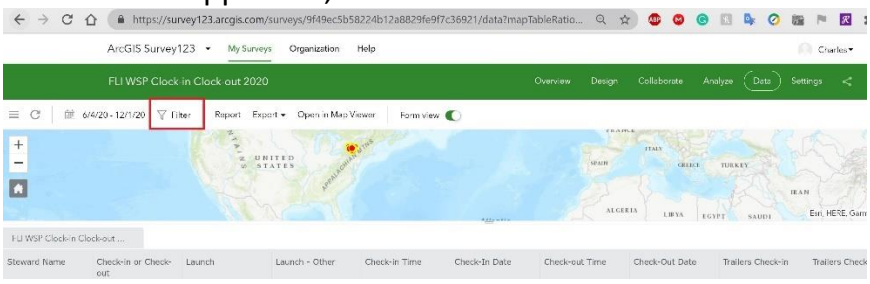
1. Go to "*new survey*", at https:// Survey123.arcgis.com/surveys
2. sign in
3. Go to "My Surveys"
4. Locate your Timekeeper survey form (ie: "FLI WSP Clock-in Clock-out 2020")



5. Click the 'Data' icon on the Timekeeper survey form



6. Click "Filter" upper left, RIGHT under the GREEN



7. The first empty box under "filter": click the upside down solid black triangle, select "Check in Date"
8. Second box first row "is after"
9. First box second row "value"
10. Second box second row …select the date (usually the previous Thursday from the current date)

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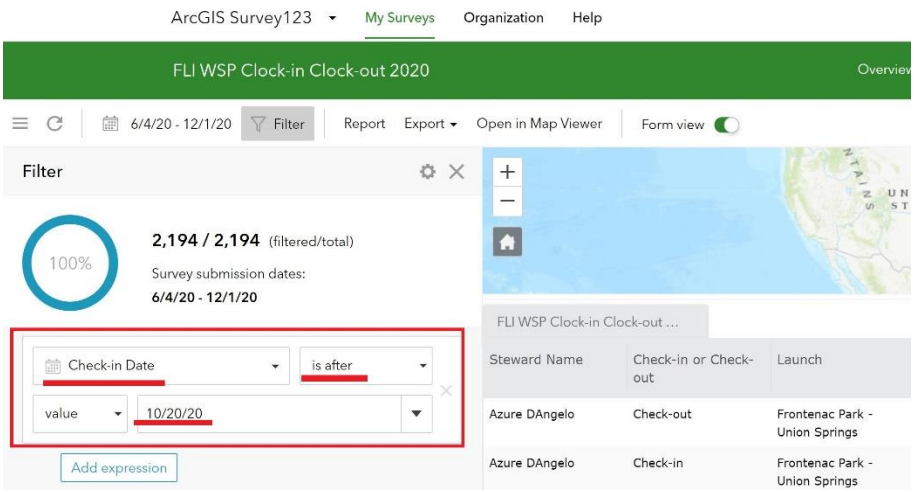
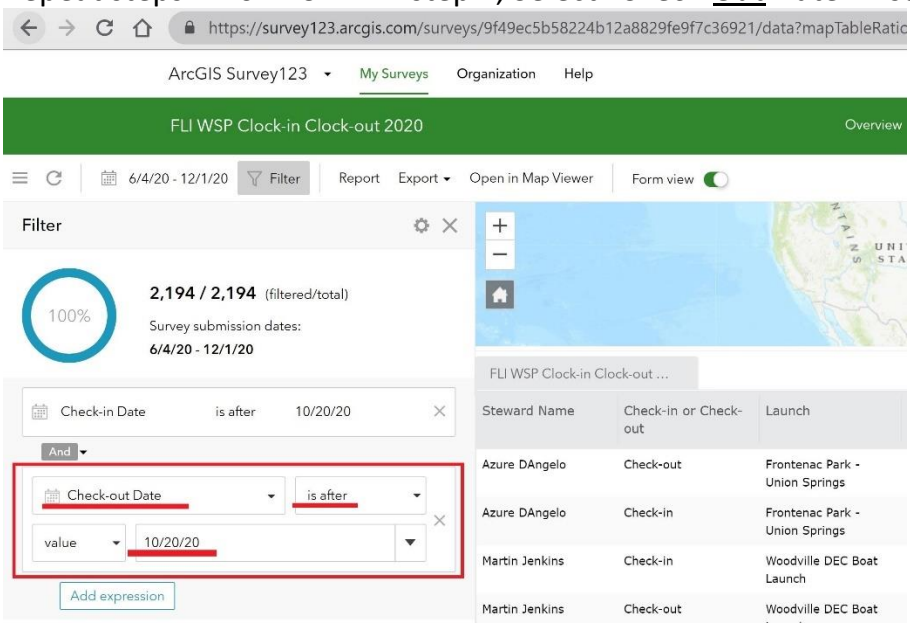


11. Click “Add Expression”
12. Repeat steps 7-10 EXCEPT in step 7, Select “*Check-<u>Out</u>* Date” instead.



13. Between the Two “Expressions” you just entered will be an “AND” or an “OR” in a small rectangular box. Make sure this says “**OR**”. To change - click on it.

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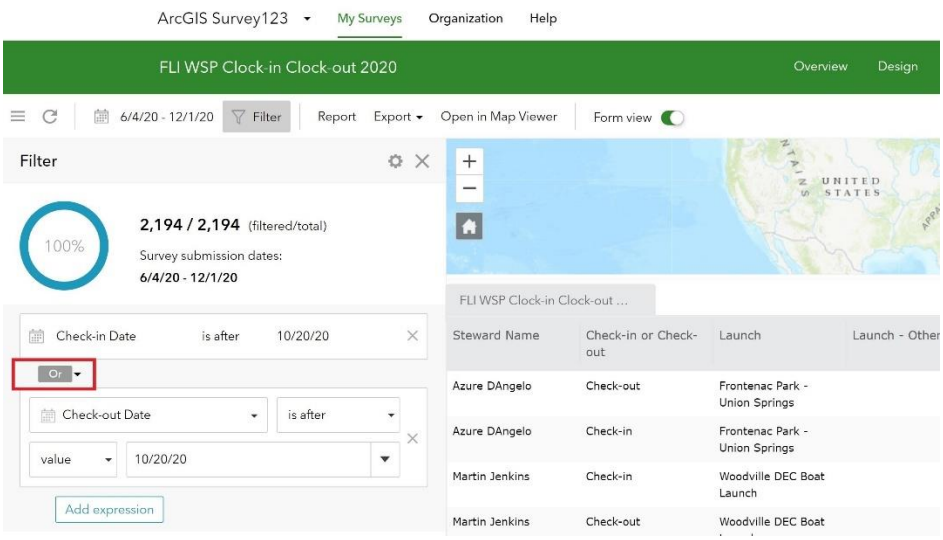
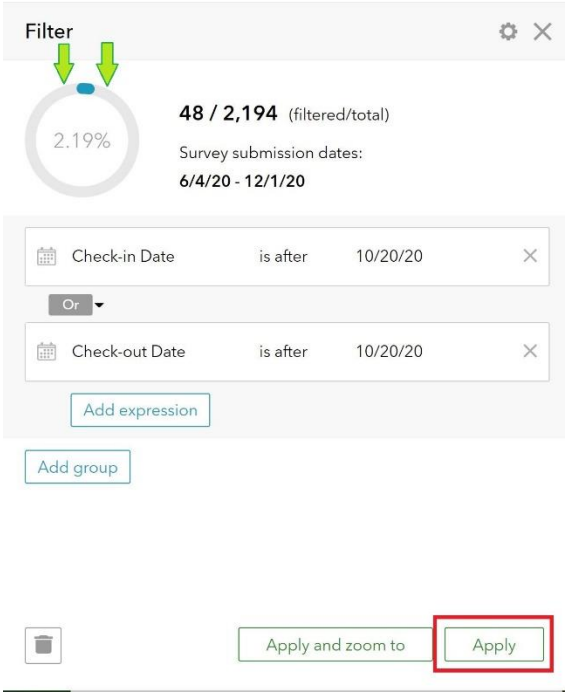


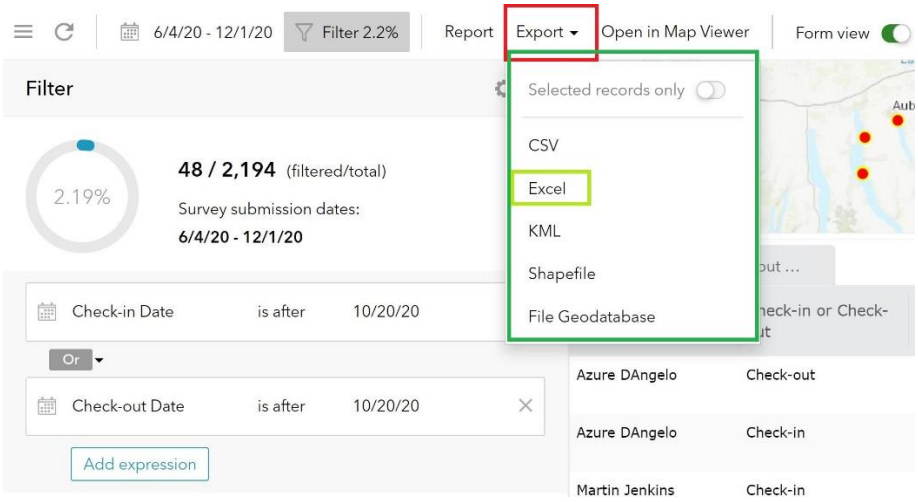
14. Click “Apply” on the bottom (or “Apply and Zoom to” {does not matter which for this QAQC})



(**Green Arrows**: Notice how the filtered/total value changes after your apply your filter)

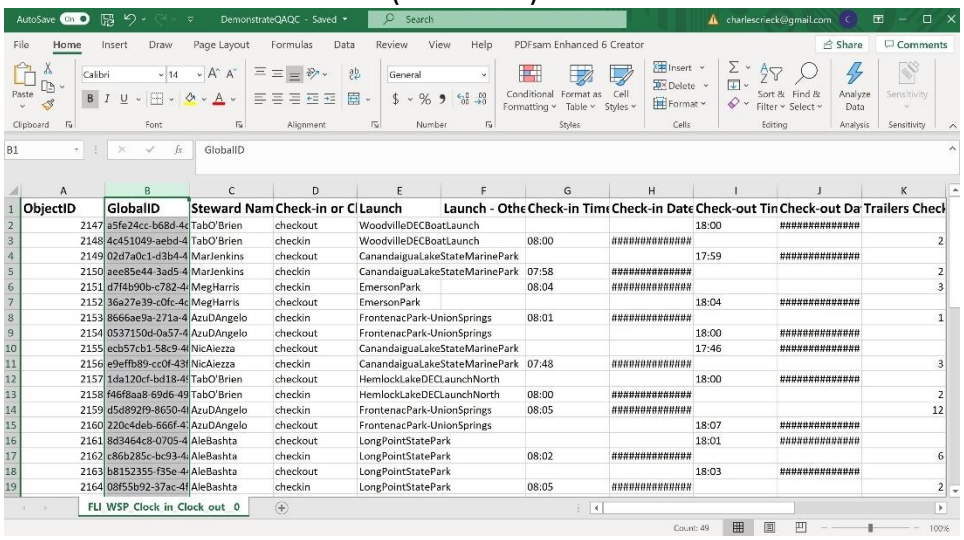
15. Click “Export” to Export data to excel (unless a VERY large data set then export the .CSV file instead and then open that with excel, copy and paste into newly dated tab in old “QAQC” Excel document)

Most Recent Revision: 12/17/2020



These Steps MUST be deleted in order! (we are now working in Excel)

