Official Colorado Watercraft Inspection and Decontamination (WID) Procedures

Certification Curriculum for Authorized Agents

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State of Colorado – Parks and Wildlife

Watercraft Inspection and Decontamination Certification

WID Training Agenda – Day 1 of 2

9:00 am	Welcome!
9:00-9:30 am	Entrance Boat Inspection Demonstration and Discussion
9:30-10:00 am	Introduction: State ANS Program Overview
10:00-10:30 am	Zebra and Quagga Mussel Biology
10:30-11:00 am	OUTSIDE – How Many Mussels Can You Find?
11:00-11:30 pm	Other ANS Biology
11:30 – 12:30 pm	Watercraft 101 (including outdoor session on boat anatomy)
12:30-1:30 pm	LUNCH BREAK (on your own)
1:30-3:30 pm	Inspection Protocol
	DEMO – WID Mobile and Seal Application (half way through lecture)
3:30 – 4:30 pm	OUTSIDE – Inspection Practice (groups of three – inspector, boater, observer)
4:30-5:00 pm	Summarize Day 1.
5:00 pm	Adjourn

STUDENT HOMEWORK – MEMORIZE ENTRANCE INSPECTION PROTOCOL AND ANSWER QUESTIONS AT THE END OF EACH CHAPTER.

Breaks will be given approximately every 90 minutes, sometimes longer.
We will break for lunch in the noon hour. Lunch is on your own.

State of Colorado - Parks and Wildlife

Watercraft Inspection and Decontamination Certification

WID Training Agenda – Day 2 of 2

9:00-9:30 am	Day 1 Chapter Review Questions
9:30-10:00am	Exit Inspection Demonstration
10:00-11:00 am	Outside: Exit Inspection Practice (Groups of 3 – Boater, Inspector, Observer)
11:00-11:30 am	Decontamination Overview
11:30 -12:00 pm	OUTSIDE – Decontamination Unit Standard Operating Procedures, Winterization and Attachments
12:00 -1:00 pm	LUNCH (on your own)
1:00 - 3:00 pm	Decontamination (two concurrent groups unless class size is 10 or less)

1. Indoor - Decontamination Manual
    - Standing Water Decontamination
        - Interior Compartments
        - Engine Flush – Outboard, I/O, Inboards
        - Ballast Tank Flush
    - Plant Decontamination
    - Bait Treatment: Live Aquatic Bait and Crayfish Regulations
    - Full Decontamination
2. Outdoor - Decontamination Demonstration and Practice
    - Standing Water Decontamination
        - Interior Compartments
        - Engine Flush – Outboard, I/O, Inboards
    - Hull and Trailer Decontamination

3:00 - 3:30 pm	Questions and Answers
3:30 – 4:00 pm	Final Exam - Inspector and Decontamination Certification
4:00 – 5:00 pm	Grade Exams & Review Answers
5:00 pm	Adjourn

Outdoor Demonstration – Entrance Inspection

What Did You Observe?

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

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12. _____

13. _____

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16. _____

17. _____

18. _____

Chapter 1 – Introduction – Table of Contents

Chapter 1 – Introduction & State ANS Program Summary

What are Aquatic Nuisance Species (ANS) or Aquatic Invasive Species (AIS)?

Aquatic nuisance species (ANS) or aquatic invasive species (AIS) can also be called non-native species, exotic species, non-indigenous species, noxious weeds or pests. ANS can be plants or animals. Invasive aquatic plants are introduced plants that live either partially or completely submerged in the water and out-compete native species for light, space and nutrients creating a dense monoculture of the noxious weed. Invasive aquatic animals also out-compete native species and require a watery habitat, but do not necessarily have to live entirely in water.

ANS plants and animals not only threaten native species but also interfere with recreational activities and municipal, industrial, commercial and agricultural water supply, storage and distribution. In their native environments, ANS populations are typically held in check and controlled by predators, parasites, pathogens, or competitors. However, when they are transported to a new environment, these natural checks are usually left behind. This gives invasive plants and animals an advantage over native species and makes them very difficult, if not impossible, to control. Long-term management of invasive species is costing the U.S. over $200 billion dollars a year (Pimental et al 1996).

How are ANS defined?

"'Aquatic Nuisance Species' means exotic or non-native aquatic wildlife or any plant species that have been determined by the Parks and Wildlife Commission to pose a significant threat to the aquatic resources or water infrastructure of the state."

[Colorado Senate Bill 08-226 signed by Governor Bill Ritter Jr. in May 2008 ("ANS Act")].

"A species that is: 1.) non-native (or alien) to the ecosystem under consideration and 2.) whose introduction causes or is likely to cause economic or environmental harm or harm to human health."

[Executive Order 13112 signed by President William Clinton on February 3, 1999 ("Invasive Species Act")]

What is the purpose of this Aquatic Nuisance Species (ANS) Watercraft Inspection Handbook?

As referenced in the ANS Regulation #800M, this document details the standard "WID [Watercraft Inspection and Decontamination] Procedures" that Colorado Authorized Locations [a.k.a. Inspection and Decontamination Stations] and Authorized Agents [a.k.a. Inspectors] must adhere to.

The WID Procedures described in the following pages and taught in the CPW Training and Certification Course has been proven to reduce the risk of mussels and other ANS being introduced into our precious waters, through implementation of a risk-based prevention and containment program that has resulted in the interception of **195** infested zebra or quagga mussel (ZQM) boats from 2009-2018.

What ANS are Colorado concerned about?

While this handbook puts special emphasis preventing introductions of two species that have the most significant economic, cultural and natural resource impacts - zebra and quagga mussels or ZQM - the procedures apply to all aquatic nuisance species, both plant and animal. The following table lists the ANS plants and animals prohibited in the ANS Regulation #800A:

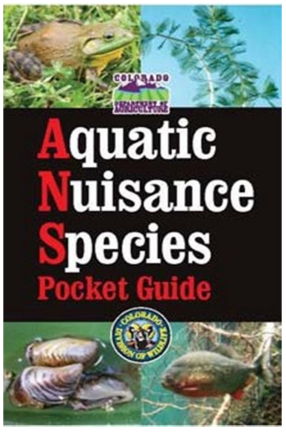
Animals:

Common Name	Scientific Name
Crayfish, rusty	*Orconectes rusticus*
Mussel, quagga	*Dreissena bugensis*
Mussel, zebra	*Dreissena polymorpha*
New Zealand mudsnail	*Potamopyrgus antipodarum*
Waterflea, fishhook	*Cercopagis pengoi*
Waterflea, spiny	*Bythotrephes longimanus (also known as Bythotrephes cederstroemi)*

Plants:

Common Name	Scientific Name
African elodea	*Lagarosiphon major*
Brazilian egeria	*Egeria densa*
Eurasian watermilfoil	*Myriophyllum spicatum*
Giant Salvinia	*Salvinia molesta*
Hyacinth, water	*Eichornia crassipes*
Hydrilla	*Hydrilla verticillata*
Parrotfeather	*Myriophyllum aquaticum*
Yellow floating heart	*Nymphoides peltata*

A comprehensive list and description of ANS that could negatively impact native species, recreation, or water resources in our state is provided in the *Colorado ANS Pocket Guide* [CDOW and Colorado Department of Agriculture, 2010]. Additional information about zebra and quagga mussels, New Zealand mudsnails and other native and non-native mollusks can be found in the Colorado Mollusk Pocket Guide [CDOW, 2011]. Chapter 8 titled "Other ANS" describes the highest priority species of these invaders. It is imperative that inspectors and decontaminations also strive to prevent or contain introductions of all invasives by ensuring watercraft are clean, drained and dry – no mud, no plants, no water, no mussels– before launching and after retrieval in Colorado waters.



State A.N.S. Program Information

The CPW Invasive Species Program provides coordination and support for the management of all invasive species on CPW properties – terrestrial and aquatic plants and animals. However, the focus of the Invasive Species Program is on the statewide coordination of a partnership based ANS prevention and containment program.

Our Mission

To protect wildlife, natural resources, recreation, infrastructure, agriculture and the economy by (1) preventing the introduction of zebra and quagga mussels, and other invasive species, (2) by containing current infestations and (3) stopping the spread of invaders into new waters.

Background

The first detection of zebra mussels in Colorado was a single veliger found at Pueblo Reservoir State Park in November 2007 and identified in January 2008. The detection was a result of a multi-year statewide sampling effort coordinated by CDOW, in partnership with State Parks and U.S. Fish & Wildlife Service. Later that same year, zebra and/or quagga mussel veligers were identified in Pueblo and six additional reservoirs. ZQM are highly invasive aquatic species that negatively impact plankton communities, fisheries, water based recreation, and water supply and distribution systems for municipal, industrial and agricultural supply. There have been no new mussel detections since 2008 and all previously positive waters have been delisted.

Legal Authority

The State Legislature responded quickly to the new invader and passed the State Aquatic Nuisance Species (ANS) Act on May 29, 2008 (senate bill 08-226). The Act makes it illegal to possess, import, export, ship, transport, release, plant, place, or cause an ANS to be released. The Act created an ANS Fund in both the former CDOW and Parks for implementation.

> The ANS Act provides authority to **Qualified Peace Officers** to inspect, and if necessary, decontaminate or quarantine watercraft for ANS. It provides authority for CPW to certify individuals as "**Authorized Agents**" (a.k.a. inspectors and decontaminators) to work at "**Authorized Locations**" (a.k.a. watercraft inspection and decontamination stations or WIDS) for the purposes of inspecting and possibly decontaminating watercraft to prevent new introductions and contain existing detections of ANS.

The Parks Board (now Parks and Wildlife Commission) passed regulations required by the Act on February 20, 2009. The rules require mandatory watercraft inspection and decontamination, if necessary, of:

- watercraft coming in from out of state
- watercraft leaving a detected (positive) water in Colorado
- watercraft entering a water body that has been designated by CPW as an Authorized Location where inspections and decontaminations are required

The ANS Regulations set the standard for certification, watercraft inspection, decontamination, impoundment, sampling, monitoring, identification and reporting.

Following the passage of the ANS Regulations, CDOW published the State ZQM Management Plan. Implementation began in March 2009 and is ongoing today. The ZQM Plan outlines the statewide approach to zebra and quagga mussel management and mirrors the regulations. Implementation of the plan is partnership based and dependent on many entities to ensure a standardized and seamless approach across jurisdictions.

The ANS regulations were updated in 2017, which included requirements for the watercraft operator to:

- Clean, Drain, Dry their vessel, trailer and equipment in between each launch
- Remove water drain plugs upon exiting the water body
- Remove aquatic plants upon exiting the water body
- Prohibition of overland transport of a watercraft with water drain plugs in or aquatic plants attached.

In 2018, the regulations were updated again based on a citizen's petition. The update exempted a new type of watercraft, the foldable plastic boat, from the definition of vessel or floating device and clarified that all exempt vessel must be hand-launched and hand-powered in order to be exempt from mandatory inspections.

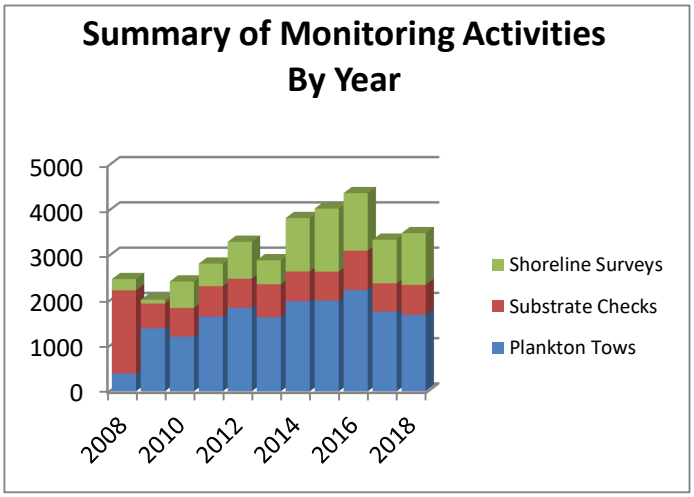
In 2018, the Colorado General Assembly passed the Mussel Free Colorado Act (House Bill 18-1008) which created the ANS Stamp (a fee for motorized watercraft and sailboats using Colorado waters – residents and non-residents), increased fines for select ANS violations, and created a reimbursement process for CPW to get restitution for full decontaminations of quarantined or impounded watercraft.

NOTE: The full text of the ANS Act and Regulations can be found at www.cpw.state.co.us. Please read the documents carefully and familiarize yourself with the language used.

Sampling/Monitoring

Sampling frequency was originally based on a risk assessment completed in June 2008, which identified 19 *very high* risk waters, 17 *high* risk waters, 58 *medium* risk waters, and 64 *low* risk waters for zebra/quagga mussel introduction. The risk assessment was updated by Invasive Species Program Staff in 2014 based on risk of introduction by recreational watercraft (only for reservoirs with existing WID stations) and an in depth habitat analysis conducted by the Colorado Department of Health and the Environment titled, *Suitability of Colorado Lakes as Habitat for Invasive Mussels.* Sampling frequency now includes 8 very high risk, 8 high risk, 9 medium risk, 4 low risk and 15 very low risk waters. The 114 waters not analyzed in 2016 remain at their original risk ranking from 2008.

CPW has sampled 584 "at-risk" waters for aquatic invasive species over the last ten years. It was through this sampling program that invasive mussel veligers were first detected in Colorado. While CPW ANS staff monitors the state's public waters for numerous invasive plants and animal species, the focus of sampling is on early detection of zebra and quagga mussels. As such, the state follows a three-tier sampling protocol targeting the three life cycles of the zebra or quagga mussel: (1) conducting plankton tows to find the veligers, (2) deploy and check substrates to find the juvenile "settlers" or attached adult mussels and (3) conduct surveys along the shoreline and existing structures for settled juveniles or attached adult mussels. The state requires three steps to identify, verify and confirm identification of zebra or quagga mussel veligers (1) visual analysis of plankton tows using a cross-polarized light microscope (2) DNA verification utilizing polymerase chain reaction [PCR] and (3) DNA confirmation utilizing gene sequencing to confirm genus and species.



In 2018, crews sampled 167 standing and approximately 11 flowing waters statewide. In addition to the sampling efforts performed by CPW, the National Park Service contributed 38 plankton samples. A summary of the sampling efforts can be seen in the graph to the right.

Water Body Listing and De-Listing

There are no positive waters for zebra or quagga mussels in the state. **In August 2017, Green Mountain Reservoir was listed as suspect for quagga mussels due to a veliger detection by the USBOR**. There has never been an adult zebra or quagga mussel found in Colorado.

Positive identification of ANS must adhere to the following state protocol. Waters in which the presence of ANS has been identified are broadly called "detected water".

- ZQM Veligers – the following tests must all be positive on the same sample.
    i. Microscopy (visual ID of an animal)
    ii. PCR (genetic or molecular identification of the species)
    iii. Gene Sequencing (genetic or molecular confirmation of the species identification)
- ZQM Settlers – Taxonomic identification by two independent experts. DNA analysis may or may not be required.
- ZQM Adults – Taxonomic identification by two independent experts. DNA analysis may or may not be required.
- Other ANS - Mollusks, Plants or Crustaceans – Taxonomic identification by two independent experts. DNA analysis may or may not be required.

There have never been any adult zebra or quagga mussels (ZQM) detected in Colorado's waters. To date, only veligers have been detected.

In 2014, Colorado adopted the Western Regional Panel's *Building Consensus* classifications to identify water bodies based on early detection sampling. The definitions for detected waters can be found below.

- **Negative** - sampling/testing is ongoing and nothing has been detected, or nothing has been detected within the time frames for de-listing.
    - Most waters in Colorado!
- **Inconclusive** (temporary status) - Water body has not met the minimum criteria for detection (e.g. a single eDNA hit).
- **Suspect** – Water body that has met the minimum criteria for detection.
    - Green Mountain Reservoir
- **Positive** – Multiple (2 or more) subsequent sampling events that meet the minimum criteria for detection.
- **Infested** – A water body that has an established (recruiting or reproducing) population of an ANS.

The regional *Building Consensus* standards also set timelines for de-listing detected waters, as detailed below. In adopting the regional standard Colorado has de-listed Granby, Grand Lake, Shadow Mountain, Willow Creek, Tarryall, Jumbo and Blue Mesa in 2014 and Pueblo Reservoir in 2017. Therefore, there are NO positive waters for zebra or quagga mussels in Colorado. The timeline for de-listing is below:

- **Inconclusive** – 1 year of negative testing including at least one sample taken in the same month of subsequent year as the positive sample (accounting for seasonal environment variability) to get to undetected/negative.
- **Suspect** – 3 years of negative testing to get to undetected/negative.
- **Positive** – 5 years of negative testing to get to undetected/negative.
- **Infested** – Following a successful eradication or extirpation event including a minimum of 5 years' post-event testing/monitoring with negative results.

History of Zebra and Quagga Mussels in Colorado

The ANS Program has been successful in stopping the continued inoculation of zebra and quagga mussels, and other ANS, into Colorado's waters by watercraft. There has never been an adult zebra or quagga mussel found in a Colorado water body. However, the larval stage of the mussels, known as veligers, have been detected in several waters in the past.

In August 2017, quagga mussel veligers were identified at Green Mountain Reservoir by the Reclamation through microscopic analysis of water samples and subsequently positively identified using DNA testing. CPW confirmed the federal results through genetic testing at an independent laboratory. It is unknown if the veligers were dead or alive at the time of detection. Upon confirmation, CPW increased monitoring at the reservoir, deployed a scuba dive team and worked

with the Marina to implement WID containment procedures. The site team was gathered to further determine actions necessary for containment, which included securing the shoreline, notifying homeowners, and improving site infrastructure.

In 2013, Colorado adopted the Western Regional Panel (WRP) standards for listing and de-listing water bodies for zebra and quagga mussels, as documented in the *WRP's Building Consensus in the West Committee.* Per this standard, **Green Mountain Reservoir is currently listed as a SUSPECT reservoir for quagga mussels.** A suspect reservoir requires three years of negative testing to be de-listed to negative.

If another veliger or an adult be detected and confirmed through both microscopy and genetic analysis by two independent laboratories, the Reservoir status will be upgraded to positive. A positive reservoir requires five years of negative testing to be de-listed to negative.

If a reproducing adult population is found, the Reservoir will be listed as infested. It is unlikely that an infested reservoir would ever be de-listed, but standards allow for this with five years of negative testing following a successful eradication event. There are currently no known treatments for eradication in an open water system making de-listing rather impossible for infested waters.

Previous Detections of Zebra and Quagga Mussels in Colorado:

- Pueblo Reservoir State Park tested positive for zebra or quagga mussel larvae (veligers) in 2007, 2008, 2009 and 2011.
- Grand Lake, Granby, Shadow Mountain, Willow Creek, Tarryall and Jumbo Reservoirs all tested positive for one zebra or quagga mussel veliger in 2008.
- Blue Mesa Reservoir tested positive for quagga mussel eDNA in 2009, 2011 and 2012 by Reclamation.

De-Listing Positive Waters:

- Lake Pueblo was de-listed for quagga mussels in January 2017 following five years of negative results.
- Lake Pueblo was de-listed for zebra mussels in January 2014, along with the de-listing of Granby, Grand Lake, Shadow Mountain, Willow Creek, Tarryall, Jumbo and Blue Mesa.

Status of Other Aquatic Nuisance Species in Colorado *(see other ANS module for details)*

- **New Zealand Mudsnails (NZMS**) – First detected in Colorado in 2004. Angler education campaign is in place to minimize spread. Snails continue to be found in new locations annually. NZMS were found in Chatfield Reservoir in 2015, the Gunnison River in 2016, Fourmile Canyon Creek, Monument Lake and the Uncompahgre River in 2017, and Monument Reservoir and Trinidad Lake in 2018.
- **Rusty Crayfish** – Four known locations are being controlled through removal efforts. Regulation prohibits the live transport from known locations. Education and information is ongoing. Must kill regulations are in place for the West Slope and Sanchez SWA.
- **Eurasian watermilfoil (EWM)** – Known to many Front Range locations and the Rio

Grande. The Colorado Dept. of Agriculture requires management per the State Weed Act. EWM is controlled with herbicides at a few Parks and other locations.

Watercraft Inspection and Decontamination

CPW coordinates the vast network of WID stations that are operated by CPW, the National Park Service, Larimer County, various municipalities and private industry locations including businesses, concessioners, marinas, clubs and private lakes. In total, the state has collectively performed over **4.4 million inspections** and **96,867 decontaminations** since 2008.

Per the State ANS Regulations, trailered watercraft must submit to an inspection, and decontamination if needed, prior to entrance in Colorado's waters following boating out of state or boating on a positive or suspect water. Boaters are also required to submit to an inspection prior to entering a water body where inspections are required by the managing agency. All persons performing inspections and/or decontaminations in Colorado must be certified by CPW. All watercraft inspection and decontamination staff in Colorado attends the same training and adheres to the same WID procedures (this document). Development of effective standardized protocols is a priority.

To ensure the protection of the state's waters and the validity of the state certification program, CPW has strict field protocols and training regiments since the program's inception. All watercraft inspection and decontamination staff in Colorado attends the same training and adheres to the same protocols. Development and implementation of effective standardized protocols is a priority. In 2014, the Western Regional Panel on ANS and the 100th Meridian Initiative adopted the Colorado training program as the regional standard for certification of boat inspectors and decontaminators. The Colorado training program is being taught nationally!