16. Delete the COLUMN: **B** (Global ID)



17. Check COLUMN Q and R for zeros (0).

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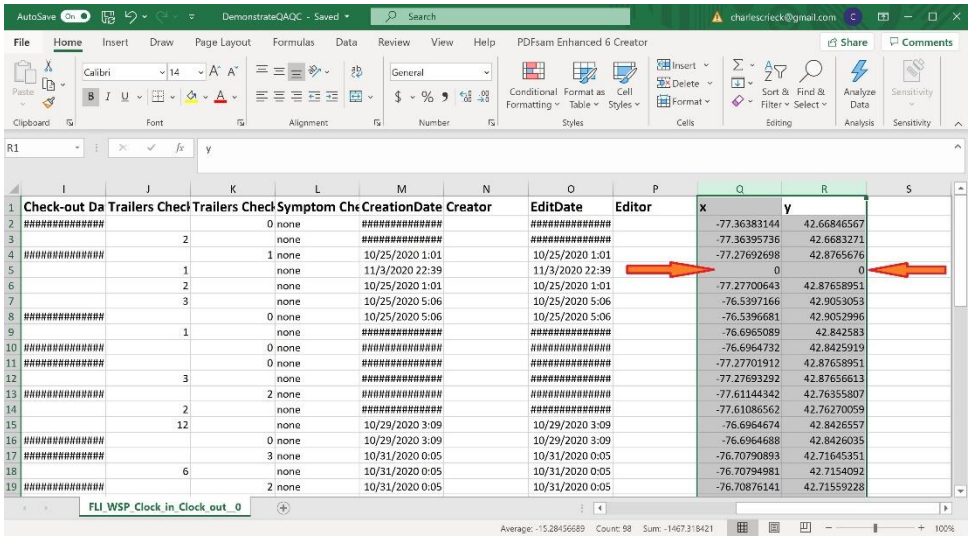
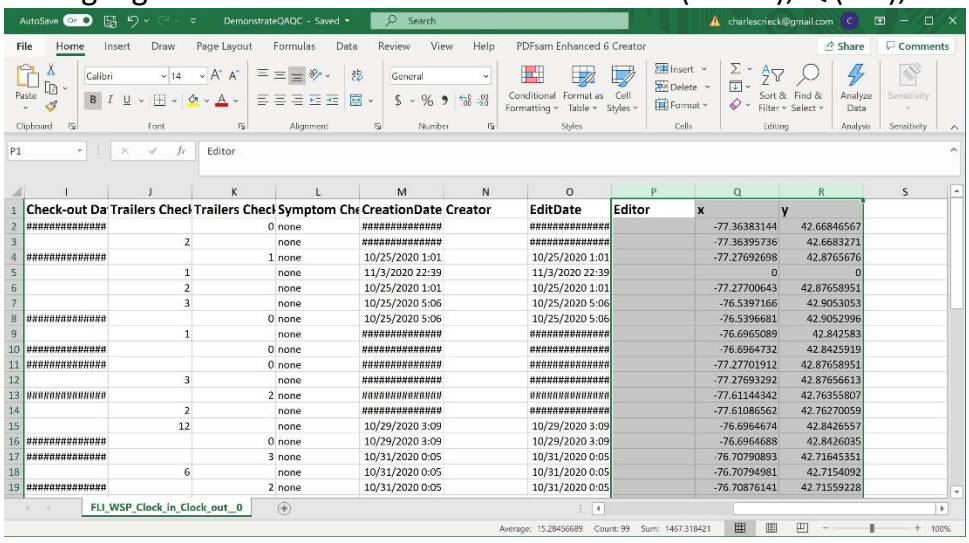


	I	J	K	L	M	N	O	P	Q	R	S
1	Check-out Da	Trailers Check	Trailers Check	Symptom Che	CreationDate	Creator	EditDate	Editor	x	y	
2	##############		0	none	##############		##############		-77.36383144	42.66846567	
3		2		none	##############		##############		-77.36395736	42.6683271	
4	##############		1	none	10/25/2020 1:01		10/25/2020 1:01		-77.27692698	42.8765676	
5		1		none	11/3/2020 22:39		11/3/2020 22:39		0	0	
6		2		none	10/25/2020 1:01		10/25/2020 1:01		-77.27700643	42.87658951	
7		3		none	10/25/2020 5:06		10/25/2020 5:06		-76.5397166	42.9053053	
8	##############		0	none	10/25/2020 5:06		10/25/2020 5:06		-76.5396681	42.9052996	
9		1		none	##############		##############		-76.6965089	42.842583	
10	##############		0	none	##############		##############		-76.6964732	42.8425919	
11	##############		0	none	##############		##############		-77.27701912	42.87658951	
12		3		none	##############		##############		-77.27693292	42.87656613	
13	##############		2	none	##############		##############		-77.61144342	42.76355807	
14		2		none	##############		##############		-77.61086562	42.76270059	
15		12		none	10/29/2020 3:09		10/29/2020 3:09		-76.6964674	42.8426557	
16	##############		0	none	10/29/2020 3:09		10/29/2020 3:09		-76.6964688	42.8426035	
17	##############		3	none	10/31/2020 0:05		10/31/2020 0:05		-76.70790893	42.71645351	
18		6		none	10/31/2020 0:05		10/31/2020 0:05		-76.70794981	42.7154092	
19	##############		2	none	10/31/2020 0:05		10/31/2020 0:05		-76.70876141	42.71559228	

18. If you find zeros, see whose name in COLUMN B (Steward Name), and what dates COLUMN G (check in) and/or I (Check out Date). record and let Sam know.
    1. A Lack of X, Y data in the dataset shows that we do not know where the steward/tablet was when the record was generated. This could be considered problematic. A steward could possibly disable location services and generate a record away from their assigned launch.
19. Highlight all at once and Delete COLUMNS P (Editor), Q (“x”), and R (“y”)



	I	J	K	L	M	N	O	P	Q	R	S
1	Check-out Da	Trailers Check	Trailers Check	Symptom Che	CreationDate	Creator	EditDate	Editor	x	y	
2	##############		0	none	##############		##############		-77.36383144	42.66846567	
3		2		none	##############		##############		-77.36395736	42.6683271	
4	##############		1	none	10/25/2020 1:01		10/25/2020 1:01		-77.27692698	42.8765676	
5		1		none	11/3/2020 22:39		11/3/2020 22:39		0	0	
6		2		none	10/25/2020 1:01		10/25/2020 1:01		-77.27700643	42.87658951	
7		3		none	10/25/2020 5:06		10/25/2020 5:06		-76.5397166	42.9053053	
8	##############		0	none	10/25/2020 5:06		10/25/2020 5:06		-76.5396681	42.9052996	
9		1		none	##############		##############		-76.6965089	42.842583	
10	##############		0	none	##############		##############		-76.6964732	42.8425919	
11	##############		0	none	##############		##############		-77.27701912	42.87658951	
12		3		none	##############		##############		-77.27693292	42.87656613	
13	##############		2	none	##############		##############		-77.61144342	42.76355807	
14		2		none	##############		##############		-77.61086562	42.76270059	
15		12		none	10/29/2020 3:09		10/29/2020 3:09		-76.6964674	42.8426557	
16	##############		0	none	10/29/2020 3:09		10/29/2020 3:09		-76.6964688	42.8426035	
17	##############		3	none	10/31/2020 0:05		10/31/2020 0:05		-76.70790893	42.71645351	
18		6		none	10/31/2020 0:05		10/31/2020 0:05		-76.70794981	42.7154092	
19	##############		2	none	10/31/2020 0:05		10/31/2020 0:05		-76.70876141	42.71559228	

20. For our purposes also Highlight all at once and delete COLUMNS J (Trailers Check), K(Trailers Check), L (Symptoms Check), M(CreationDate), N(Creator), O(EditDate)

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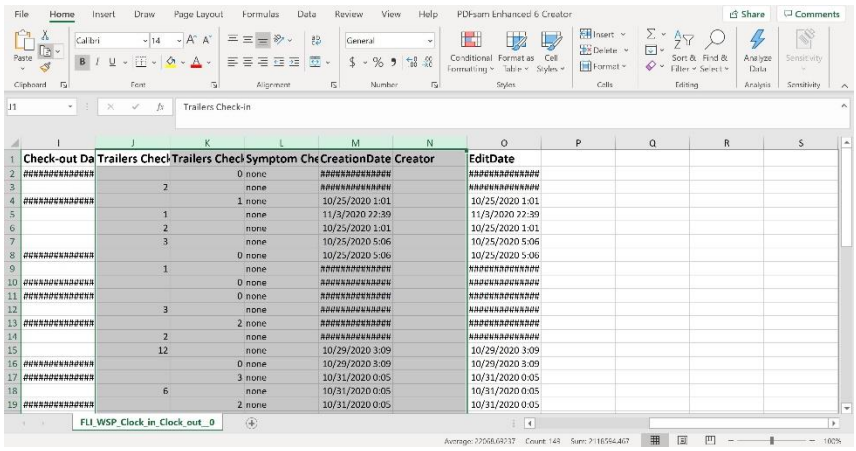
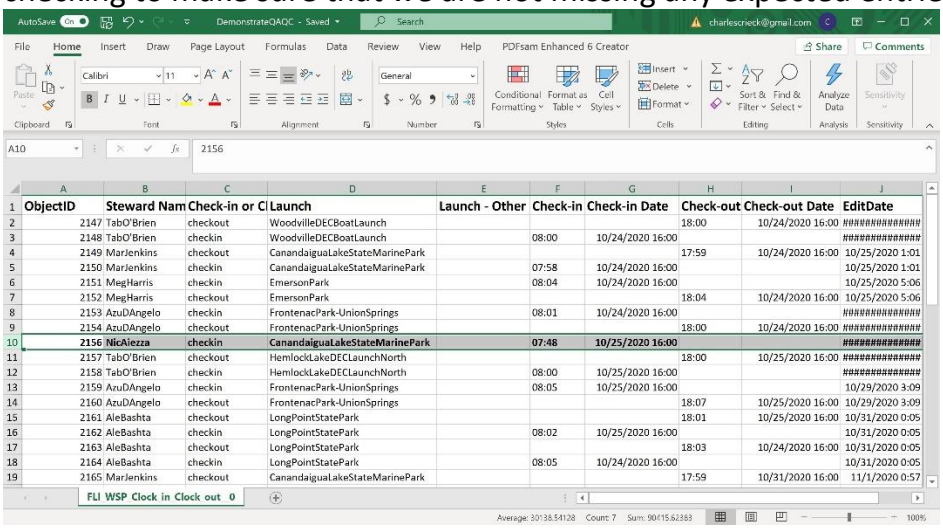


	I	J	K	L	M	N	O	P	Q	R	S
1	Check-out Da	Trailers Check	Trailers Check	Symptom Che	CreationDate	Creator	EditDate				
2	############		0	none	############		############				
3		2		none	############		############				
4	############		1	none	10/25/2020 1:01		10/25/2020 1:01				
5		1		none	11/3/2020 22:39		11/3/2020 22:39				
6		2		none	10/25/2020 1:01		10/25/2020 1:01				
7		3		none	10/25/2020 5:06		10/25/2020 5:06				
8	############		0	none	10/25/2020 5:06		10/25/2020 5:06				
9		1		none	############		############				
10	############		0	none	############		############				
11	############		0	none	############		############				
12		3		none	############		############				
13	############		2	none	############		############				
14		2		none	############		############				
15		12		none	10/29/2020 3:09		10/29/2020 3:09				
16	############		0	none	10/29/2020 3:09		10/29/2020 3:09				
17	############		3	none	10/31/2020 0:05		10/31/2020 0:05				
18		6		none	10/31/2020 0:05		10/31/2020 0:05				
19	############		2	none	10/31/2020 0:05		10/31/2020 0:05				

21. Resize Column D (Launch) so that the words all fit in the cell
22. Look in Column E ("Launch-Other") delete any ROWs that have "Test" in them
23. Look in Column C for any multiple "CheckIn's" or "CheckOuts" in a row. Ex. Check in, check in means someone forgot to check out make that ROW **BOLD** (We are checking to make sure that we are not missing any expected entries.)

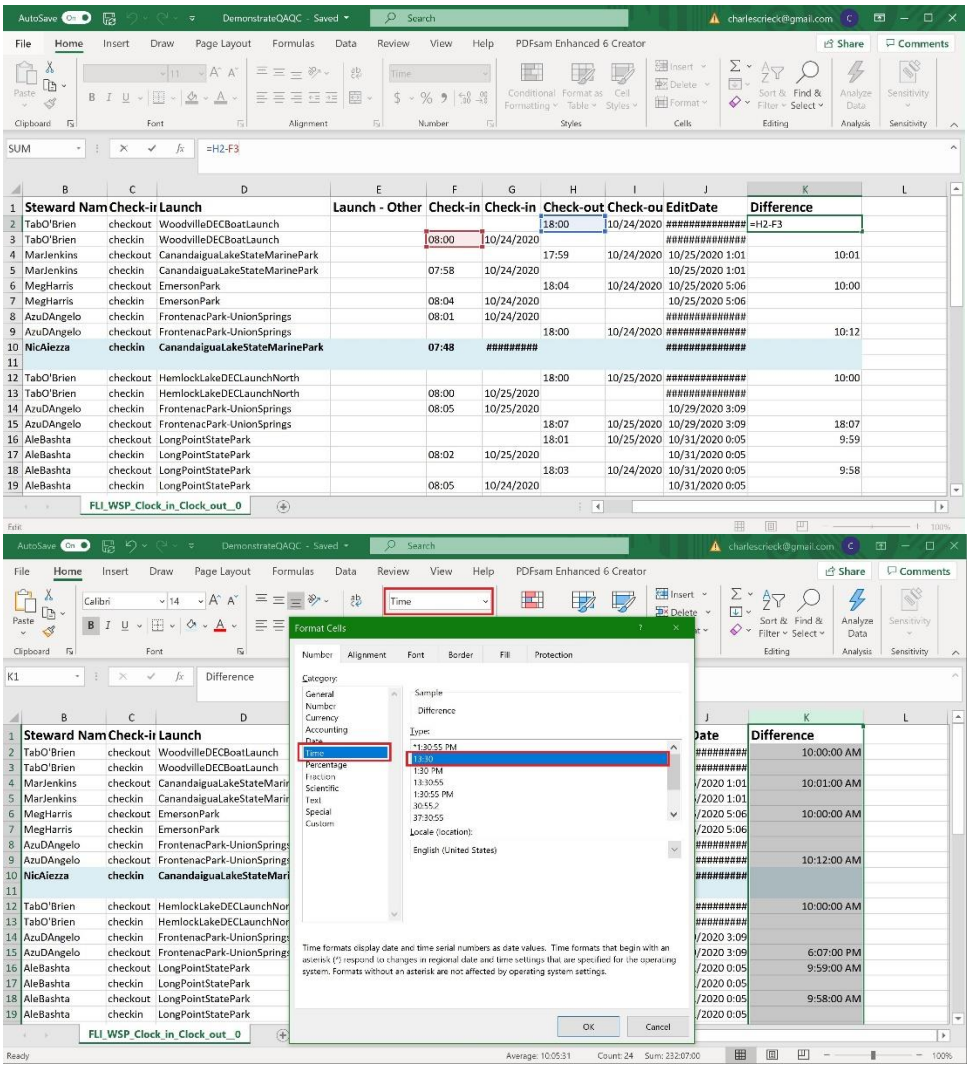


	A	B	C	D	E	F	G	H	I	J
1	ObjectID	Steward Nam	Check-in or Cl	Launch	Launch - Other	Check-in	Check-in Date	Check-out	Check-out Date	EditDate
2	2147	TabO'Brien	checkout	WoodvilleDECBoatLaunch				18:00	10/24/2020 16:00	############
3	2148	TabO'Brien	checkin	WoodvilleDECBoatLaunch		08:00	10/24/2020 16:00			############
4	2149	MarJenkins	checkout	CanandaiguaLakeStateMarinePark				17:59	10/24/2020 16:00	10/25/2020 1:01
5	2150	MarJenkins	checkin	CanandaiguaLakeStateMarinePark		07:58	10/24/2020 16:00			10/25/2020 1:01
6	2151	MegHarris	checkin	EmersonPark		08:04	10/24/2020 16:00			10/25/2020 5:06
7	2152	MegHarris	checkout	EmersonPark				18:04	10/24/2020 16:00	10/25/2020 5:06
8	2153	AzuDAngelo	checkin	FrontenacPark-UnionSprings		08:01	10/24/2020 16:00			############
9	2154	AzuDAngelo	checkout	FrontenacPark-UnionSprings				18:00	10/24/2020 16:00	############
10	**2156**	**NicAiezza**	**checkin**	**CanandaiguaLakeStateMarinePark**		**07:48**	**10/25/2020 16:00**			############
11	2157	TabO'Brien	checkout	HemlockLakeDECLaunchNorth				18:00	10/25/2020 16:00	############
12	2158	TabO'Brien	checkin	HemlockLakeDECLaunchNorth		08:00	10/25/2020 16:00			############
13	2159	AzuDAngelo	checkin	FrontenacPark-UnionSprings		08:05	10/25/2020 16:00			10/29/2020 3:09
14	2160	AzuDAngelo	checkout	FrontenacPark-UnionSprings				18:07	10/25/2020 16:00	10/29/2020 3:09
15	2161	AleBashta	checkout	LongPointStatePark				18:01	10/25/2020 16:00	10/31/2020 0:05
16	2162	AleBashta	checkin	LongPointStatePark		08:02	10/25/2020 16:00			10/31/2020 0:05
17	2163	AleBashta	checkout	LongPointStatePark				18:03	10/24/2020 16:00	10/31/2020 0:05
18	2164	AleBashta	checkin	LongPointStatePark		08:05	10/24/2020 16:00			10/31/2020 0:05
19	2165	MarJenkins	checkout	CanandaiguaLakeStateMarinePark				17:59	10/31/2020 16:00	11/1/2020 0:57

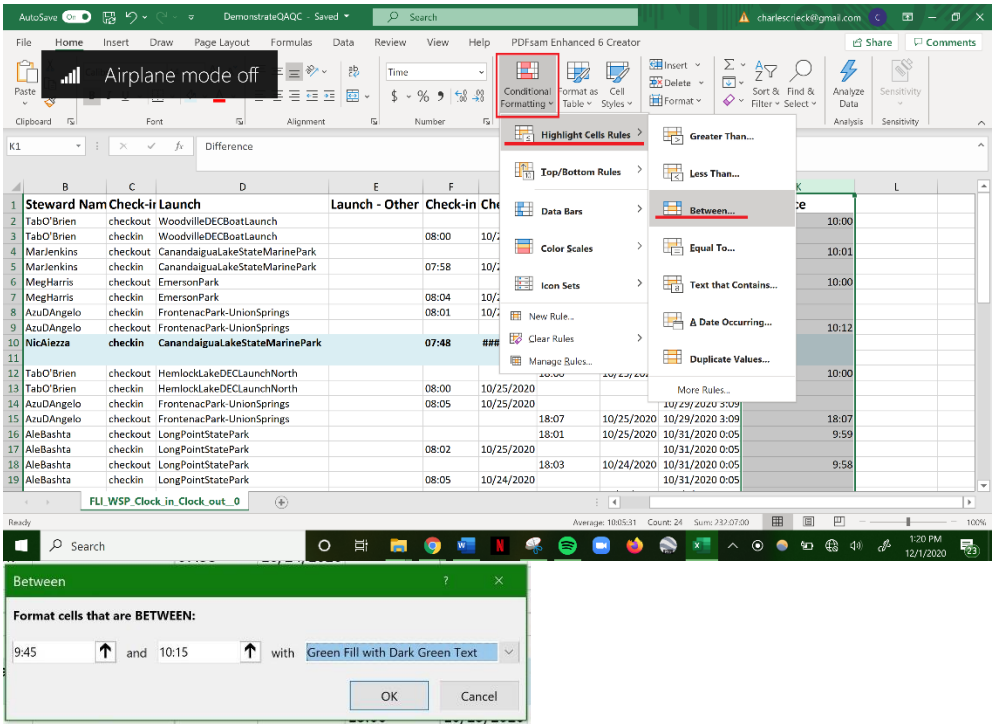
24. During the previous step also make sure the "check out" time comes BEFORE the "check in" time (95% of the time the order is correct, but sometimes they are switched for some reason)(otherwise formulas will not work)

25. AND Look in Column B and make sure each Stewards name appears twice in succession…IF ONLY ONCE, then make that ROW **BOLD**
26. "Insert Row" either above or below (depending if "check in" or "check out" is missing). This will make it easier/standardize the spacing for when we enter the formulas in the next steps. (Check out comes first, followed by check in second)

27. In Column K in the row# where the first persons name is (usually Row 2) enter “=H2-F3” then in select “format” then select “cells” “Number” then select custom, choose “h:mm” ENTER.



28. Conditional formatting, select COLUMN K, “Highlight Cells Rule” … Between … set values. low value “9:45” and high value “10:15”… select colors to green instead of red.



29. Copy and paste cell K2 to every other cell in Column K (make sure the values change accordingly or may have to re-type new formula in cell K4)… IF you have to type new formula in K4 type "=H5-F4". Do this every-OTHER ROW
30. Check to see that times are GREEN, if BLACK, then investigate why it isn't GREEN.
31. By doing Step 26 you are checking that all Stewards hours fell between 9h 45m shift and 10h 15m shifts. Type up explanations if the times fall outside of these parameters.
32. Items of CONCERN in RED at bottom of data, Justifications for step 25,26 write in BLACK in COLUMN M in the appropriate ROW for the Steward.

Reminders:

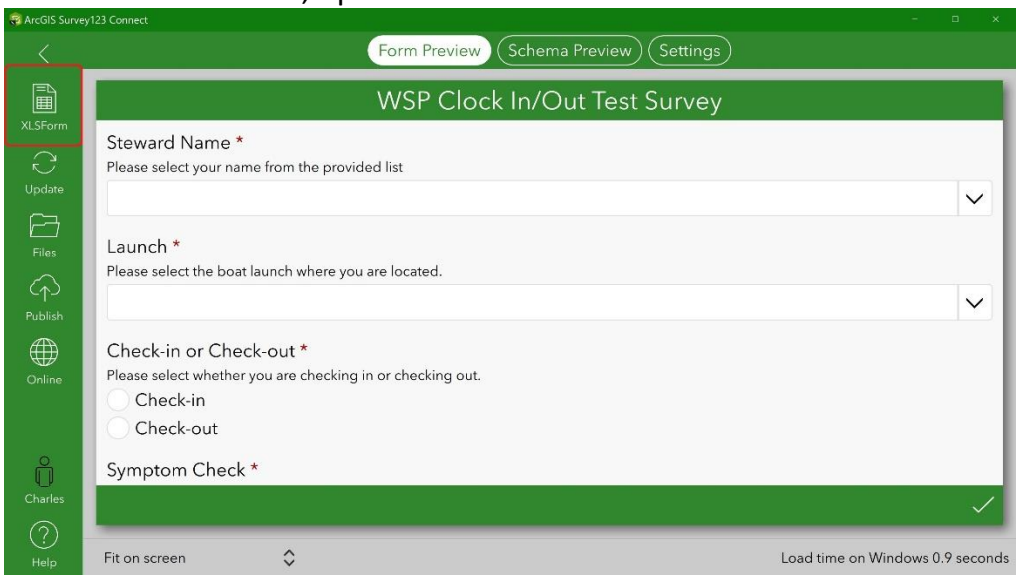
- when in doubt, or for reference, refer to the Master Schedule.
- Bi-weekly meetings will screw up some of the times

Addendum 4: Making Survey Changes in-season & Providing Updates

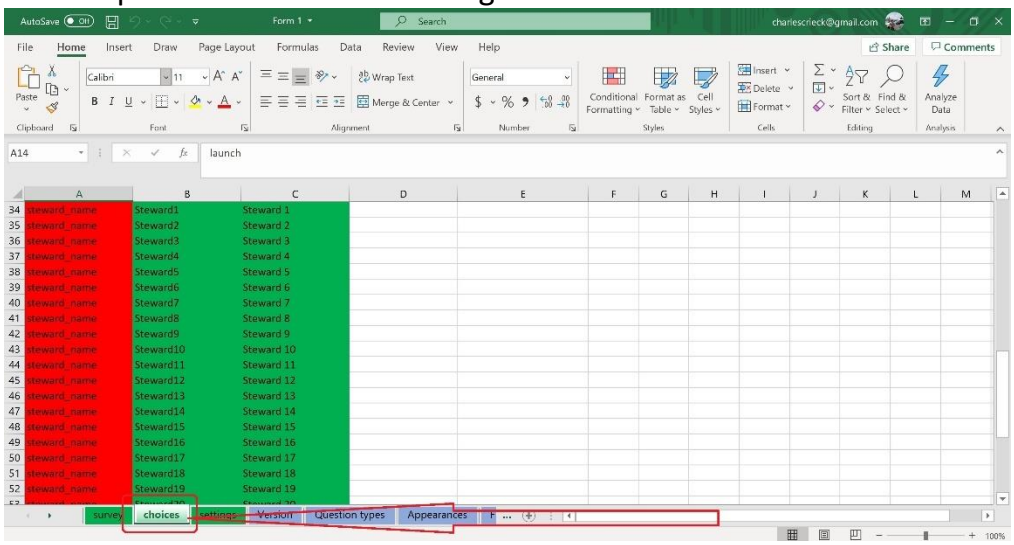
This addendum illustrates how to add additional choices can be added to the Timekeeper Survey. The example discussed will be adding new Stewards in-season. Other scenarios do apply.

1. Open the Timekeeper Survey in your Survey123 Software Desktop Extension.

2. On the left-hand side, open the XLSForm.



3. For this process we will be working from the "*choices*" tab in the XLS Form.



4. Navigate to the portion of the choices tab where the steward names are; add rows for each Steward that is being on-boarded.
5. Fill out the empty cells in the newly created rows.
    a. *List_name*: This cell defines what list the choice is added to. For steward on-boarding, this cell should be named "steward_name".
    b. *Name*: This cell defines how this choice selection is recorded in the data. For steward on-boarding, enter the new Steward's name without spaces or special characters.
    c. *Label*: This cell defines how this choice is displayed to the Surveyor. For steward on-boarding, enter the new Steward's name how it should be displayed on the Survey form.