CPW Protocol Document Title	Date Published
Western Regional Student Training Curriculum for Watercraft Inspectors and Decontaminators to Prevent and Contain the Spread of Aquatic Invasive Species in the U.S.A	January 2015 (final) February 2016 (last update)
Colorado WID Trainers Manual	January 2014 (final) January 2019 (last update)
Colorado Watercraft Inspection and Decontamination Curriculum	May 2013 (final) January 2019 (last update)
QZAP Containment Manual for Positive Waters with ZQM	September 2013
Initial Merge of CDOW and State Parks Watercraft Inspection and Decontamination Protocols (training slideshows and handouts)	February 2012
Colorado Boat Compendium for Aquatic Nuisance Species Inspectors	January 2012
Colorado Watercraft Containment Manual for Waters Positive with ZQM/ANS	September 2011
Colorado Watercraft Decontamination Manual	June 2011
Colorado Watercraft Inspection and Decontamination Containment Protocol	June 2010
Colorado Watercraft Inspection and Education Handbook	February 2009

Types of Watercraft Inspection and Decontamination Stations

- ***Negative Prevention Waters*** – Waters that have never had a verified detection of any ANS or have not had a detection within the time frame for de-listing.
- ***Other ANS Containment Water*** – Waters that are positive for an Other ANS. They have a verified presence of an ANS listed in Chapter 8 regulations other than zebra or quagga mussels. Most ANS Positive waters are also prevention waters for mussels and other ANS.
- ***ZQM Containment Water*** – Waters that have had a verified zebra or quagga mussel detection.
- ***Off Water WIDS –*** Authorized locations that are not located at a water body.

Watercraft Inspection and Decontamination Training and Certifications

CPW and their partners taught 57 watercraft inspection and decontamination certification courses in 2018 including an online re-certification program for experienced inspectors and decontaminators, for a total of 854 trainings since the program's inception. In addition to the online course for experienced staff, the Invasive Species Program within CPW also maintained two other new specialized courses for trainers and advanced decontamination. CPW certified 755 individuals this year, for a total of 6,854 certifications since the training program began in 2009. Both the training and the inspections focus on educating the boaters.

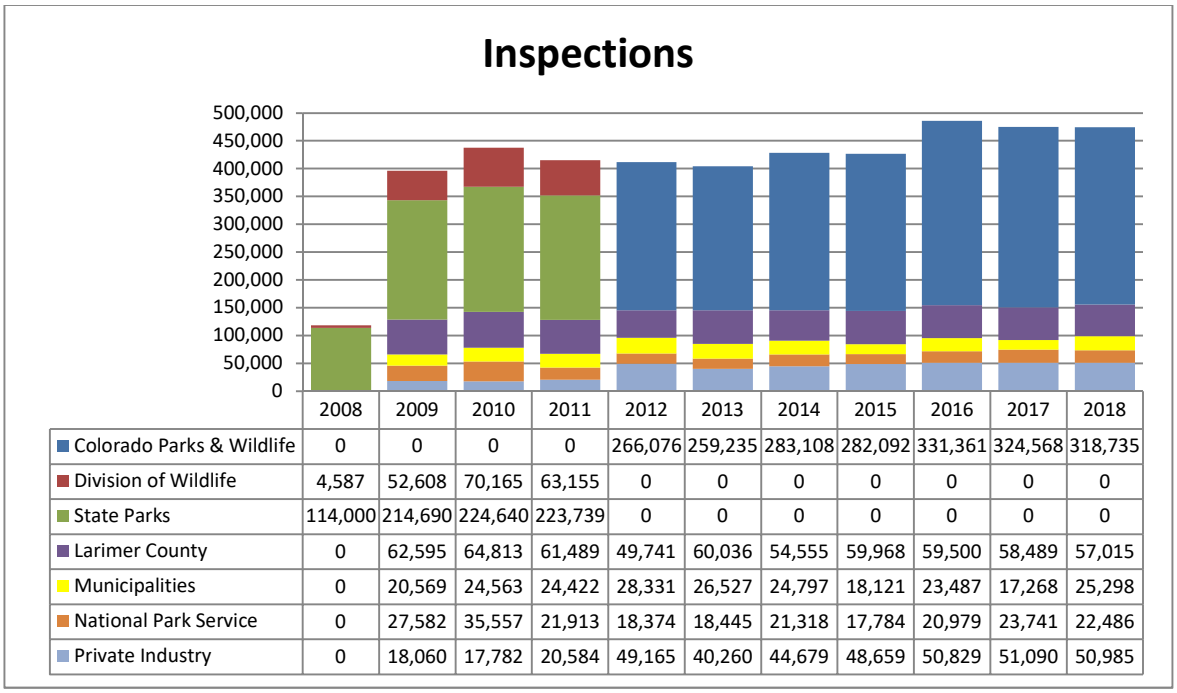
In 2018, CPW authorized 72 locations to perform watercraft inspection and decontamination. Of those, Green Mountain Reservoir was operated as a containment operation for quagga mussels after their detection in August and 10 locations operated as other ANS containment. The focus of the containment program is to inspect watercraft leaving the lakes/reservoirs to prevent boats from moving ANS overland into currently uninfested areas.

Sixty-two locations operated as prevention locations. Prevention locations are those that are negative for all ANS or are not located at a waterbody (e.g. offices or marine dealers). Authorized Locations for WID are operated by a variety of entities, including CPW, the National Park Service, Larimer County, municipalities, marinas, private concessioners, private clubs and marine dealers.

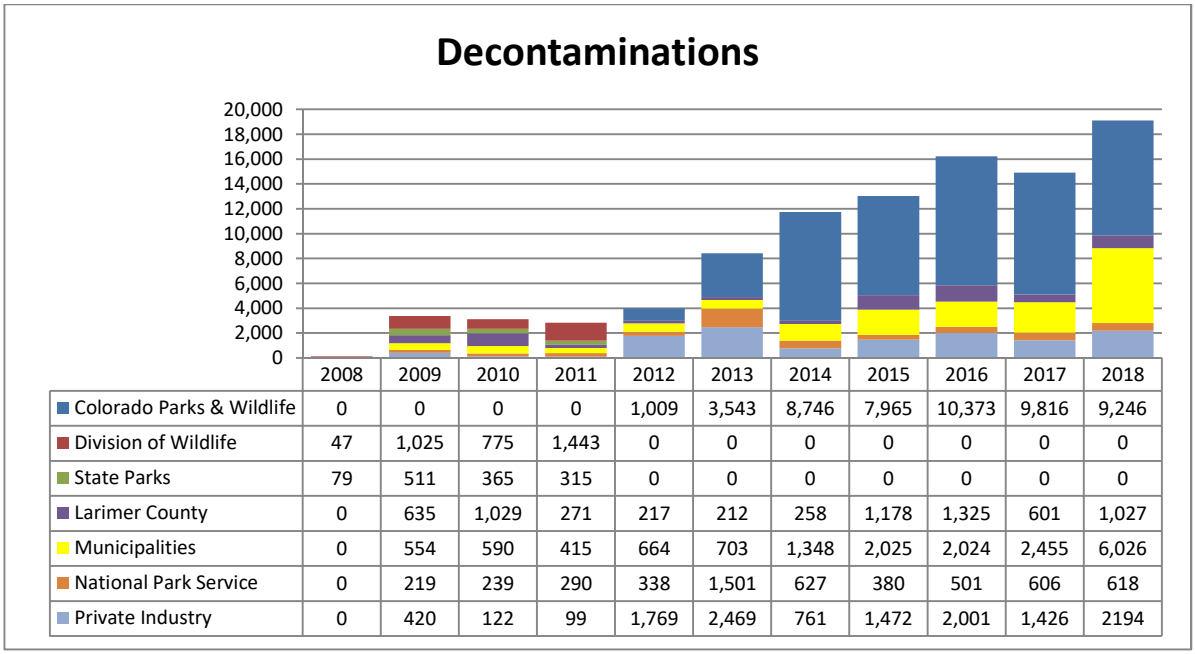
Number of Authorized Locations by Entity											
Entity Type	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Colorado Parks & Wildlife					38	37	37	32	32	30	29
State Parks	24	28	28	28							
Division of Wildlife	5	160	19	19							
Larimer County	0	2	2	2	2	2	2	2	2	3	2
Municipalities	3	7	11	9	8	8	8	8	8	7	8
National Park Service	0	1	1	1	1	1	1	1	1	1	1
Private Industry	3	11	51	30	21	23	24	23	23	31	32
Total:	**35**	**209**	**112**	**89**	**73**	**74**	**75**	**71**	**71**	**72**	**72**

Number of Inspections and Decontaminations Performed in Colorado

A total of 474,519 inspections and 19,111 decontaminations were performed in Colorado in 2018. There continues to be a large increase in the number of decontaminations performed as a direct result of CPW adapting to mitigate new threats. Research publications indicate zebra or quagga mussel veligers can survive up to 27 days in standing water on watercraft which increased the need to decontaminate parts of watercraft which can't be drained (e.g. ballast tanks). Another factor increasing Colorado's need for decontamination is the increase in mussel infested waters in other states, including Lake Powell and several northern Texas State Parks, and Kansas reservoirs. In the last year, South Dakota, Nebraska, Arizona and other states had new waters infested with zebra or quagga mussels because of the lack of prevention WID programs. Lastly, waters in close proximity to, or positive for, NZMS & EWM infestations perform more decontaminations to limit their spread in state. CPW and their partners revised mandatory standing water decontamination triggers in 2012 to reduce the threat of invasion from viable zebra or quagga mussel veligers living in standing water, to protect against watercraft coming from other state's infested waters and to reduce the spread of other invasive species.