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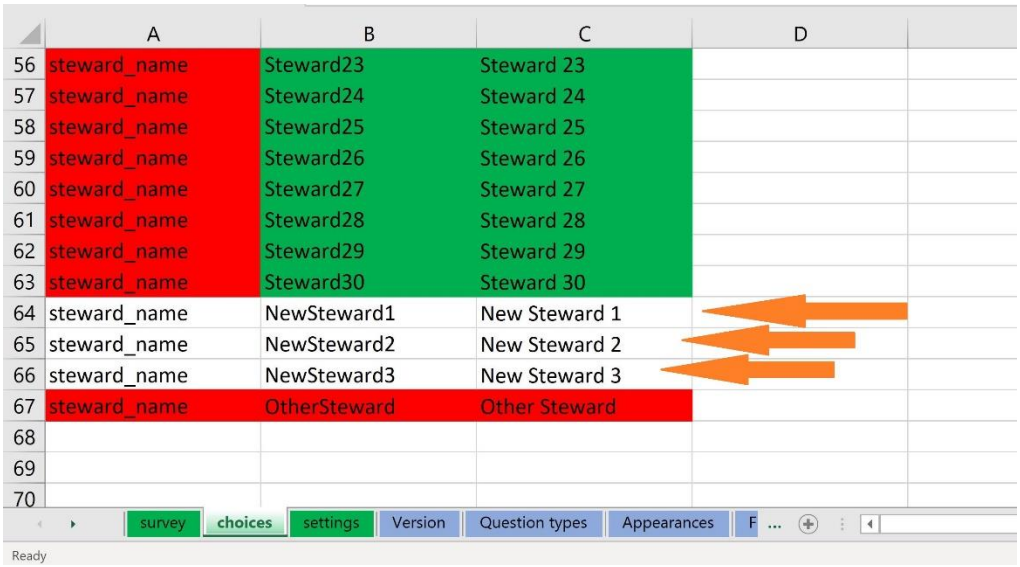


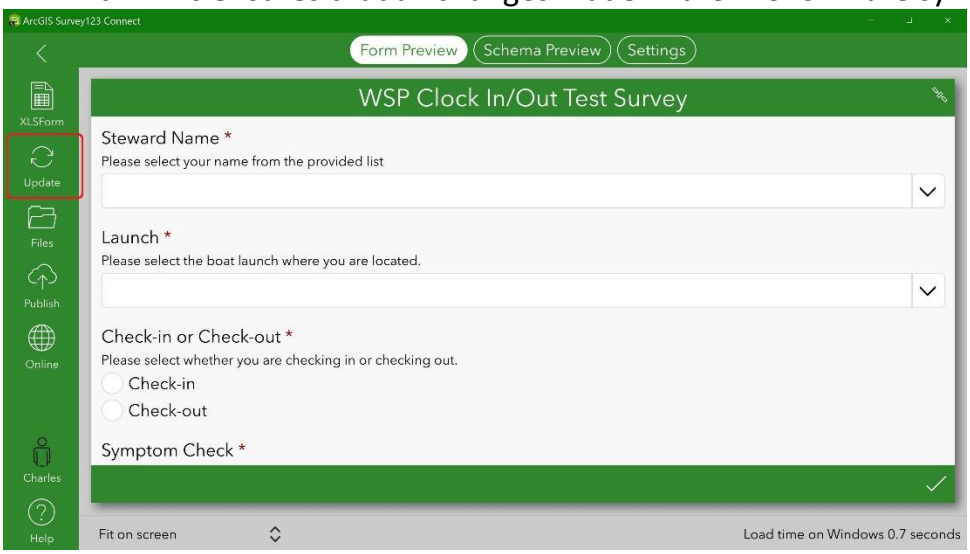
	A	B	C	D
56	steward_name	Steward23	Steward 23	
57	steward_name	Steward24	Steward 24	
58	steward_name	Steward25	Steward 25	
59	steward_name	Steward26	Steward 26	
60	steward_name	Steward27	Steward 27	
61	steward_name	Steward28	Steward 28	
62	steward_name	Steward29	Steward 29	
63	steward_name	Steward30	Steward 30	
64	steward_name	NewSteward1	New Steward 1	
65	steward_name	NewSteward2	New Steward 2	
66	steward_name	NewSteward3	New Steward 3	
67	steward_name	OtherSteward	Other Steward	
68				
69				
70				

survey | choices | settings | Version | Question types | Appearances | F ...

Ready

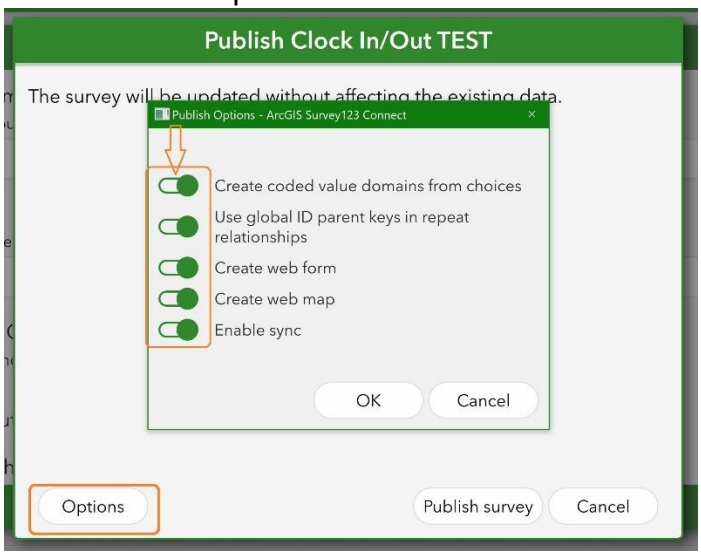
Once all the additions & desired changes have been entered into the form, we now must focus on updating the all users' survey form.

6. Save & Close the XLSForm.
7. From the Survey123 extension, select the 'Update' button on the left-hand side.
    a. This ensures that all changes made in the XLSForm are synced to the survey.

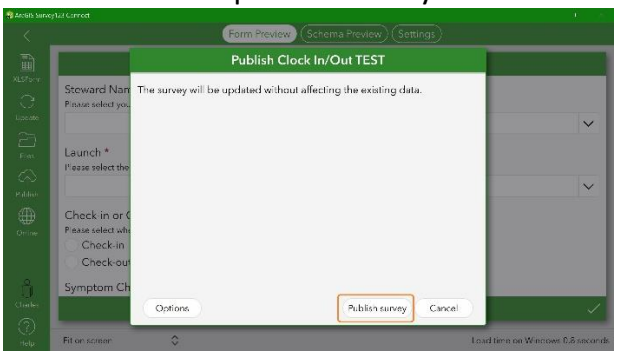


8. Once the Survey has been updated, select the 'Publish' button on the left-hand side.

9. Ensure that all options are checked in the 'Publishing Options'



10. Publish the updated survey.



How to notify a Steward there is a new version of the Timekeeper Form and How to download the update.

<u>If the Steward Does not have the Survey form on their Device already:</u>

11. Go to www.survey123.arcgis.com

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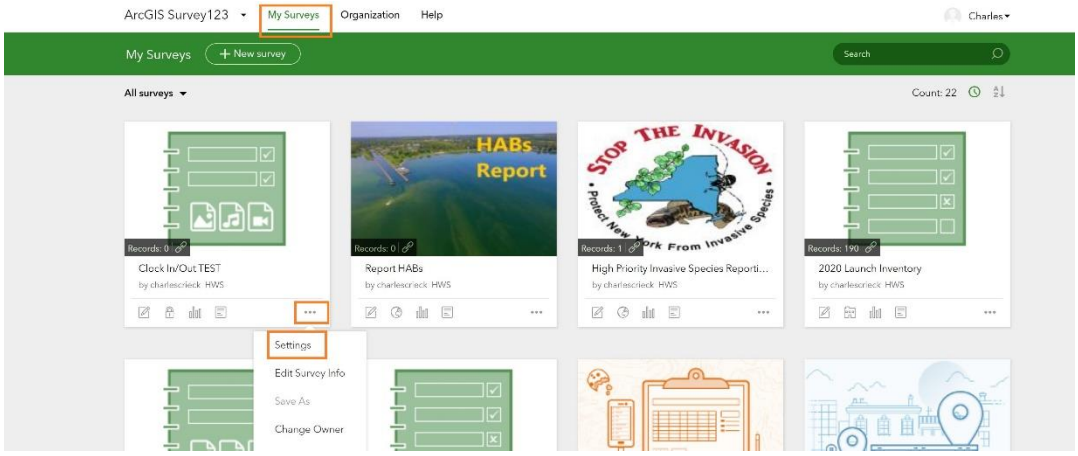
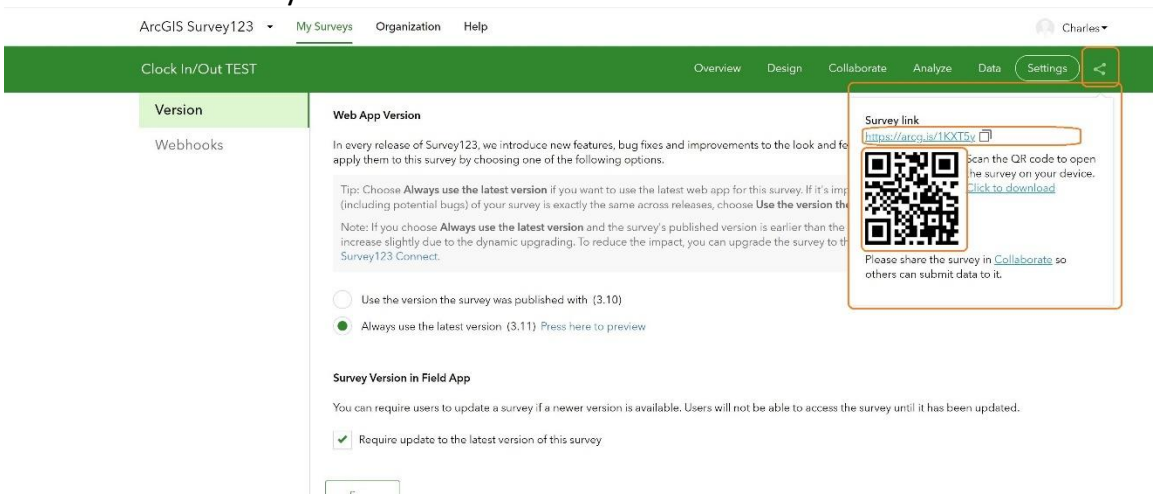
12. From the My Surveys page, navigate to the Settings of the Timekeeper Survey



13. Click on the 'share' icon in the upper right corner to get the QR code or URL used to download the survey.



14. Send the QR code or URL to anyone in need of the survey.

<u>If the Steward already had the Survey on their device and needs to update it:</u>

- In this instance, the steward will be prompted to update the survey from their Device, before submitting a record.
- Ensure that the Survey settings require the most recent version of the Survey to be used (pictured below)

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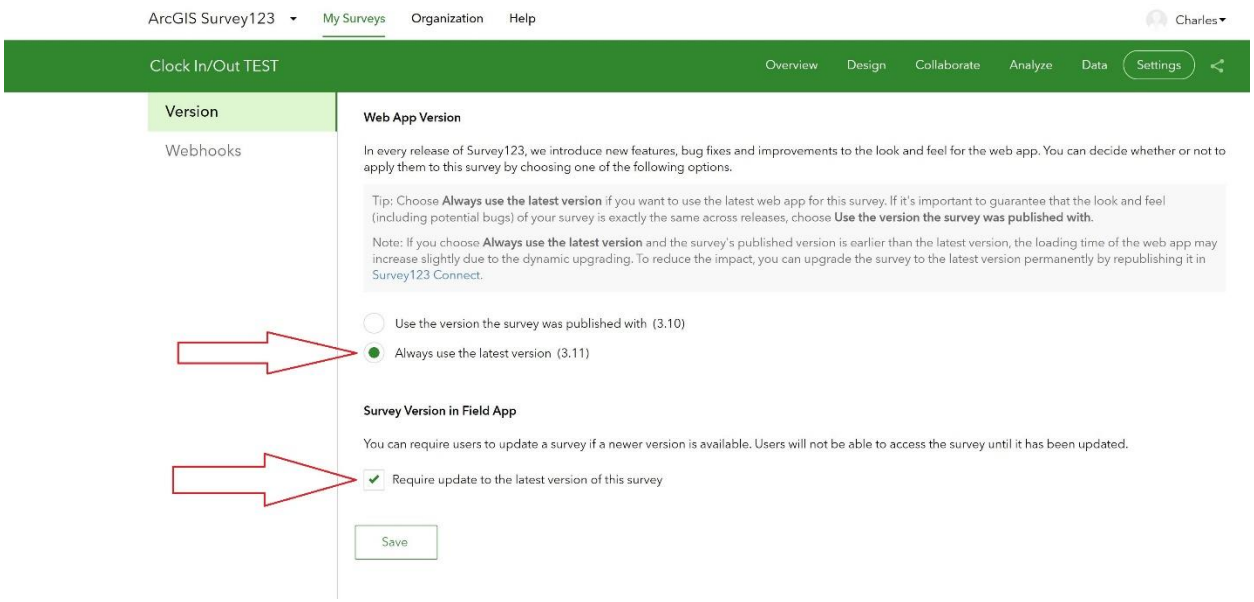

Appendix F: Watercraft Decontamination

What is Watercraft Decontamination?