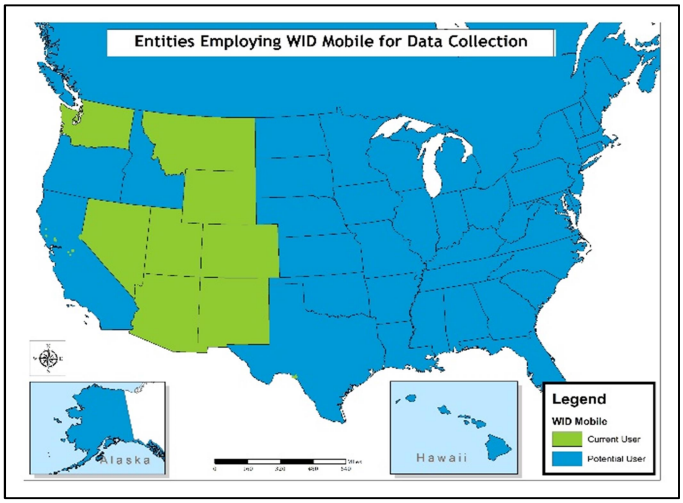
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Colorado Parks & Wildlife	0	0	0	0	266,076	259,235	283,108	282,092	331,361	324,568	318,735
Division of Wildlife	4,587	52,608	70,165	63,155	0	0	0	0	0	0	0
State Parks	114,000	214,690	224,640	223,739	0	0	0	0	0	0	0
Larimer County	0	62,595	64,813	61,489	49,741	60,036	54,555	59,968	59,500	58,489	57,015
Municipalities	0	20,569	24,563	24,422	28,331	26,527	24,797	18,121	23,487	17,268	25,298
National Park Service	0	27,582	35,557	21,913	18,374	18,445	21,318	17,784	20,979	23,741	22,486
Private Industry	0	18,060	17,782	20,584	49,165	40,260	44,679	48,659	50,829	51,090	50,985



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Colorado Parks & Wildlife	0	0	0	0	1,009	3,543	8,746	7,965	10,373	9,816	9,246
Division of Wildlife	47	1,025	775	1,443	0	0	0	0	0	0	0
State Parks	79	511	365	315	0	0	0	0	0	0	0
Larimer County	0	635	1,029	271	217	212	258	1,178	1,325	601	1,027
Municipalities	0	554	590	415	664	703	1,348	2,025	2,024	2,455	6,026
National Park Service	0	219	239	290	338	1,501	627	380	501	606	618
Private Industry	0	420	122	99	1,769	2,469	761	1,472	2,001	1,426	2194

W.I.D. Mobile – A Regional Data Sharing Solution

Colorado successfully continued utilizing the ANS Mobile data collection system at 50 authorized locations within the state of Colorado. This application is compatible on all iOS and Android devices which greatly reduces the effective cost of operating mobile data collection on boat ramps across the state, and reduces costs for data entry. It also provides for much greater reliability in data collected in the field at inspection stations.

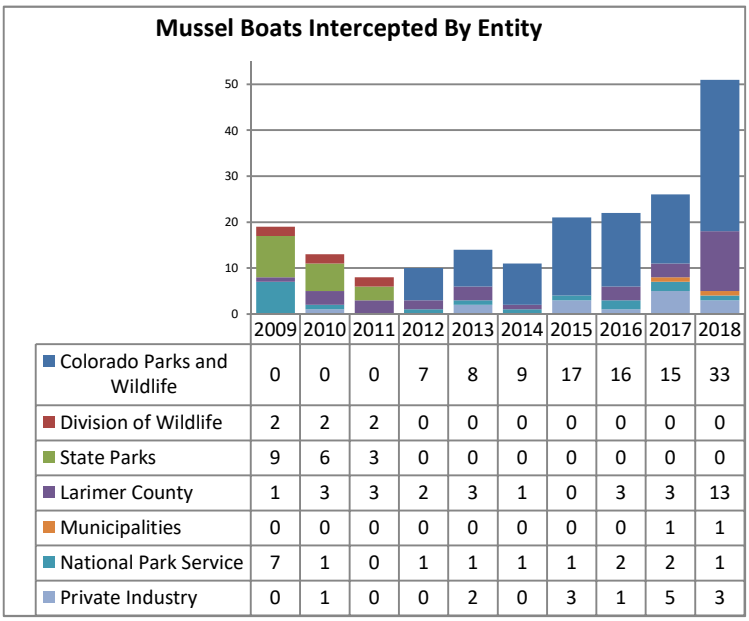


Colorado continues to lead the way in mobile data collection at a regional and national level. New Mexico has been using the Colorado system since 2014 and Utah since 2015. In 2016, the CPW Invasive Species program, with the help of a grant from U.S. Fish & Wildlife Service through the Quagga Zebra Action Plan for Western Waters (WRP, 2010), deployed a western regional version of the mobile data collection system for WID stations. In 2018, Montana, Washington and Wyoming joined Arizona, Nevada, New Mexico, Utah and the Lake Tahoe Regional Planning Agency in employing WID Mobile as their primary form of data collection. With the benefits of regional data sharing proving to be abundant, the states of Arizona, Nevada and Utah have been using the Colorado developed data collection system to send out notices of watercraft leaving their infested waters. This increased timely communication has directly increased the number of infested watercraft being intercepted within the western region. Many more states and agencies, such as NPS waters, are anticipated to join in 2019 and it is expected that all western states and potentially Canadian provinces will be using this system and sharing data by 2020. As user numbers continue to increase, this system will continue to improve communications amongst jurisdictions and assist watercraft inspectors in assessing the risk of watercraft intending to launch at their water body!

Mussel Boat Interceptions

In 2018 the state intercepted more watercraft infested with zebra or quagga mussels than ever before! All watercraft were fully decontaminated prior to being allowed into Colorado's waters. A total of 195 boats with attached adult zebra or quagga mussels have been intercepted coming into Colorado's waters from out of state at watercraft inspection and decontamination stations since 2009.

Infested vessels were intercepted at Barr Lake, Blue Mesa, Boulder Marine, Boulder Reservoir, Boyd Lake, Canon Marine, Carter, Cherry Creek, Chatfield, Clear Creek, Crawford, Denver CPW Office, Dillon, Eleven Mile, Frisco Bay Marina, Granby, Grand Lake, Grand Junction CPW Office, Great Lakes Marine, Highline, Horsetooth, Jackson, Lathrop, McPhee, Navajo, North Sterling, Pueblo, Ridgway, Roadside (SW Colorado), Ruedi, Shadow Mountain, Spinney Mountain, Stagecoach, Steamboat Lake, Strontia Springs, Sweitzer, Taylor Park, Turquoise, Vallecito and Williams Fork.



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Colorado Parks and Wildlife	0	0	0	7	8	9	17	16	15	33
Division of Wildlife	2	2	2	0	0	0	0	0	0	0
State Parks	9	6	3	0	0	0	0	0	0	0
Larimer County	1	3	3	2	3	1	0	3	3	13
Municipalities	0	0	0	0	0	0	0	0	1	1
National Park Service	7	1	0	1	1	1	1	2	2	1
Private Industry	0	1	0	0	2	0	3	1	5	3

The infested vessels were coming from Arizona, California, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Michigan, Minnesota, Mississippi, Missouri, New York, Nevada, Oklahoma, Ohio, Texas, Utah and Wisconsin. The majority of the intercepted vessels were coming from the Great Lakes, the Mississippi River, or Arizona. All boats were fully decontaminated to ensure all mussels were dead, and no mussels were visibly attached to the vessel.

WID Quality Control

The CPW Quality Control and Field Support Team perform quality control evaluations annually at all state certified watercraft inspection and decontamination stations to ensure that standard procedures are being followed, per regulatory requirements. The team also ensured that stations were stocked with educational materials and provided on the job training to inspectors and supervisors.

State Fish Hatchery Program and Aquatic Biologists

To date, no zebra or quagga mussels have been identified in any Colorado hatchery, including the hatchery at Pueblo Reservoir. However, proactive measures have been put in place statewide to protect hatcheries and state waters from an invasive species introduction. Those measures include annual fish health inspections, hazardous analysis and critical control point plans (HACCP), trainings and workshops. Hatcheries are monitored for ANS two times per year.

Statewide preventative measures also include implementation of standardized disinfection

protocols for wild spawn, fish transfers and egg transfers. Through a contract with the Bureau of Reclamation, the CDOW explored methodologies for disinfection for fish being transported from Pueblo Fish Hatchery. In addition, specialized trailer units have been constructed for all wild fish spawning operations to ensure no ANS are transported.

Aquatic biologists should be certified inspectors and decontaminators. All biologists have access to a watercraft decontamination unit to clean boats, gear and equipment in between each use. When hot water decontamination units are not available, they have alternate methods, including freezing, drying and disinfectants, available to decontaminate gear and equipment in between each and every use.

ANS Sampling Staff

All ANS sampling staff members are certified Authorized Agents in both inspection and decontamination. They are required to fully decontaminate their watercraft, trailer and gear in between each and every use. They will seal their boats and issue receipts upon completion of the full decontamination. The ANS Program Office supervises the sampling crews and holds them to strict standards. They are instructed to stop at the inspection stations and provide the inspector their seal receipt. Please work together with them as a team and help to get the crews on the water fast to conduct ANS sampling, versus wasting ANS dollars by having them sitting in long inspection lines or being re-inspected following a full decontamination.

Western Regional State Activities

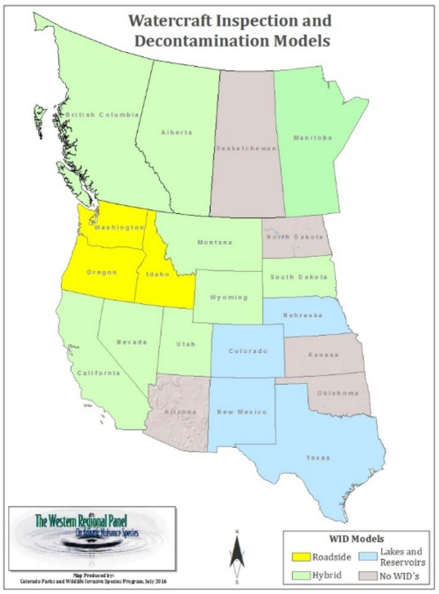
Western state programs are connected and trying to work together to provide more connectivity and coordination between inspection stations. All states in the West now have ANS Programs, and the Western Regional Panel is working through the *Building Consensus* effort to increase understanding and knowledge among western states.

The following have **Mandatory** WIDS:

- California*
- Colorado**
- Idaho
- Montana**
- New Mexico
- Oregon
- Tahoe
- Texas*
- Utah*
- Washington
- Wyoming

The following have **Voluntary** WIDS:

- Arizona*
- Nebraska*
- Nevada*
- South Dakota*



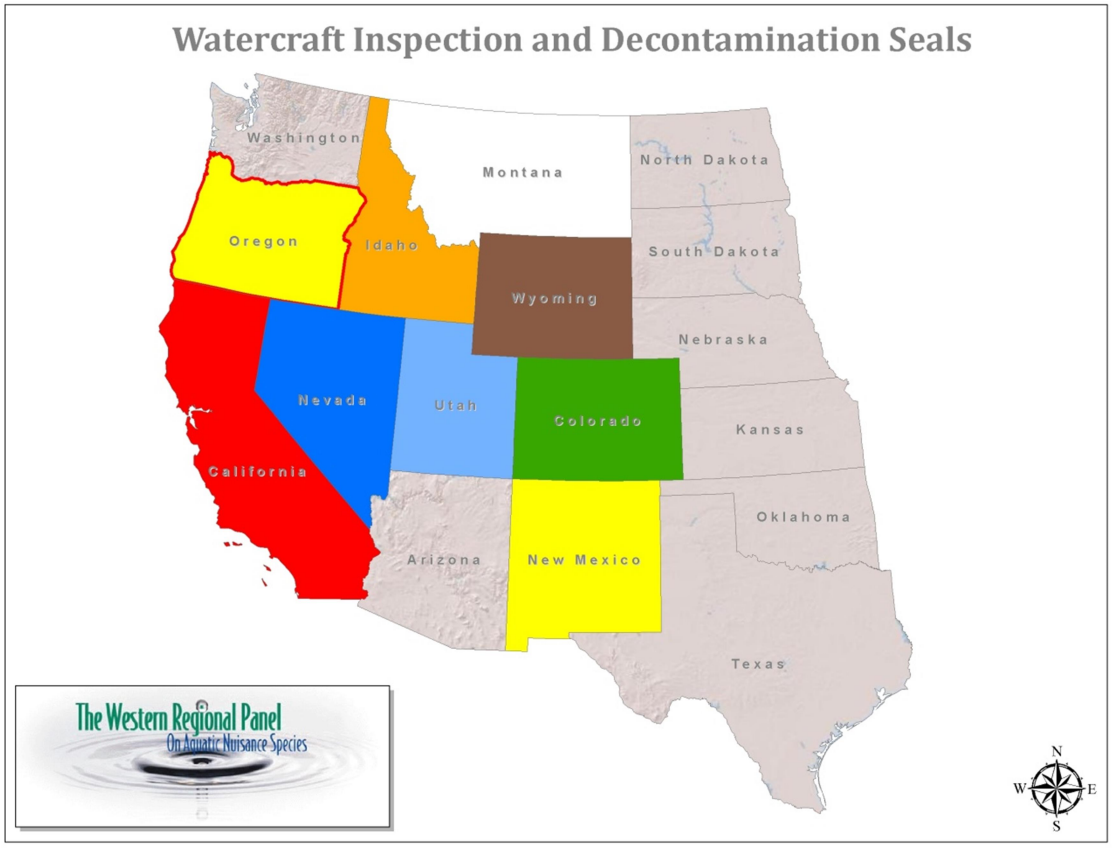
The following have **No** WIDS:

- Alaska
- Hawaii
- Kansas*
- North Dakota*
- Oklahoma*
- States east of the 100th Meridian*

**State with 1 or more infested waters.*
***State with 1 or more positive or suspect waters.*

Current efforts that are ongoing in the region to combat mussels include the following:

- WISCE – Western Invasive Species Coordinating Effort
- QZAP – Quagga Zebra Action Plan for Western Waters
- WEST911 – An email and phone alert system to intercept non-compliant infested boats
- National Education Campaigns – Stop Aquatic Hitchhikers & Habitattitude
- 100th Meridian Initiative



Education and Outreach

Education and Outreach is the **MOST** important thing! There will never be enough money to have Authorized Agents on all boat ramps all the time. Each inspection is a face-to-face opportunity to educate the boater and change their behavior by teaching them to clean, drain, dry every time they boat. Consistency in messaging is key for boaters to learn Clean, Drain, Dry!

The CPW ANS Program trains approximately 700 individuals per year, and it is the inspector's job to train the 86,000+ registered Colorado boaters through repeated face-to-face educational contacts on the boat ramps while doing 450,000+ inspections per year.

There are many educational tools to help you. Spend time learning the text of CPW provided brochures and signage so that all Agents provide consistent information to the public. Provide a 'Boaters Guide to ANS Inspections' brochures immediately upon making contact with the boater. There are also handouts on specific topics, rack cards for anglers and divers, youth materials, and standard signage available. Display mussel props and show them to boaters.

Chapter 1 Review Questions

1. What are Aquatic Nuisance Species (ANS)?

   _____

   _____

   _____

2. What two ANS is Colorado the most concerned about?

   _____

3. The mission of the CPW Invasive Species Program is to protect wildlife, natural resources, recreation, infrastructure, agriculture and the economy by:
   a. Preventing the introduction of ZQM and other invasive species
   b. Containing current infestations/introductions
   c. Stopping the spread of invaders to new waters
   d. All of the above

4. The ANS regulations require mandatory watercraft inspection and decontamination, if necessary, of watercraft that:
   1._____
   2. _____
   3._____
   4._____

5. Fill in the blank next to the following definitions with the letter of the corresponding classification.

   A. Inconclusive **B. Positive** **C. Suspect** **D. Infested** **E. Negative**

   ___Testing is ongoing and no evidence of Dreissena mussels has been discovered.

   ___eDNA detection with no confirmation (one hit wonder).

   ___One verified detection of mussel veliger or adults.

   ___More than one verified detection of mussel veliger or adults.

   ___A reproducing and recruiting population of mussels is established.

6. Why is education the most important aspect of being an inspector?
    a. So that boaters learn to keep their boats and equipment clean, drained, and dry And do it themselves without inspectors every single time.
    b. Because the state cannot put inspectors on all of the reservoirs in Colorado all the time
    c. The best way to change a behavior is through education
    d. All of the above

7. CPW operates all of the WID stations in Colorado (circle one). True or False

8. Which Colorado fish hatcheries have tested positive for mussel veligers?
    a. Leadville National Hatchery
    b. Mt. Shavano Hatchery
    c. Pueblo Hatchery
    d. No hatcheries in Colorado have ever tested positive for mussels.

9. Name the four types of WIDS:
    1. _____
    2. _____
    3. _____
    4. _____

10. How many invasive mussel boats have been intercepted since 2009?

11. Which waterbody in Colorado is positive for quagga mussels in 2019?
    a. Ridgway Reservoir
    b. Tarryall Reservoir
    c. Pueblo Reservoir
    d. Green Mountain Reservoir
    e. Cherry Creek Reservoir
    f. None of the Above

12. Which waterbody in Colorado is suspect for quagga mussels in 2019?
    a. Ridgway Reservoir
    b. Tarryall Reservoir
    c. Pueblo Reservoir
    d. Green Mountain Reservoir
    e. Cherry Creek Reservoir
    f. None of the Above

13. How many waters in Colorado are positive for zebra mussels?

    a. 7
    b. 8
    c. 1
    d. 0
    e. 5

14. Fill in the blanks below regarding state protocols to positively identify mussels
    a. Veligers- the following tests must be on the same sample
        - _____(visual ID of an animal)
        - PCR (genetic or molecular identification of the species)
        - Gene Sequencing (genetic or molecular confirmation of the species)
    b. Settlers- Taxonomic identification by _____independent expert(s)
    c. Adults- Taxonomic identification by _____independent expert(s)

15. It is the inspector's job to educate every boater and customer about how they can help to prevent invasive species?
    a. True
    b. False

16. What are the three reasons that decontaminations are increasing?

    a. _____
    b. _____
    c. _____

Chapter 2 – ZQM & Other ANS Biology – Table of Contents

Chapter 2 - Zebra and Quagga Mussel Biology

It is important to understand mussel ecology to both answer questions from the public or partner agencies, and to be best equipped to find mussels attached to watercraft or equipment.

The ANS program is grounded in the biology of this species.

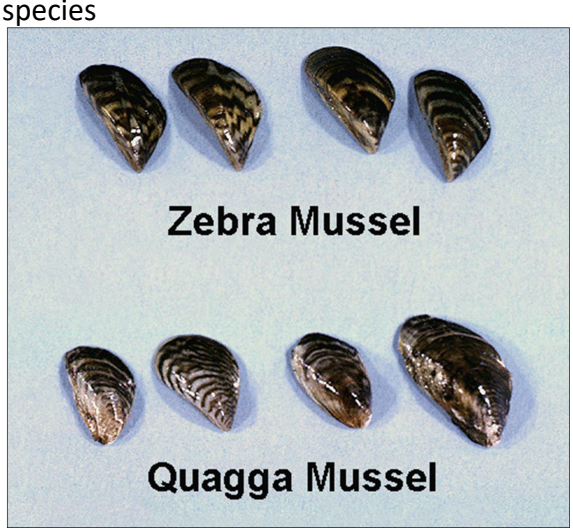
- For example, all watercraft must be CLEAN (to prevent moving adults or settlers), DRAINED and DRY (to prevent moving microscopic veligers in water).
- Another example is early detection methodology for mussels (plankton tows for veligers, substrates for settlers and shoreline surveys for adults).
    - We know that mussels are light sensitive and begin establishment in the depths of the water where we physically survey, and therefore efforts are prioritized to detect veligers within the water column with the goal of detecting the introduction, and not the invasion that happens years later, so that management can work to contain the spread from getting to other waters over land by hitchhiking on, or in watercraft.

Definitions

- *Benthic*- Refers to the bottom of a water body.
- *Byssal threads* – A spider-web like appendage that enables the zebra or quagga mussels to attach to surfaces. Native species do not have byssal threads.
- *Dreissenids* – A term referring to all species in the genus Dreissenid which includes zebra and quagga mussels.
- *Exotic* – An exotic species is a species that is not native to a given environment. Exotic species often invade an ecosystem displacing or destroying the native plants and animals.
- *Macrophytes* – An aquatic plant, large enough to be seen by the naked eye.
- *Maturation* – The action or process of maturing.
- *Metamorphosis* – The process of transformation from an immature form to an adult form in two or more distinct stages.
- *Non-Native/ Non-Indigenous* – A species that has been introduced to a new environment, either intentionally or unintentionally. It is out of its native range.
- *Settler* – The second main life stage of a zebra or quagga mussel. A juvenile mussel that has gathered enough calcium that it has become heavy and settles out of the water column changing from a planktonic veliger to a benthic animal with two shells.
- *Phytoplankton* - Plankton consisting of microscopic plants in water.
- *Veliger* – The first life stage of a zebra or quagga mussel. These animals are planktonic and free-floating in the water column. They are microscopic, unable to be seen without magnification.
- *Water Column* – The concept of the entire water depth of a water body, from its bottom (benthic zone) to the water surface.
- *Zooplankton* – Plankton consisting of microscopic animals in water.

Identification

Quagga mussels (*Dreissena bugensis*) and zebra mussels (*Dreissena polymorpha*) are small freshwater bivalve mollusks, which are animals with two shells. They are relatives of clams and oysters. It is very difficult for a non-expert to tell the two species apart. The shell color of both mussels alternates between a yellowish and darker brown, often forming stripes. Color patterns are highly variable and can be attributed to environmental factors. They range in size from microscopic up to about two inches long.



Several diagnostic features aid in identification. Quagga mussels have a rounded angle, or carina, between the ventral and dorsal surfaces. They also have a convex ventral side that can sometimes be distinguished by placing the shells on a flat surface. The quagga mussel will topple over when stood on its ventral side, whereas a zebra mussel will not topple due to a more triangular shape. Quagga mussels also have a small byssal groove on the ventral side near the hinge. They also have asymmetrical valves when viewed from the front or ventral side.

Unlike native North American freshwater mussels, which burrow in soft sediment, adult zebra and quagga mussels can attach to most hard and semi-soft surfaces via tiny threads called byssal threads. Native species do NOT have byssal threads! These **byssal threads** are one of three main invasive characteristics that give zebra and quagga mussels an advantage over natives, along with **rapid reproduction** and their ability to **filter feed** at amazing rates.