The goal of watercraft decontamination is to intercept and decontaminate watercrafts transporting aquatic invasive species (AIS) so to reduce aquatic invasive species spread and establishment into new waterways. Watercraft decontamination is the process in which hot water, both pressurized and non-pressurized, is utilized to kill AIS that are being transported on watercrafts and their associated equipment. Low-pressure hot water is the primary factor ensuring that all present AIS have been killed, while the combination of high-pressure hot water and handheld tools are used to removal the dead AIS from the watercraft.

Importance of Watercraft Decontamination

From dense Eurasian watermilfoil (Myriophyllum spicatum) beds to carpeted zebra mussel (Dreissena polymorpha) lake bottoms, aquatic invasive species (AIS) have proven their devastating effects on our region's lakes, ponds, rivers, and streams. Aquatic invasive plants AIS, such as variable-leaf milfoil (Myriophyllum heterophyllum) and water chestnut (Trapa natans), have the ability to out compete native vegetation and grow to the extent of blocking boat launches, beaches, and navigable waterways. Small-bodied aquatic invasive animals such as zebra mussels, deplete available nutrients in the ecosystem and cause millions of dollars of private and commercial property damage annually. Widespread public education regarding spread prevention practices, coupled with robust watercraft inspection and decontamination, can help prevent the spread and establishment of AIS into new waterways.

Watercraft Decontamination Requirements

1. 140^{o}F water at high pressure (3,000 psi), for an exposure duration of 10 seconds, to decontaminate the hull and exterior surfaces of the watercraft and trailer.
2. 120^{o}F water at low pressure (rinse or flush), for an exposure duration of 30 seconds, to decontaminate internal water holding compartments.

Tools and Attachments

Valve Gun – The valve gun is connected to the primary pressure washer hose, that runs back to the pressure washer to supply water. There is a trigger mechanism that engages and disengages an internal valve system. When the trigger is depressed, the valve is opened, allowing water to leave the gun freely. On the outflow end of the gun, there is a quick coupler connection which allows multiple other attachments to be added. The valve gun is used in every decontamination application that requires the use of hot water.

Wand – The wand is an attachment that connects to the valve gun, producing controllable and variable pressure. Using the handle that protrudes perpendicularly off the center of the wand, the operator can control the pressure of the water by either twisting the handle forward or backwards. The wand is used

for all decontamination applications that require low to high pressure hot water on the exterior of the hull, motor and trailer.

Low Pressure Hose – The low-pressure hose is used for two purposes. The first is to read the water temperature. At the start of a decontamination or while switching to another region of the watercraft to decon, the technician needs to adjust the water temperature accordingly. This hose allows for "garden hose" water pressure. This makes reading the water temperature easier and safer. The low-pressure hose is also used to flush interior compartments such as the bilge, livewell, and anchor well.

Lower Unit Flushing Muffs – The lower unit flushing muffs are used to flush and decontaminate outboard motors and inboard/outboard motors. Connect the hose adapter to the valve gun (quick coupler fitting), then attach the muffs to the opposite end of the hose adapter (garden hose fitting).

Fake-A-Lake – The fake-a-lake is used to flush and decontaminate inboard motors and their cooling systems. Additionally, it is used to decontaminate ballast tanks and bags. Connect the hose adapter to the valve gun (quick coupler fitting), then attach the fake-a-lake to the opposite end of the hose adapter (garden hose fitting).

Hose Adapter – The hose adapter serves two purposes. One, it is used as an adapter connection from the valve gun to the lower unit muffs and fake-a-lake. Two, it is used as a motor flushing connection hose for jet propulsion watercrafts such as jet skis. The quick coupler, male fitting, connects to the valve gun. The garden hose, male fitting, connects to the desired attachment.

Undercarriage Sprayer – The undercarriage sprayer has a long handle that has a rotary sprayer on the outflow end. This attachment also connects to the valve gun. It can be used to decontaminate watercraft that sit low to the ground. The extended handle allows for maximum spraying coverage of the back side of bunks and rollers, while remaining safely to the side of the trailer.

Brushes and Scrapers – Brushes and plastic scrapes are used to remove AIS that are encrusted on the watercraft or trailer. The combination of brushing and scaping followed by high pressure hot water can be used.

Flashlight - The flashlight is used to see in dark spaces either inside watercraft compartments or under the trailer.

5 Gallon Bucket – The 5-gallon bucket can serve multiple purposes. Firstly, it can be used to collect AIS as it is removed from the watercraft. Secondly, the bucket can be situated underneath a lower unit while it is being lowered. If water drains out of the lower unit, the bucket will catch it and any AIS. Thirdly, it can be used to decontaminate damp equipment.

Signage and Cones

Fixed Highway Road Signs – At roadside watercraft decontamination stations, fixed highway road signs are located on the right-hand side of the road (in the direction of travel) coming from both directions (east and west bound or north and south bound). At some of these stations, the road signs will have a hinged panel. At the start of each shift, wearing a hard hat and safety vest, the technician is to open the

folded sign, exposing, “Boat Wash Station”. Using the provided wingnuts, secure the opened panel in place against the adjacent support bar. At the end of the shift, the technician is to revisit the road signs to close both panels. Again, both a hard hat and safety vest is to be worn while on a roadway right-of-way.

Portable Signs – At both roadside decontamination stations and select boat launches, portable signage is provided. At roadside locations, the signs should be set up at both entrances to the pull off, facing oncoming traffic. These signs should never be set up in the right-of-way or on the paved breakdown lane. Situate the signs so they are at least 6 feet off the traveled portion of the road, preferably off the pavement. At boat launch locations, refer to the site map in the decon shed. This map will show the proper location for the road signs to be set up within the parking lot or roadsides. Sign placement will vary site to site.

Safety Cones – Safety cones are used to direct the flow of traffic at both roadside decontamination stations and boat launches. Cone placement will vary from site to site.

Personal Protection Equipment (PPE)

Wearing personal protection equipment (PPE) is mandatory for operating decontamination pressure washer units. This is due to high water pressure, hot water temperatures, flying debris, moving parts, uneven ground, slippery ground conditions, present flammable propellants, and moving vehicles and trailers. Listed below, are the required PPE to be worn while operating a decontamination unit.

Hard Hat – The hardhat is only required for use while working on a roadway right of way. This occurs when opening and closing road signage. This includes opening panels on fixed highway road signs and placing folding signs along the shoulder of the road.

High Visibility Vest – The blue DEC stewarding vest must be worn at all times during your shift. The safety yellow and orange vest must be worn whenever working along a roadway right of way. This includes opening panels on fixed highway road signs and placing folding signs along the shoulder of the road.

Eye Protection – Eye protection must be worn whenever starting or operating a pressure washer or whenever using hand tools to remove AIS from a watercraft. Personal sunglasses or safety glasses may be worn if they meet OSHA safety standards.

Hearing Protection – Hearing protection is optional when operating the pressure washer. Personal hearing protection may be used.

Rubber coated gloves – Rubber coated gloves must be worn while operating a pressure washer or while using hand tools to remove AIS from a watercraft or trailer. Two styles of gloves to consider include a thin, nitrile coated, gardening style glove, that allows for maximum dexterity and a second style is a thicker nitrile coated, heat resistant glove with longer cuffs. Personal gloves may be used.

Closed toed shoes – Closed toed shoes must be worn at all times, regardless of what job duties are being performed.

Site Safety

Understanding the *flow* of the launch is the first step in ensuring that you are working both efficiently, but most importantly, SAFELY! Stewards should be familiar with the anticipated direction of travel for both incoming and outgoing traffic, as well as the desired watercraft inspection and decontamination locations.

Follow the below safety steps while performing a decontamination.

1. When a vehicle is approaching, remain at your station until the vehicle comes to a stop.
2. Ask the driver to put the vehicle in park.
3. Always know where the driver is and maintain communication whenever possible.
4. Never go under a watercraft or stand in front or behind the trailer if you have not directly addressed these plans with the driver.

Portable Water Containment Pad Usage

The portable containment pad is the large, yellow colored plastic mat to be used whenever a suitable decontamination site (high and dry, at least 50ft away from the waterbody, with suitable wash water containment or filtration) is not available. The mat is used to ensure wastewater from decontaminating the watercraft and trailer, is contained and properly filtered. If using a portable water containment pad, follow the protocol below.

1. At the start of each shift, unfold or straighten the mat so that it is spread out to its maximum dimension.
2. Clear off any debris to include sticks, leaves, and rocks. If there are present AIS, remove from the mat and place in the AIS disposal bin.
3. Place two safety cones along the road or parking lot side of the mat, opposite the decon shed side.
4. When a watercraft is ready to be decontaminated, inform the driver to drive over the mat with the vehicle and trailer. The boat and trailer should be centered on the mat – front to back and left to right. The tow vehicle must be put in park.
5. Begin the watercraft decontamination.
6. Upon completion, tell the driver they can pull off the mat.
7. Remove all visible vegetation by hand and place in the AIS disposal bin.
8. See below for the water reclaim system procedures.

Petroleum Containment

One of our primary duties is to minimize the risk of petroleum-based products being introduced into the natural systems surrounding the watercraft decontamination sites. It is useful to supply multiple products to combat this. Understanding how to properly deploy these products is crucial in minimizing environmental damage and achieving our goals.
While inspecting a watercraft or preparing to perform a decontamination, inspect the watercraft for potential petroleum hazards. Petroleum hazards include but are not limited to, gas leaks, diesel leaks,

lower unit oil leaks, and engine oil leaks. Common places to look include, the bilge, deck, engine bay below the deck, hydraulic pump on outboards and inboard/outboard motors, and the lower unit.

Hydrophobic Petroleum Absorbent Products

Two useful forms of hydrophobic petroleum absorbent products include pads and boom socks. Note: These products only absorb petroleum-based products, not water.

The pads can be used like a paper towel. They can either be laid flat on a surface, such as a boat floor or on the pavement, or can be used to wipe or dab a contaminated region. For example, if there was a noticeable gasoline smell and sheen coming from the undrained bilge water of a fishing boat, you could place a pad on top of the water's surface. Using gloves, move the pad around the bilge area to absorb all the gas.

The boom socks can be used to filter flowing water mixed with contaminants. Example - If wastewater was flowing towards a common focal point on the containment pad, the boom sock could be placed in a "U" shape, ends facing upstream, to filter all petroleum substances.

If pads or booms were used to absorb petroleum products, dispose of them in the trash. Notify your supervisor of the circumstances.

Daily Operations

Decontamination units should be started and run for 2 minutes at the beginning of each shift to ensure proper function and readiness to service the boating public. At all times, safety should be the top priority, **Personal Protective Equipment (PPE) MUST be inspected daily and worn whenever the decontamination unit is being operated.** The technician is responsible for the discharge of any high-pressure hot water. The technician must consider their surroundings and advise the public to stand back at a safe distance of 20 feet. Public and staff safety should always be the first priority. **Never allow a member of the public or a non-certified employee to decontaminate a watercraft.**

Only trained Decontamination Technicians can operate decontamination units.

1. When you first arrive to the worksite, inspect the shed and water tank (if present) for noticeable damage or vandalism. If found, notify your Lead Steward before proceeding.
2. Open the storage shed. With all doors open, allow the shed to vent for 2min before entering. If both gasoline and kerosene/diesel are stored in the shed there is a possibility for fumes to build up overnight.
3. Once vented, enter the shed.
    a. If there is a pre-work check list fill it out. Inspect equipment. Look for vandalism, fluid leaks on the floor, unusual smells, or damaged tools or PPE. If found, notify your supervisor before proceeding. Check the pressure washer for adequate fuel. To start the day, the gasoline and kerosene/diesel fuel tanks must be at least 1/3 full. On the ECOS, the red tank is for gasoline and the black tank is for kerosene/diesel.
    b. On the MHC, the small tank, on top of the Honda engine, with a silver cap, is for gasoline. The yellow plastic tank on the rear is for kerosene/diesel.

c. Your program may have a different unit type.

4. Check the pressure washer for adequate engine and pump oil. Both oils can be checked with a dipstick and should be at the "full" line.
   a. On the ECOS, the engine oil dipstick can be found under the hot water burner. It is most easily accessed from the rear alleyway between the water tanks. The pump oil dipstick can be found on the front of the unit, closest to the trailer hitch. It is located on top of the water pump. It can be accessed by reaching over the front gate of the unit.
   b. On the MHC, the engine oil dipstick can be found near the base plate of the Honda engine, where it is mounted to the frame of the pressure washer. It is plastic and light grey in color. The pump oil dipstick can be found on top of the water pump, located in the center of the pressure washer. It is plastic and black in color. In addition to the dipstick, there is a site glass on the side of the water pump. Instead of checking the oil level on the dipstick, the oil level can be read here. The center dot on the sight glass represents proper oil level.
5. Wearing the appropriate PPE begin the startup procedure for the given pressure washer at your location.