Ecology of Zebra and Quagga Mussels

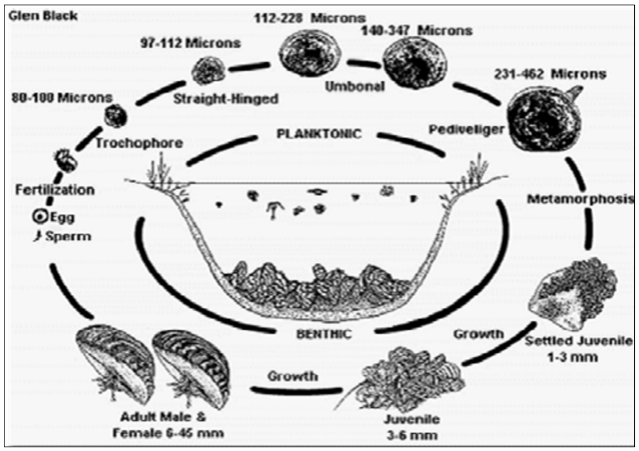
Both zebra and quagga mussels can survive cold waters, but cannot tolerate freezing. They can endure temperatures between 1° - 30°C (33° - 86°F). Zebra mussels need waters above 12°C (54°F) to reproduce, while quagga mussels can reproduce in waters as cold as 9°C (48°F). Adult mussels are light sensitive and prefer to live in water around 200 to 300+ feet deep. They are able to live in a wide range of conditions including oxygen-depleted water.

In locations where quagga and zebra mussels live together, it seems that quagga mussels have begun to out-compete zebra mussels. In lakes where zebra mussels once constituted 98% of mussels, now are represented by 97% quagga mussels. Quagga mussels have the ability to settle in greater depths and in colder temperatures than zebra mussels. Quagga mussels have been found as deep as 540 feet in Lake Michigan!

Life Cycle

It is important that inspectors understand the life cycle of ZQM because the inspection, decontamination and sampling/listing protocols are based in their biology. ZQM have three life cycles; (1) veligers, (2) settler juvenile stage and (3) adult stage.

1. The embryos are microscopic larvae, called **veligers**. They are free-floating plankton in the water column and impossible to see with the naked eye. The veligers float in the water column or are carried in the current for about four to eight weeks.
2. The veligers undergo metamorphosis and develop shells while settling out of the water column onto a solid surface (which could include a grain of sand or the skin or shells of native aquatic species). This juvenile form of the mussel is known as the **settler** stage. At this point in their life cycle, they settle into the deep benthic zone of the water column.



3. Upon maturation, **adult** mussels are sessile, meaning fixed in one place or immobile. They are attached semi-permanently with their byssal threads. Adult mussels typically form dense clusters in which they pile up on top of each other essentially smothering the generation beneath them. Their typical lifespan is four to five years.

Where Do Mussels Like To Hide?

Right Angles. Wet or Moist Places. Rough Surfaces. Below the waterline.

Where Did They Come From?

Zebra mussels are native to the Black, Caspian and Azov Seas of Eastern Europe. They were discovered in the Great Lakes in Lake St. Clair in 1988.

Quagga mussels are native to the Dnieper River Drainage in the Ukraine. They were discovered first in the Great Lakes in the Erie Canal and Lake Ontario in 1989.

How Did They Get Here?

Many aquatic nuisance species, including zebra and quagga mussels, have been introduced into the Great Lakes in the discharged ballast water of ocean-going ships. Another method of dispersal from Europe to the United States is believed to be through transportation of attached mature adults on anchors stored internally in compartments on transoceanic vessels. Once in North American waters, aquatic nuisance species often hitch rides to other bodies of water on the boats, trailers, and equipment that people transport from place to place. Boaters and anglers can inadvertently transport ANS on waders and in bait buckets and live wells.

Zebra and quagga mussels likely made their way to the Western USA on trailered watercraft. The first discovery west of the 100th Meridian was in Lake Mead in 2007. The invasive quagga mussels found in Lake Mead in 2007 were 1,000 miles farther west than any other known colony of quagga mussels at the time. The primary method of overland dispersal of these mussels is through human-related activities, especially trailered watercraft. Given their ability to attach to hard surfaces and survive out of water for extended periods [30 days!], many infestations have occurred by adult mussels hitching rides on watercraft. The microscopic larvae also can be transported in bilges, ballast water, live wells, or any other equipment that holds water.

Where Are Mussels in Colorado?

The are NO positive waters for zebra or quagga mussels in Colorado!
Green Mountain Reservoir is considered "Suspect" for quagga mussels.

Preliminary monitoring was conducted by the former Division of Wildlife and State Parks from 2004-2008. In January 2008, the first confirmation of mussel larvae occurred in Colorado in water samples from Lake Pueblo. The former Division of Wildlife intensified monitoring in the summer of 2008. Mussel veligers were positively identified in July of 2008 at Grand Lake, Granby, Shadow Mountain, and Willow Creek. In October of 2008, a mussel veliger was confirmed in Jumbo Reservoir in Logan County and Tarryall Reservoir in Park County. In 2009, mussel DNA was confirmed in Colorado's largest reservoir, Blue Mesa within Curecanti National Park. To date, there have never been adult mussels found in Colorado lakes or reservoirs.

Following five years of negative testing, in 2014, Colorado de-listed Blue Mesa, Tarryall, Jumbo, Willow Creek, Granby, Grand Lake and Shadow Mountain for zebra or quagga mussels. Pueblo was de-listed for zebra mussels in 2014 and quagga mussels in January 2017. The listing criteria and de-listing standards are consistent with the Western Regional Panel's Building Consensus definitions and procedures.

In August 2017, quagga mussel veligers were discovered by Bureau of Reclamation sampling staff at Green Mountain Reservoir. Green Mountain Reservoir is considered "Suspect" and testing is ongoing.

Impacts

Zebra and quagga mussels pose a great ecological and financial threat to the state. The invasion of these mussels can affect every Coloradoan and visitors in some way and the impacts could be devastating.

Why Be Concerned?

- Ecological Impacts
- Recreational Impacts
- Economic Impacts
- Social Impacts

- Industrial Impacts
- Agricultural Impacts
- Impair Water Infrastructure

Invasive Characteristic #1 - Prolific Reproduction

Zebra and quagga mussels reproduce *exponentially.* They can spawn year-round if conditions are favorable. A single female mussel can produce up to one million eggs per spawn! Even if only ten percent of the offspring survive, there would be ten septillion mussels in the waterway at the end of five years! As the mussel population explodes, they cover the bottom and sides of the waterway.

Invasive Characteristic #2 - Byssal Threads

As mentioned before, zebra and quagga mussels can attach via byssal threads to any stable substrate in the water column such as; rock, aquatic plants, artificial surfaces (cement, steel, rope, etc.), crayfish, native clams, and each other. They attach to most underwater structures and can form dense clusters that impair facilities and impede the flow of water. They clog intake pipes and trash screens, canals, aqueducts, and dams – disrupting water supply to homes, farms, factories, and power plants. Zebra and quagga mussels also degrade water quality and can alter the taste and smell of drinking water.

Byssal threads are made up of proteins and are secreted from a gland inside the mussel. Scientists have identified three types of byssal threads in zebra and quagga mussels: belaying, temporary, and permanent. Belaying byssal threads are 20-30 times the length of the mussel and are used by relocating juvenile and adult mussels to reach out and attach to surfaces. Juvenile and small adult mussels also produce temporary byssal threads in order to move and relocate. These threads are thinner, longer and attach in a tripod shape for greater stability. Permanent byssal threads are grown and an enzyme is secreted to release the temporary threads. Permanent byssal threads form within a few minutes after attaching.

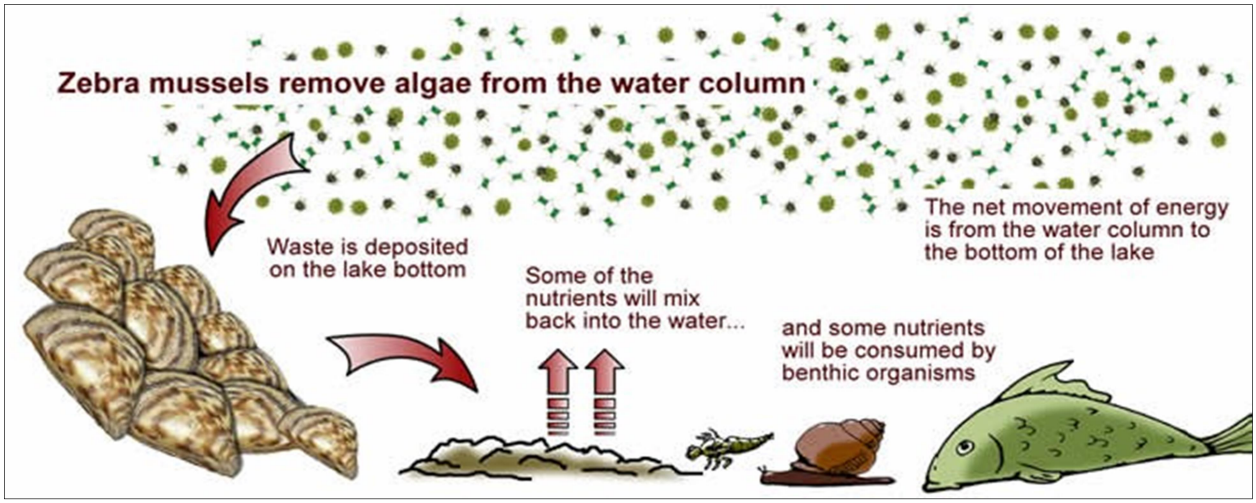
Recent studies have shown that zebra mussels produce more byssal threads, and stronger byssal threads than quagga mussels. This may explain why zebra mussels are better at colonizing flowing waters such as streams and rivers, while quagga mussels tend to colonize lentic, or still waters.

Invasive Characteristic #3 - Filter Feeding

Ecological Impacts - Invasive species have the ability to change aquatic ecosystems, including native plant and animal communities. As filter feeders, these species remove large amounts of microscopic plants and animals that form the base of the food chain, leaving little or nothing for native aquatic species. The amount of food the mussels eat and the waste

has life-altering effects on the ecosystem and can harm fisheries. Zebra mussels attach to and encrust native organisms, essentially smothering them and removing more animals from the food chain. Zebra and quagga mussels are one of the few species that have the ability to crash the entire food web by removing the base of the food chain – plankton – and by smothering benthic organisms that are a source of food for larger fish.

Zebra and quagga mussels are able to filter or remove substantial amounts of phytoplankton and suspended particulate from the water. Each mussel can filter over a liter of water per day! An established population of adult mussels in a water body can filter out a majority of nutrients in a water body, initially making the water clearer. This is known as an oligotrophic state, meaning that the water body is not biologically productive, and is lacking aquatic life. The opposite phenomenon can also occur as a result of mussels invading in a water body. After filtering nutrients and creating clearer water, increased sunlight penetration into the water can cause blooms of unwanted aquatic plants and algae. This can cause a hypereutrophic state, meaning that the water body is overly productive and nutrient rich. These plant and algal growths cause a reduction in oxygen and prevent life from functioning below the surface. Growth of nuisance algae can also cause toxic water conditions, killing fish, polluting drinking water and cause a foul odor.



Filter feeders reject unwanted mucous covered food from their body known as pseudofeces. Pseudofeces accumulate and create an unsuitable environment. As waste from the mussels decomposes, oxygen availability is depleted, and the pH becomes very acidic causing toxic byproducts to be produced. The accumulation of organic pollutants within the tissue of the mussel is passed up the food chain, causing increased exposure by wildlife.

While filter feeding, zebra and quagga mussels absorb and excrete heavy metals and other toxic substances. These high concentrations of toxins can be ingested by other aquatic organisms and work their way up the food chain, poisoning other animals and even humans.

Recreational Impacts


Lake Superior

These mussels encrust docks and boats. Attached mussels increase drag on boats and can even sink navigational buoys with their weight. Veligers or settlers can get sucked up into the engine cooling system and clog the engine from the inside causing it to overheat and be damaged. Increased hull and engine fouling will result in increased maintenance costs on vessels moored for long periods of time. Continued attachment of mussels can cause corrosion of steel and concrete affecting its structural integrity. Zebra and quagga mussels impact fish populations and reduce sport-fishing opportunities. Their sharp shells can cut the feet of unsuspecting swimmers and beach goers.

Economic Impacts

As maintenance costs for power plants, water treatment facilities and water delivery infrastructures increase, so does the cost of food and utilities. In the Great Lakes area, maintenance costs in water treatment plants, power plant intakes and dams have been in the billions of dollars. The destruction of native fisheries also has a wider economic impact in terms of tourism and recreation dollars not spent. Marinas and watercraft dealers could suffer business declines.

Management

The eradication of zebra mussels first occurred in a closed, isolated 12-acre quarry in Virginia in the 90's. A large volume of potassium chloride chemical was used to treat the water and kill the adults and larvae. Eradicating or treating zebra or quagga mussels in large water bodies and/or connected waterways is truly not possible because it could also kill other aquatic life forms. Pre-chlorination has been tried but the amounts used to treat an area will reach hazardous levels. Predation from migratory diving ducks, fish species, and crayfish may reduce mussel abundance but not for any substantial length of time, so prevention is very important.

If watercrafts are cleaned, drained, and dried in between water bodies, any attached mussels or other ANS will be eliminated.

The rapid invasion of United States waterways has been attributed to the mussel's ability to disperse during all stages of its life. Mussels can spread to other bodies of water by attaching to watercraft hulls and anchors, trailers, and fishing equipment. Larvae can be transported in bilge water, ballast water or live bait wells. Mussel larvae also disperse naturally, and can be carried by water currents to other lakes or reservoirs downstream or through water diversions.

Since there are no viable control methods once mussels are introduced in open water bodies, prevention is our only defense. As a watercraft inspector, **your most important task is**

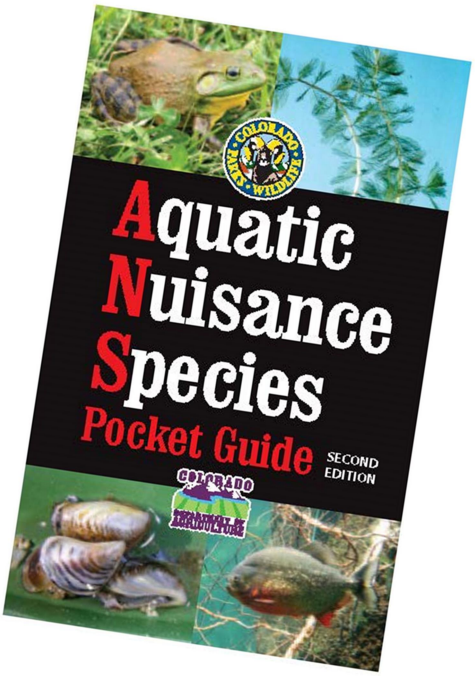
educating the public both coming into and exiting your lake/reservoir. Many lakes and reservoirs in the state will not have inspections, therefore, it is essential that you:

1—Show the boaters how to inspect their boats themselves.
2—Explain why inspections are critical to find mussel settlers and other ANS.
3—Impress on the boater how zebra and quagga mussels damage boats, ruin fishing opportunities, harm the environment and impair water infrastructure.

You need to drive home the primary education message to **Clean/Drain/Dry** and explain why boaters need to do it ***each time*** they use their craft. Teaching boaters and anglers to clean, drain, dry their boats and gear themself in between each and every launch is invaluable! If boaters and anglers do this, mussels will not spread!

Other A.N.S. Biology

As you learned in the introduction module, there are many species of aquatic plants and animals that are invasive. The watercraft inspection and decontamination program prevents all ANS from being introduced into new waters.



Boat inspectors have detected New Zealand mudsnails, Eurasian watermilfoil and rusty crayfish in the past. While zebra and quagga mussels are the poster child, this program is aimed at protecting the state's resources from all invaders being transported on watercraft.

CDOW developed and published the *Aquatic Nuisance Species Pocket Guide* in partnership with the Colorado Department of Agriculture. This booklet combines all four prohibited species lists (in three state agencies) into a single book that instructs the reader how to report the species if they were to find it.

Outdoor Demonstration – How Many Mussels Can You Find?

Write Down All The Places You Found A "Mussel" On The Watercraft:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____

Asian Clams (Corbicula fluminea)

A Zebra/Quagga Mussel "Look-a-Like" Invader

Asian clams are small non-native bivalves that are commonly mistaken for zebra and quagga mussels in Colorado. Because it is often observed littering the beaches with expansive shells, it is commonly confused with zebra or quagga mussels. Its shells have striations (or ridges) which give it the appearance of having stripes.

Asian Clams	Zebra or Quagga Mussels
Ridges or Striations on Shells	Smooth Shells with Stripes or Colorations
Does Not Have Byssal Threads	Has Byssal Threads

Identification: Adults can reach 50 to 65 mm in length, although 25 mm is typical. Shell is oval, but not elongated, and is deep on the hinge side. The outer layer of shell has well defined, thick growth rings and varied coloration. Older clams have a darker colored shell, while younger clams are lighter brown or tan.

Habitat: They prefer fast moving water because currents provide food for these suspension feeders. However, they are commonly found on the shorelines of lakes and reservoirs.

Pathway of Introduction and Spread: Corbicula fluminea is used in Asia as a food source and may have been cultivated in the United States. It is also used for fish bait—probably another way it has been spread throughout North America. It is sold in the aquarium trade as "pygmy clam", or "golden clam."

Impacts: The Asian clam invasion in North America has created problems for power plants and water canals because large numbers of clams block water intake valves. They also compete with native bivalves for food, and competition increases as Asian clam populations explode.

Current Status in Colorado: Corbicula has experienced great success in North America and is moving through Colorado rapidly. Asian clams were first detected in the South Platte River in Colorado in 1993 and have since expanded their range to include the Arkansas River, Gunnison River, San Juan River and Colorado River basins (Cordeiro et al, 2007).

New Zealand Mudsnail (*Potamopyrgus antipodarum*)

New Zealand mudsnails (NZMS) are small aquatic snails native to fresh waters of New Zealand. They were first discovered in North America in the late 1980s in the Snake River, Idaho and Madison River, Montana.

Identification: NZMS range in size from a grain of sand to 1/8 inch in length and are black or brown in color. The shell has about 5 ½ spirals. If the shell is held tip up with the opening toward you, the opening is on the right. There is an attached operculum (cover) which can close off the opening.

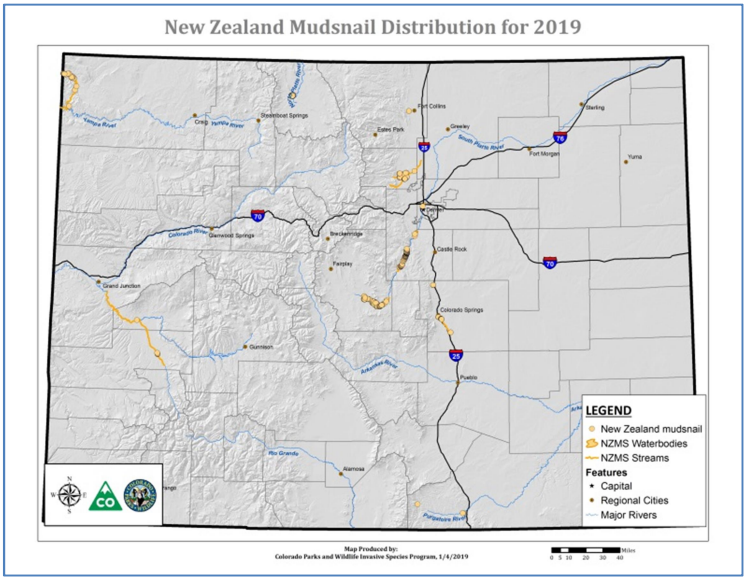
Habitat: Found in freshwater, brackish, or saline waters with almost any substrate. Populations in saline conditions produce fewer offspring and grow more slowly. Also tolerates a wide range of temperatures, ranging from near freezing to 82°F.

Pathway of Introduction and Spread: New Zealand mudsnails are spread into new river systems primarily by humans, although they can be carried on the feet of dogs and wildlife. Anglers, boaters, researchers and others can carry NZMS to uninfested locations on their boots and gear. They can survive up to 50 days on a damp surface, giving them ample time to be transferred from one body of water to another on fishing gear.

Impacts: NZMS compete with native invertebrates, including native mollusks, for space and food resources. NZMS may reduce the availability of native invertebrate prey for fish – particularly mayflies, caddis flies and chironomids. They are not a viable food sources themselves – their hard shell allows them to pass through a fish gut unharmed.

Current Status in Colorado (See Map)

All populations have been mapped and are being monitored for long-term impacts.
There are no viable control methods.



Rusty Crayfish (Orconectes rusticus)

Rusty crayfish are native to the Ohio River Basin. They were first discovered outside of their native range in the 1960s.

Identification: Rusty crayfish grow up to five inches long. They have brown bodies and large grayish-green to reddish-brown claws with dark black bands on the tips. There are two rusty patches on either side of the crayfish's body. The claws, when closed, have an oval gap in the middle. The moveable claw is smooth and S-shaped. Males tend to be larger than females.

Habitat: Found in freshwater lakes, rivers, and streams. Prefer deep pools and fast currents with cover from predators.

Pathway of Introduction and Spread: Introduced by anglers who use the crayfish as bait and throw unused bait into the water or illegally stocked as a prey base for a fishery. Although they are often introduced as bait, they do not make good bait due to their aggressive nature.

Impacts: Rusty crayfish eat small fish, insects, and fish eggs. They also eat aquatic vegetation, damaging underwater habitat that is important for fish spawning, cover, and food. They are aggressive and displace native crayfish.