The below start-up procedures need to be performed at the start of each shift. This ensures that the equipment is operating correctly and is warmed up for the first decontamination. This procedure will also be used for starting the pressure washers when a boat arrives for decontamination.

A. Landa ECOS – Start Up and Operation

The Landa ECOS (Environmentally Clean Operating System) is an all-inclusive decontamination package. This pressure washer is built upon a dual axle trailer. Atop the trailer, there are four 100-gallon water tanks, a gasoline engine to power the unit, a kerosene burner to heat the water, and a reclaim vacuum system used to recycle and filter wastewater.

i. The ECOS unit remains inside the shed during operation. Open both garage doors to allow proper ventilation while in operation.

ii. Unwind the pressure washer hose from the back of the unit and attach the low-pressure hose to the valve gun.

iii. Standing at the control panel, open the lid to the outside facing water tank nearest you. With the low-pressure hose (in your left hand) pointed into the water tank, depress the trigger on the valve gun.

iv. With your right hand, pull the choke out towards you. This is the black circular knob.

v. Using the key in the electric start ignition, turn the key to the right (clockwise) until the unit starts. Upon the engine starting, let go of the key.

vi. With the valve gun still pointed into the tank and now dispensing water, allow the engine to continue running on choke for 3-5 seconds. Then push the choke back into the control panel, to the OFF position.

vii. Let go of the trigger on the valve gun and remove the low-pressure hose from the water tank.

viii. Turn on the hot water burner switch located on the top of the control panel. The switch is labeled "Burner." Adjust the temperature control knob to 120^{o}F.

ix. Close the control panel door and pick up the laser temperature gun.

x. With the tip of the low-pressure hose approximately 1.5 feet off the ground, depress the trigger on the valve gun, allowing water to flow freely from the hose onto the ground.

xi. Point the laser temperate gun at where the water is hitting the ground. Depress the trigger. Monitor the temperature of the water on the display screen. Adjust the thermostat on the ECOS control panel until the water achieves the target temperature of 120^{o}F.

xii. Once the target temperature is achieved, put the laser temperature gun down.

xiii. Turn OFF the burner switch. To cool down the burner and hose connections, dispense water through the low-pressure hose for 30 seconds. Dispense this water into the top of the water tank closest to the control panel, not onto the ground.

xiv. Release the valve gun trigger and remove from the water tank.

xv. Turn the engine OFF by turning the key to the left (counterclockwise).

xvi. Once the engine is OFF, point the valve gun in a safe direction and depress the trigger. This will release built up pressure in the pump and hose.

The ECOS reclaim system does not need to be tested or operated at the start of each day. Follow the below procedure only when wastewater is ready to be reclaimed during your shift.

i. Standing at the rear of the ECOS unit, lift the door that is built into the alleyway floor.

ii. Remove the (grey 50') hose.

iii. On the rear of the ECOS, attach one end (both ends are the same) of the hose to the silver male connection on the top right corner of the unit. Bring the other end of the hose to the water containment pad. Attach the suction head to the hose. Place in the deepest water on the mat (the lowest point).

iv. Remove all large debris from the mat – sticks, leaves, rocks, etc.

v. Standing at the control panel, open the lid to the outside facing water tank nearest you. With the low-pressure hose (in your left hand) pointed into the water tank, depress the trigger on the valve gun.

vi. With your right hand, pull the choke out towards you. This is the black circular knob.

vii. Using the key in the electric start ignition, turn the key to the right (clockwise) until the unit starts. Upon the engine starting, let go of the key.

viii. With the valve gun still pointed into the tank and now dispensing water, allow the engine to continue running on choke for 3-5 seconds. Then push the choke back into the control panel, to the OFF position.

ix. Let go of the trigger on the valve gun and remove from the water tank.

x. Now that the ECOS is running, turn ON the vacuum switch and then turn ON the reclaim switch. Both switches are found on the top of the control panel.

xi. At this time, the hose will start sucking water from the pad and the reclaim pump will start filtering water in the reclaim reservoir.

xii. The vacuum processes water faster than the reclaim pump. The vacuum will fill the reservoir within 60 seconds. The fill time will vary based on how much water was in the reservoir when the vacuum was started.

xiii. When the reservoir is full, you will be able to hear the vacuum self-turn off and there will no longer be suction at the end of the hose. At this time, manually turn off the vacuum switch on the control panel.

xiv. With the vacuum turned off, allow the reclaim pump to filter the water in the reservoir. This will take approximately 5 min. Once all the water has been filtered, a sensor will turn off the reclaim pump.

xv. Turn the vacuum switch back on, allowing more water from the pad to be sucked into the reclaim reservoir.

xvi. When you hear the vacuum kick off and there is no longer suction at the end of the hose, turn off the vacuum switch on the control panel.

xvii. Allow the reclaim pump to filter the water in the reservoir.

xviii. Continue steps xi-xviii until all of the water has been removed from the mat and all water has been filtered out of the reclaim reservoir.

B. Landa MHC – Start Up and Operation

The Landa MHC is a sub-compact commercial hot water pressure washer. Some units are built upon a mobile skid frame on wheels. This model has the ability to be moved by one person. Onboard, there is a Honda gasoline engine that runs the unit and a kerosene/diesel hot water burner. Note – this model does not have the reclaim function. Push the MHC out of the shed onto the front ramp/deck. This unit is to only be operated outside of the shed.

i. Take the external water supply hose connected to the water tank and connect to the hose fitting on the front of the MHC.

ii. Open the water valve on the water supply hose.

iii. Slowly unscrew the water supply hose that you previously just connected. Only loosen halfway. Allow all visible air bubbles in the water supply hose to bleed out. Once all air is out and only water is dripping or spraying out of the threads, retighten the water supply hose to the MHC.

iv. Unwrap the pressure washer hose from the back of the MHC.

v. Return to the front of the MHC (where the controls are located). Connect the low-pressure hose attachment to the valve gun.

vi. On the front of the MHC, there are three levers on the left-hand side. The top lever is the throttle. This controls engine speed or RPM's. Push this lever all the way to the right. This would be towards the "turtle" icon.

vii. The gray plastic lever is the choke. Push this lever all the way to the left for full choke.

viii. The black lever is the fuel shut off. Make sure this lever is pushed to the OPEN position. All the way to the right.

ix. With the throttle on turtle and the choke on full – depress the trigger on the valve gun with your left hand.

x. With your right hand, turn the key in the ignition. Once the engine starts, let go of the key.

xi. Slowly back off the choke in increments of 1/3 choke, over the course of 6 seconds. Full choke for 2 seconds, then drop to 2/3 choke for 2 seconds, then drop to 1/3 choke for 2 seconds, then turn the choke off.

xii. Once the engine stays running with the choke in the OFF position, quickly move the silver throttle lever all the way to the left, towards the rabbit icon.

xiii. If the engine does not stay running, repeat steps ix-xi.

xiv. Once the choke is off and the engine remains running, release the trigger on the valve gun.

xv. If there is inadequate water pressure, there is likely air trapped in the water pump. With the MHC running, take the provided adjustable wrench and loosen the upper banjo bolt located on the left side of the water pump. Loosen this bolt 1 complete turn or until water starts spraying out of the threads. Allow water to spray out of the bolt threads for 10 seconds. Then retighten the bolt.

xvi. Retest the water pressure. If still inadequate, repeat the previous step. This time, increasing how far you loosen the bolt by 1 complete turn.

xvii. Once proper water pressure has been achieved, turn on the burner switch, located on the front of the MHC. This switch is labeled "Burner".

xviii. Set the thermostat to 120^{o}F.

xix. With the tip of the low-pressure hose approximately 1.5 feet off the ground, depress the trigger of the valve gun, allowing water to flow freely from the hose onto the ground.

xx. Point the laser temperate gun at where the water is hitting the ground. Depress the trigger. Monitor the temperature of the water on the display screen. Adjust the thermostat on the MHC until the water achieves the target temperature of 120^{o}F.

xxi. Once the target temperature is achieved, put the laser temperature gun down.

xxii. Turn OFF the burner switch. To cool down the burner and hose connections, dispense water through the low-pressure house for 30 seconds. Dispense this water into the top of the water tank.

xxiii. Release the valve gun trigger and remove from the water tank.

xxiv. Lower the engine RPM's by pushing the throttle lever to the turtle icon.

xxv. Turn the engine OFF by turning the key to the left (counterclockwise).

On the Landa MHC, make sure to spray water at least every 30 seconds. The water pump on this model is in constant motion, even when water is not being sprayed. This causes heat to build up quickly. Spraying water out of the valve gun ensures that fresh water is passing through the pump, keeping it cool. If you won't be dispensing water within a 30 second time frame, make sure to shut the MHC down until it is needed.

Equipment Trouble Shooting

Engine won't start.

1. Follow the standard operating procedure.
2. Use the choke when starting the engine. If the engine was running within the last hour, attempt starting without the choke. If the engine doesn't start, reattempt using the choke.
3. Depress the trigger of the valve gun while turning over the engine. This reduces compression build up and allows the engine to turn over easier.
4. Check to make sure both gas and diesel/kerosene tanks are at least 1/3 full. If low or empty, add fuel. Check engine oil level. If the oil is too low, the engine control module (ECM) will not allow the engine to start. If the oil is low, contact the supervisor.
5. Check to make sure the battery leads are connected to the battery terminals snuggly. The ECOS battery is located above and behind the control panel in a black plastic box. The MHC battery is located in the center of the unit, mounted on the base plate of the frame, in a black plastic box. Remove the cover from the battery box and inspect the battery connections. Holding the plastic end of the cable, wiggle the cable back and forth. If the connection moves on the terminal, use the provided adjustable wrench to tighten the nut.

Low or no water pressure.

1. MHC, no water – check to make sure the valve on the water tank line is in the *OPEN* position. The handle of the valve should be in-line or parallel to the hose, when open.
2. MHC, no water – check for a clogged screen. With the water supply line valve turned off, remove the water supply hose from the MHC. Inspect the screen inside the MHC's threaded connection point. If sediment, debris, or build up from the tank is clogging it - clean it out and reconnect.
3. MHC, low pressure – check to make sure there are no air pockets in the water supply hose. If present, slowly unscrew the hose halfway off the MHC connection. Allow water and air to leak or spray out of the connection point. Visually inspect the semi-transparent water supply hose to confirm that there is no air remaining in the line. Retighten the hose to the MHC.

4. MHC, low pressure – If there is still low water pressure after burping air out of the water supply line, the water pump likely has air pockets. With the MHC running, take the provided adjustable wrench and loosen the upper banjo bolt located on the left side of the water pump. Loosen this bolt 1 complete turn or until water begins spraying from the bolt threads. Allow water to spray out of the bolt threads for 10 seconds. Then retighten the bolt. Test the water pressure with the wand. If the pressure is found to still be low, loosen the banjo bolt again. This time loosen the bolt 1 additional turn.

9. No water pressure – check to make sure the ECOS water tanks or MHC external water supply tank has water.

No hot water.

1. Check to make sure there is fuel in the diesel tank.
2. The burner will only ignite while the trigger on the valve gun is depressed.
3. With the pressure washer running make sure the burner switch is turned ON and the thermostat dial is set to the appropriate temperature.
4. If the burner still won't ignite, turn OFF the pressure washer. Let the pressure washer rest for 10 seconds, then restart the engine. Once running, reattempt to turn on the burner. If the burner fails to ignite within 5 seconds, turn the burner switch OFF and notify your Lead Steward. Do NOT operate the burner switch until the pressure washer has been assessed by the Decontamination Program Manager.

Water spraying out the sides of the wand tip, wand, or valve gun.

1. With the pressure washer tuned off, check to make sure the connections are securely seated in the quick coupler fittings.
2. The most likely cause is a worn-out O-ring. Notify your supervisor. The gun and wand are safe to operate with a worn-out O-ring.

Water spraying out of the water pump unloader valve.

1. Using the provided adjustable wrench, tighten the banjo bolt on the left side of the water pump (the bolt that is leaking or spraying water) clockwise until firmly seated against the pump.

Engine randomly turned off while operating.

1. Check to make sure there is fuel in the gas tank.
2. The pressure washers have a low oil sensor. If low oil is detected, the engine will shut down. Double check the engine oil level using the dipstick. The dipstick can be accessed from the alley way in-between the water tanks. After confirming low oil, report this to your supervisor and do not use the pressure washer until serviced. **Wand, low pressure hose or adapter hose won't release from the valve gun.**

3. With the valve gun against your hip, push the attachment (wand, low pressure hose, or adaptor hose) towards your body. With your other hand pull the collar of the quick coupler back towards you. This is the locking mechanism that secures the attachment to the gun. Once the collar is pulled back, pull the attachment away from the gun.

Situations that Warrant Decontamination

Most watercraft inspections do not result in a decontamination being performed. In many instances, visible aquatic plant material, mud, debris can be removed by hand and disposed of. However, there are certain circumstances that will result in decontamination. A decontamination should be recommended if upon inspection one or more of the following is discovered - standing water and damp equipment, visible inaccessible organic material, visible small bodied AIS like zebra or quagga mussels, and baitfish or other organisms used in the taking of sport fish. Each of these situations are described in detail below:

Standing Water and Damp Equipment

This protocol is performed to kill suspect veligers (microscopic dreissenid larvae) or other microscopic AIS in standing water or damp equipment that has not been fully drained or dried. This decontamination applies to interior compartments where standing water is present or equipment that has come in contact with water and has not been sufficiently dried. The interior compartments include but are not limited to, live wells, bait wells, bilge areas, and ballast tanks. Standing water decontamination also includes flushing the outboard motor, inboard/outboard motor or inboard motor of a watercraft.

Visible Inaccessible Organic Material

This decontamination is performed whenever organic material is located in an inaccessible area and cannot be easily removed from the watercraft or trailer by hand. This decontamination is localized and requires the use of 140ºF hot water on the areas where the AIS is located.

Visible Small Bodied AIS

This protocol is performed when adult or juvenile small bodied AIS, unidentifiable bumps, or other adhered but unidentifiable organic matter is detected on the watercraft. A combination of low- and high-pressure hot water is used to kill and remove the material. Plastic scrapers and brushes are also utilized in removal.

Baitfish or Other Organisms Used in the Taking of Sport Fish

This decontamination prevents the transport of AIS used as bait or potentially present in the standing water of bait wells or buckets. If the bait is uncertified or from out of state, it is suggested that it be disposed of. Certified baitfish are those that have been tested and found to be free of virulent diseases. Certified baitfish purchased from a bait dealer can be transported overland in a motorized vehicle and used in any water body where it is legal to do so. Baitfish without a receipt or with a receipt that is older than 10 days shall be considered uncertified bait. Stewards are not designated to enforce the baitfish law.

In many instances you will run into more than one of the above situations while inspecting the same watercraft. Each situation should be addressed independently until the watercraft and equipment have been fully decontaminated.

In rare instances, you may encounter an uncooperative boater who refuses the recommended watercraft decontamination. **The steward or decon tech does not have the authority to stop a boater from launching or from leaving a launch after retrieval**. **This is a voluntary program and service.** In this situation, the steward or decon tech should disengage from the individual and allow them to proceed as they wish. Discretely record information about the boater and watercraft. This should include watercraft registration number, type (sailboat, motorboat, PWC), and tow vehicle info (license plate/make/model/color). After collecting as much information as possible contact your supervisor so they can relay the information to program management and law enforcement as appropriate.

Decontamination Procedure for Standing Water and Damp Equipment

Standing Water Decontamination of Interior Compartments

An interior compartment decontamination would be recommended if there were dampness or visible standing water found in the livewell, baitwell, anchor well, bilge, or any other compartment found inside the watercraft.

1. Follow the standard operating procedures for your decontamination unit.
2. Turn ON the burner and set the thermostat to 120^{o}F. Measure the temperature of the water using the laser temperature gun. Adjust the thermostat until a consistent 120^{o}F is achieved.
3. Start the decontamination by having the boat operator open all interior compartments that need to be decontaminated and ensure all drain plugs are in place.
4. Using the low-pressure hose, flush each compartment for 30 seconds. Be sure to keep the tip of the hose close to the sides of the compartment to prevent temperature loss.
5. Next, if equipped, have the boater turn on the discharge pump for each given compartment. If no pumps are present, remove the drain plugs.

Standing Water Decontamination of Outboard Motors and Inboard/Outboard Motors

An outboard or inboard/outboard (I/O) engine flush would be recommended if, when asked to trim the motor or lower unit down, water drained out. OR if the watercraft was last in a waterbody that is known to have small bodied AIS.

1. Follow the standard operating procedures for your decontamination unit. Turn on the burner and set the thermostat to 120^{o}F. Measure the temperature of the water using the laser temperature gun. Adjust the thermostat until a consistent 120^{o}F is achieved.

2. Attach the adapter hose to the valve gun. Then connect the lower unit flushing muffs to the opposite end of the adapter hose (garden hose fitting).
3. Make sure the motor is completely lowered. Coming from the front of the lower unit (opposite end of the propeller), slide the muffs onto either side of the lower unit. Make sure that both rubber cups are covering the water intake ports.
4. Start the flow of water to the lower unit by depressing the trigger on the valve gun. Check to make sure the intake openings are fully covered on both sides.
5. Stand safely off to one side of the lower unit, approximately 3 feet.
6. Once the water is on, inform the boater to start the engine in neutral.
7. Once the water starts discharging from the appropriate port, allow the motor to continue running for 30 seconds with water still flowing.
8. Once 30 seconds is complete, inform the boater to turn off the motor.
9. After the motor is turned OFF, stop the flow of water and remove the muffs. Allow the motor to drain.
10. Ask the boater to raise and lower the motor twice, to ensure all water has drained.

Standing Water Decontamination of Inboard Engines

An inboard engine motor flush would be recommended if the boat has been in the water within the last 2 weeks. Due to the configuration of this propulsion type, there is no mechanical way to raise/lower the propeller or motor to check for draining water.

1. Follow the standard operating procedures for your decontamination unit.
2. Turn ON the burner and set the thermostat to 120^{o}F. Measure the temperature of the water using the laser temperature gun. Adjust the thermostat until a consistent 120^{o}F is achieved.
3. Attach the adapter hose to the valve gun. Then attach the fake-a-lake.
4. The fake-a-lake must be placed snuggly against the bottom of the hull covering the intake port for the motor. The pressure against the intake is possible by using the opposite end of the fake-a-lake as a kickstand on the ground. Adjust the fake-a-lake to the appropriate length (distance from ground to hull).
5. Start the flow of water to the intake port by depressing the trigger on the valve gun. Check to make sure the intake is fully covered.
6. Stand safety off to one side of the watercraft while still holding the gun.
7. Once the water is on, inform the boater to start the engine in neutral.
8. Once the water starts discharging from the appropriate port, allow the motor to continue running for 30 seconds with water still flowing.

9. Once 30 seconds is complete, inform the boater to turn off the motor.
10. After the motor is turned OFF, stop the flow of water and remove the fake-a-lake.
11. Allow the motor to drain.

Standing Water Decontamination of Jet Drives

Jet drives are most commonly found on PWC's (personal watercraft) such as jet skis. Though they can also be found on sport performance bowriders.

1. Follow the standard operating procedures for your decontamination unit. Turn ON the burner and set the thermostat to 120^{o}F. Measure the temperature of the water using the laser temperature gun. Adjust the thermostat until a consistent 120^{o}F is achieved.
2. Attach the adapter hose to the end of the valve gun (quick coupler fitting) and then attach the adapter hose.
3. The flushing port on most jet skis is typically located under the front hood or the rear seat. On larger sport performance bowriders, the flushing port will be located under the rear seat or hatch to the engine bay. Screw the garden hose fitting on the hose adapter to the flushing port.
4. **Important! This step is in the reverse order as other engine propulsion types!** Inform the boater to start the engine **FIRST**, before the water is flowing.
5. Once the engine starts, depress the trigger on the valve gun to start the flow of water.
6. Once water has started to discharge from the rear of the watercraft, allow to flush for 30 seconds.
7. Once 30 seconds is complete, stop the flow of water from the valve gun.
8. Allow the watercraft to run for 15 seconds without water flowing.
9. Inform the boater to turn off the engine.
10. Remove the adapter hose from the flushing port.

Standing Water Decontamination of Ballast Tanks

Most inboard boats, where the engine is centrally located under the deck, have ballast tanks.

1. Follow the standard operating procedures for your decontamination unit.
2. Turn ON the burner and set the thermostat to 120^{o}F. Measure the temperature of the water using the laser temperature gun. Adjust the thermostat until a consistent 120^{o}F is achieved.
3. Attach the adapter hose to the end of the valve gun (quick coupler fitting) and then attach the fake-a-lake.
4. The fake-a-lake must be placed snuggly against the bottom of the hull covering the intake port for the ballast tanks.

5. Start the flow of water by depressing the trigger on the valve gun.
6. Have the boat operator turn on the ballast tank pump. Fill the tanks or bags until the ballast gauge reads FULL or water begins to come out of the through hull fittings.
7. Once full, inform the boater to turn off the ballast pump.
8. Allow the tank or bags to soak for 30 seconds.
9. Inform the boater to drain the ballast tank or bags using the discharge pump.
10. Repeat steps 4-9 for every ballast tank or bag on board.

Damp Equipment Decontamination

1. Place damp equipment away from the watercraft but within the containment pad or filtration bed.
2. Follow the standard operating procedures for your decontamination unit.
3. Turn ON the burner and set the thermostat to 140^{o}F. Measure the temperature of the water using the laser temperature gun. Adjust the thermostat until a consistent 140^{o}F is achieved.
4. Fill a 5-gallon bucket ¾ full using the low-pressure hose.
5. Submerge any anchors, lines, life jackets, fishing gear or other damp accessories that will fit into the bucket. Allow to soak for 30 seconds. This step can be repeated multiple times for additional equipment or gear.
6. Rinse all larger equipment such as fishing poles, nets, or paddles with the low-pressure hose. Rinse each item for 30 seconds.

Procedure for Inaccessible Organic Material

Inaccessible organic material decontamination involves plants and animals that have become entrapped on the watercraft, motor, or trailer, in such a manner that makes the complete removal of the suspect AIS unattainable. The most common scenario is aquatic vegetation that has become trapped between the hull of the watercraft and the bunks or rollers of the trailer.

1. Before starting the pressure washer, remove as much organic material by hand as possible.
2. Follow the standard operating procedures for your decontamination unit.
3. Turn on the burner and set the thermostat to 140^{o}F. Measure the temperature of the water using the laser temperature gun. Adjust the thermostat until a consistent 140^{o}F is achieved.
4. Using the low-pressure hose, start the flow of water by depressing the trigger on the valve gun.
5. Saturate the entrapped AIS from all angles for 60 seconds. Keep the hose tip close to the contaminated area and move slowly. Repeat this step for all locations with inaccessible organic material.

6. Once the entire watercraft decontamination has been completed, perform the following.

a. Inform the boater about the presence of inaccessible organic material on the watercraft. Explain why it could not be fully removed and the steps that were taken to ensure that the AIS has been killed and is no longer a viable risk. The boater needs to be aware of this situation so they can effectively communicate with another steward upon arriving at another launch.

b. Record this information in the notes section of the WISPA survey. Make note that this particular watercraft had inaccessible organic material and the steps that were taken to minimize the transportation risk.

c. Immediately upon the watercraft leaving the decontamination site, contact your supervisor. Inform them that you sealed a watercraft with inaccessible organic material after performing the appropriate decontamination procedures.

Decontamination Procedure for Visible Small-bodied AIS

Once small bodied AIS are found, decontamination is recommended. You must first conduct a high-risk inspection of the watercraft to identify all areas with small bodied AIS. AIS such as zebra mussels and quagga mussels can be very difficult to fully remove from a watercraft, especially in adult form. The most import part of this decontamination is to ensure that they are dead and no longer a viable risk for introduction into a new waterbody. This is achieved by applying the appropriate water temperature and pressure for the required duration.

1. Follow the standard operating procedures for your decontamination unit.

2. Turn ON the burner and set the thermostat to 140^{o}F. Measure the temperature of the water using the laser temperature gun. Adjust the thermostat until a consistent 140^{o}F is achieved.

3. Keep the low-pressure hose attached to the valve gun.

4. Start at the bow of the watercraft. Start the flow of water by depressing the trigger on the valve gun. Slowly work your way around the watercraft rinsing down all surface areas. Zebra and quagga mussel veligers can be invisible to the naked eye, thus, ensure all surfaces are treated equally. For areas with dense adult mussel growth, spend 30 seconds per 1sqft, to ensure lethal exposure.

5. Work your way around the watercraft until the starting point is reached at the bow of the boat.

6. Remove the low-pressure hose and connect the high-pressure wand.

7. Using 140^{o}F high pressure water, spray the exterior of the hull and trailer. Start at the bow of the watercraft. With the wand at a 45deg angle to the hull, spray top to bottom as you work your way along the hull.

8. Spend extra time on areas with dense mussel growth. Use the spray to scrape off the encrusted shells.

9. Once completed, follow the shutdown procedure for the decontamination unit.

10. Pick up the plastic scraper and brush.

11. Revisit all areas on the hull, motor or trailer where dead but still affixed mussels exist.
12. Being careful not to damage the watercraft, use the provided tools to both scrape and brush the mussels off. The boater is never allowed to use the pressure washer. However, they are permitted to use the handheld tools on their own watercraft.
13. Once all mussels have been removed, restart the pressure washer using the standard operating procedure.
14. Turn on the burner and set the thermostat to 140^{o}F. Measure the temperature of the water using the laser temperature gun. Adjust the thermostat until a consistent 140^{o}F is achieved.
15. Attach the high-pressure wand.
16. Starting at the bow, respray the entire hull, motor and trailer from top to bottom. This is the final sweep to ensure all potentially remaining small-bodied AIS are dead and removed from the watercraft.

Aquatic Plants

If aquatic plants are found on a watercraft and can be completely removed from the watercraft by hand, watercraft decontamination is not recommended. However, depending on the volume of the aquatic plants and if the watercraft is coming from a high-risk water body, a localized decontamination can be recommended.

1. Remove all visible aquatic plants from the watercraft, motor, and trailer. If the entire plant is removed without fragmentation, then decontamination is complete.
2. If there are fragments remaining from the plants that are difficult to reach, too small to pick up, or otherwise difficult to remove from the watercraft, a localized decontamination can be performed.
3. Follow the standard operating procedures for your decontamination unit. Turn ON the burner and set the thermostat to 140^{o}F. Measure the temperature of the water using the laser temperature gun. Adjust the thermostat until a consistent 140^{o}F is achieved.
4. Keep the low-pressure hose attached to the valve gun.
5. Rinse off the contaminated area for 10 seconds.
6. Remove the low-pressure hose and connect the high-pressure wand.
7. Spray down the contaminated area. Make sure that all fragments have been washed off the watercraft.

Decontamination Procedure for Present Baitfish

Certified Baitfish

Certified baitfish are those that have been tested and found to be free of virulent diseases. Use of certified baitfish helps prevent the spread of fish diseases in native fish populations. Certified baitfish purchased from a bait dealer can be transported overland in a motorized vehicle and used in any water body where it is legal to do so. For baitfish to be considered certified, the seller must provide a receipt that contains the seller's name, date of sale, the species of bait, and the number of each species sold. The buyer must retain the receipt while in possession of the baitfish. Baitfish without a receipt or with a receipt that is older than 10 days shall be considered uncertified bait.

Uncertified Baitfish

Uncertified baitfish are those that have not been tested. These uncertified fish may carry diseases that could be harmful to native fish species. Uncertified baitfish purchased from a bait dealer or personally collected can only be used on the same body of water that they were collected in. Uncertified baitfish cannot be transported overland by a motorized vehicle (car or truck) except within a designated overland transportation corridor. The Adirondack Park is not included in any overland transportation corridor; however, these corridors narrowly follow the St. Lawrence, Niagara and Lower Hudson rivers.

AWISP staff are not permitted to check receipts for baitfish or require boaters to produce proof of certified bait.

Bait treatments should only be conducted where a water source is readily accessible for the replacement of bait bucket water. This would include lakes, ponds, rivers, or streams.

DO NOT PERFORM THESE TREATMENTS AT ROADSIDE DECONTAMINATION STATIONS AND DO NOT USE DECON SUPPLY WATER FOR BAIT.

1. Using a 5-gallon bucket – fill halfway with lake water. Avoid sediment and debris if possible.

2. Transfer the bait into the 5-gallon bucket. Minimize the transfer of water from the original container to the new bucket.

3. Drain the original container or compartment (e.g. live well) onto the appropriate containment pad or filtration bed.

4. Follow the standard operating procedures for your decontamination unit.

5. Turn ON the burner and set the thermostat to 120^{o}F. Measure the temperature of the water using the laser temperature gun. Adjust the thermostat until a consistent 120^{o}F is achieved.

6. Keep the low-pressure hose attached to the valve gun.

7. For live wells or interior compartments, make sure the drain plug is in place.

8. Depress the trigger on the valve gun to start the flow of water. Rinse the lid, hinges, handle, and all interior sides and bottom of the container.

9. Rinse for 30 seconds.

10. Stop the water and turn OFF the pressure washer.

11. Inform the boater to either pull the drain plug, dump the bucket, or turn on the livewell discharge pump to remove all water from the given bait storage container.

12. Pour the bait and water from the 5-gallon bucket into the boater's bait container.

13. If necessary, fill bait container with additional buckets of lake water at the boater's request.

Procedure for Complete Watercraft Decontamination

1. Follow the standard starting and operating procedures for the decontamination unit.

2. Turn ON the burner and set the thermostat to 120^{o}F. Measure the temperature of the water using the laser temperature gun. Adjust the thermostat until a consistent 120^{o}F is achieved.

Note: Decontaminate all regions that require 120^{o}F water first, then start on regions that require 140^{o}F.

3. Keep the low-pressure hose attached to the valve gun.

4. Before beginning decontamination, ask the boat owner to prepare the interior compartments that will be decontaminated. Identify the discharge ports for the interior compartments. If they have drain plugs, secure them in place.

5. Starting at the bow of the boat, rinse all interior compartments that are suspect to contain standing water or dampness. These compartments can include, but are not limited to, the anchor well, livewell, baitwell, and bilge.

    a. Rinse the lids, hinges and all sides and bottom of each compartment.

    b. Allow the 120^{o}F water to sit for 30 seconds.

    c. Fill the bilge area with 5-7 gallons of water. Allow to sit for 30 seconds.

    d. Remove the drain plug of each compartment and bilge or turn on the discharge pump if equipped.

6. With the low-pressure hose still attached, retake the waters temperature. If needed, adjust the thermostat until a consistent 120^{o}F is achieved.

7. Disconnect the low-pressure hose.

8. Ballasted boats only – For wake or ski boats with ballast tanks or bags, attach the fake-a-lake and perform a ballast tank decontamination for each tank or bag present. Connect the motor flushing attachment that matches the motor configuration at hand. See "Standing Water Decontaminations" for step-by-step instructions for flushing the motor.

    a. **Outboard** – lower unit flushing muffs

    b. **Inboard** – fake-a-lake

    c. **Inboard/Outboard** – lower unit flushing muffs

    d. **Jet** – adapter hose with garden hose fitting

9. Disconnect the motor flushing attachment. Reconnect the low-pressure hose.

10. Turn the thermostat to 140^{o}F. Measure the temperature of the water using the laser temperature gun. Adjust the thermostat until a consistent 140^{o}F is achieved.

11. Disconnect the low-pressure hose. Connect the wand.

12. Starting at the bow of the boat, work your way around the hull and trailer until you reach your starting point, on the opposite side of the trailer. Work top to bottom. Water runs downhill with gravity, thus, start at the highest points on the hull so that you don't potentially wash AIS onto clean space.

13. Spray at a 45^{o} angle to the hull. Making sure that all sprayed water and potential AIS is being washed away from you and in a downward motion.

14. The wand has a handle that adjusts the water pressure. Turn the handle counterclockwise to decrease pressure and turn the handle clockwise to increase pressure.

    a. Turn the water pressure down when washing sensitive areas. These areas include but are not limited to, hull ID numbers, stickers, transducers, carpeting, electrical wires, flacking paint, exposed caulking, trailer lights, etc.

    b. Turn the water pressure up when washing non-sensitive areas. These areas include but are not limited to, hulls, trailer frames, tires, bunks, rollers, lower units, etc.

15. Follow the standard operating procedure for shutting down the pressure washer.

16. Upon completion of the decontamination, perform a final inspection of the watercraft. If AIS is found, perform a localized decontamination to the region found to still contain AIS.

17. Make sure all drain plugs are removed if the watercraft is leaving the site. Remind the boater to put drain plugs back in place if proceeding to launch at the given site.

18. If the boater is not launching, offer to attach a VICS seal. See VICS protocols and procedures below.

Vessel Inspection Control Seal (VICS) (Lake George and ADK Park only)

Vessel Inspection Control Seals (VICS), also referred to as seals are a small single use seal, designed to mark watercrafts that have been certified to be **clean, drain, and dry**. It is constructed of a composite body and is secured to the watercraft and trailer using steel wire.

A watercraft can receive a VICS if:

1. The watercraft arrives at a watercraft decontamination station and upon a full inspection, is found to be clean, drain, and dry.

a. If the boater wishes to launch at the current site, **do not seal the boat** and allow the boater to launch.

b. If the boater is planning on leaving the current site to launch elsewhere, **seal the boat** before departure.

2. The watercraft receives a watercraft decontamination at a roadside location or at a boat launch after retrieving from the water.

How to attach a VICS

1. Record the seal ID number into your WISPA survey, where prompted.

2. Using steel wire and wire clippers, cut an appropriate length of wire that will be able to pass through one closed loop on the watercraft and one closed loop on the trailer. The goal of this wire is to create a closed circuit between the watercraft and trailer. Thus, once connected with the seal, the boat will not be able to leave the trailer without the wire being cut or snapped. The most common place to pass the wire through on the watercraft is the D-loop winch connection point, on the upper portion of the keel, at the bow of the boat. The wire can then pass through whichever closed loop on the trailer is nearest. This is most commonly on the winch post.

3. Once the wire has been passed through both the watercraft and trailer, connect the two loose ends with the seal. Take one end of the wire and pass through one of the holes in the body of the seal. The orientation and direction of the wire and seal does not matter. Take the other loose wire end and pass through the second hole, next to the first hole.

4. With both ends of the wire passed through the seal, pinch the silver protruding piece of metal into the body of the seal. This locks the two wires in place. Once locked, the clip cannot be released. This is a one-time use seal. If you need to restart, due to an improper connection or placement, you will need to cut off the current seal and start with a new seal and wire.

What do you do if a VICS shows up at your site?

1. Record the VICS ID number in the WISPA survey if/where prompted.

2. Give the watercraft a quick overview to determine that the seal has not been tampered with and that the watercraft is clean, drain, and dry. Do not hold up the boater for too long. These seals are designed to speed up the boater's inspection the next time they launch.

Adirondack Watershed Inspection Training Resources

adkwatershed.org/watercraft-inspection-training-resources

Appendix G: Solutions for Thwarting AIS Spread

Hot water decontamination is the gold-standard for preventing the spread of AIS, but it is not the best way to thwart AIS spread in every instance. When air drying is not possible and boaters have limited access to hot water decontamination stations, solutions provide boaters with the ability to decontaminate their boats efficiently and effectively. Solutions penetrate hard to reach or overlooked areas and in concert with air drying and decontamination can further help to prevent the spread of AIS. Many kayaks and canoes have floatation in the front and back that can become saturated with water and potentially house microscopic AIS. These areas may remain wet if the kayak is air dried or may not be fully decontaminated at a decontamination station. Solutions also allow boaters an easy and effective way to decontaminate life jackets, water shoes, fishing tackle, and other water equipment. Listed below are some of the most effective solutions and how to properly use them.

Potassium Chloride

Potassium Chloride (KCl), a common water softener, is an effective disinfectant for aquatic invasive species that survive in damp areas such as dreissenid mussels, hydrilla, and spiny water fleas. KCl is a less corrosive than sodium chloride (rock salt; NaCl) and is particularly useful for flushing out the water intakes of motors as well as other corrosion prone areas. A saturated solution of dissolved KCl in water is needed to make a proper disinfectant. To make a saturated solution you need to add KCl crystals until they no longer dissolve. Once the solution is made, you can take a rag and wipe down boats and equipment as well as allow damp materials to soak in the solution (for at least one minute). You can also drop KCl crystals into areas with standing water such as ballast tanks or water in the bilge. KCl can be purchased at most hardware stores and can be kept for long periods of time. It has no noticeable smell and is safe to use on boats and most equipment. KCl can cause corrosion to metals if left to soak for more than 2 days, but dipping and rinsing off with NON-lake water afterwards and allowing to air dry is perfectly safe.

Bags of Potassium Chloride can be found at most hardware stores. Potassium Chloride is sold in bags (depicted above) and in buckets.

Vinegar

Vinegar has acetic acid in it which has been shown to kill plants and animals in small concentrations. Davis et. al. found that a 5% solution of vinegar mixed with water in concentrations of 25% or more was enough for 100% mortality in zebra mussels after 4 hours. White vinegar or even apple cider vinegar mix in a 1:1 ration will create a solution for decontaminating your boat and other supplies. Apple cider vinegar is especially useful since the potassium in it acts as a sedative for mussels and spiny water fleas. When spraying down your boat or soaking your equipment, be sure to let the solution sit for at least 15 minutes before rinsing. Vinegar is effective but slow acting, and it does leave a noticeable smell for a short period of time.

Apple cider vinegar (better) and white vinegar (effective). Both can be used for AIS Decontamination.

Bleach

Bleach is an effective cleaning method but is also caustic and can cause corrosion to many materials. A 2% solution (3oz/1 gallon) can be used to soak equipment in for at least one minute. If whirling disease is suspected, it is recommended to use 10% solution (13oz/1 gallon) for disinfection. Ten minutes of soaking is recommended for equipment exposed to waters with dreissenid mussels. Be careful about which materials you expose to this solution as it is corrosive to aluminum as well as sensitive fishing equipment and other materials. Bleach is effective for most species (not waterfleas) but can cause damage to clothes and equipment, and it leaves a noticeable smell.

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