Current Status in Colorado: Rusty crayfish was first detected in Colorado in the Yampa River and Catamount Reservoir in 2009, in Sanchez State Wildlife Area in 2010 and in Stagecoach Reservoir State Park in 2011. Populations are being controlled through mechanical and physical harvesting.

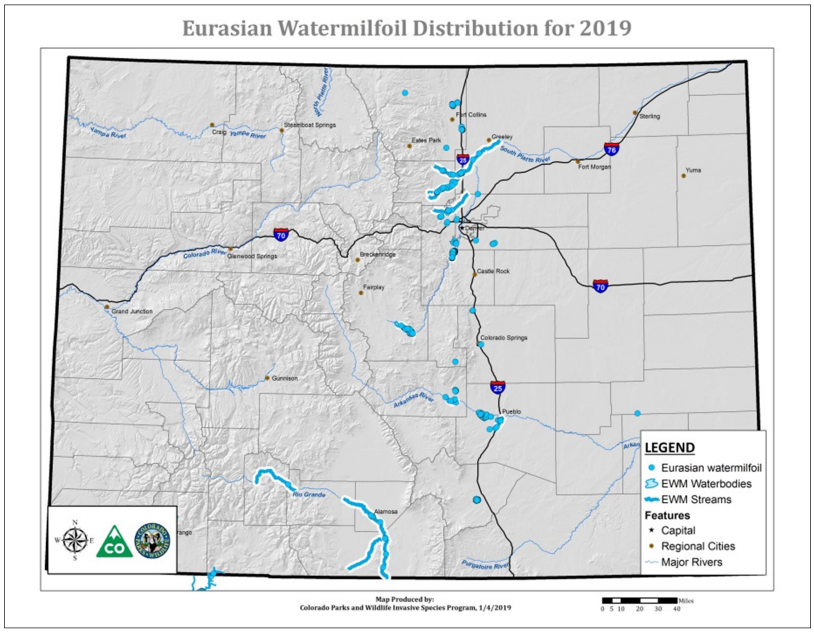
Eurasian Watermilfoil (Myriophyllum spicatum)

Eurasian watermilfoil is native to Europe, Asia, and northern Africa. It was once commonly sold as an aquarium plant and was introduced to the eastern U.S. at least as long ago as the 1940s, but it may have arrived as early as the late 1800s.

Identification: Eurasian watermilfoil is a submerged, rooted perennial with long, branching stems and soft feathery leaves attached in whorls of four. Each leaf has 11 to 21 pairs of leaflets, which are closely spaced, and about ½ inch long. Eurasian watermilfoil produces small yellow, four-parted flowers on a spike that projects two to four inches above the water surface.

Habitat: Tolerates a wide range of water conditions and depths; prefers nutrient-rich substrate.

Pathway of Introduction and Spread: Eurasian watermilfoil reproduces by seeds, fragmentation, and winter buds. Fragmentation and winter buds are believed to be more important in spreading the plant. Any plant fragment can start a new infestation. Winter buds are tight leaf clusters that break off and fall to the bottom, where they overwinter. In the spring, the buds grow and form new plants.



Impacts: Eurasian watermilfoil forms dense mats that restrict swimming, fishing, and boating and clog water intakes. The mat alters water chemistry by choking and shading out other native aquatic plants. The decaying plants decrease oxygen levels in the water and foul lakeside beaches. This disrupts the food chain and destroys habitat and food needed by fish and birds. Eurasian watermilfoil slows the flow of water in irrigation ditches and canals and creates standing water that is ideal mosquito habitat.

Current Status in Colorado: (see map)

Brazilian egeria (Egeria densa)

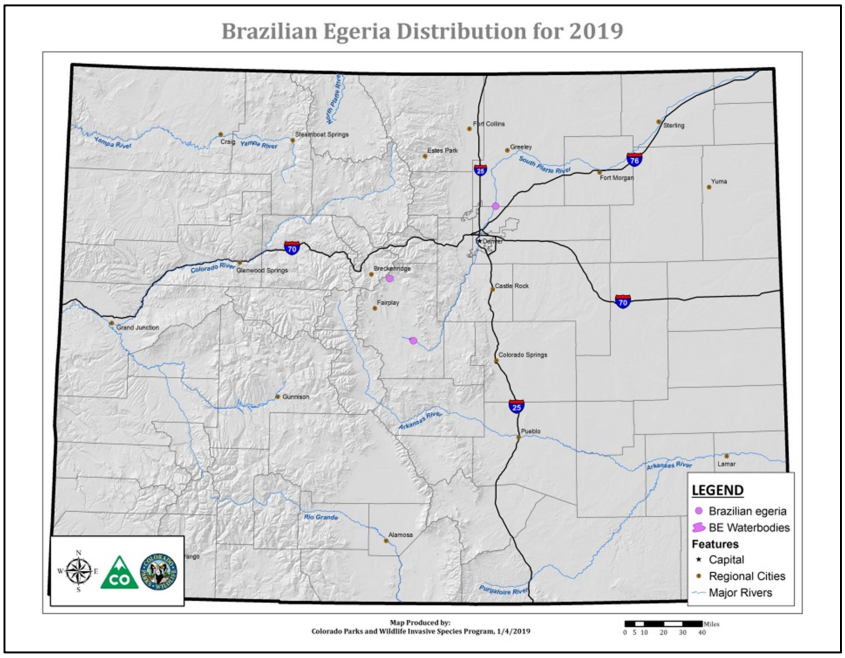
Brazilian egeriaegeria's native range includes some of the regions of Brazil to coastal areas of Argentina and Uruguay. It was initially introduced by the aquarium and water garden industry. It was sold for its oxygenation capabilities, and for its attractive flowers. It currently is the top-selling aquatic plant for use in aquaria and has been sold under several names including egeria, "oxygenating plant", and anacharis.

Identification: Brazilian elodea is a submerged perennial that can reach lengths of six feet. This plant can live rooted or free floating at depths of up to 20 feet. It has bright green leaves in whorls of four around each node on the stem. Each leaf is up to 1¼ inches long with a linear oblong shape and the margins of the leaf are very finely toothed, visible only with a hand lens. The flowers of Brazilian egeria have three white petals and three green sepals. The flowers emerge above the water on long stalks. Brazilian egeria is easily confused with another exotic weed, Hydrilla (Hydrilla verticillata). Hydrilla will have rough teeth on the underside of the leaves where Brazilian egeria will not.

Habitat: Found in slow moving, shallow waters in lakes, ponds, and sluggish rivers and streams.

Pathway of Introduction and Spread: Fragmented pieces of Brazilian egeria that have double nodes can produce a new plant. It is extensively sold in the aquarium industry. If people dispose of these plants into open water, it can create a new infestation. Boaters, anglers, and other water recreationists can transport fragments from one body of water to another.

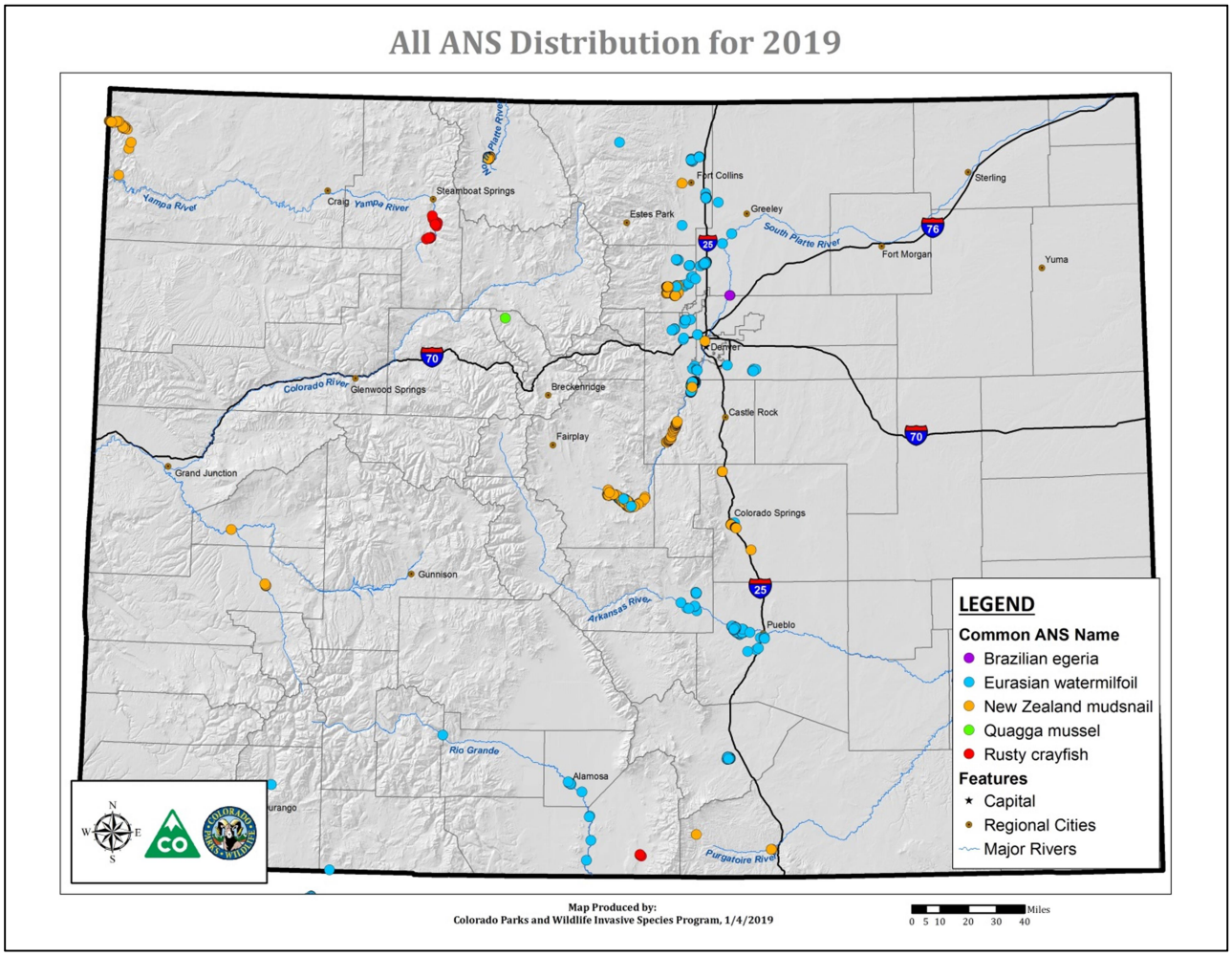
Impacts: Brazilian egeria creates dense mats that crowd out native plants. Mats can impede boating, fishing, swimming, and other aquatic recreation activities. The mats are unsightly, restrict water movement, trap sediment, impair water quality and degrade fish habitat. The fragmented pieces can clog water intake pipes and other water delivery infrastructure.



Current Status in Colorado:
(See Map)

List of WID Stations with Known ANS

WID Location (alphabetical order)	ANS Present
Arvada Reservoir	Eurasian Watermilfoil
Chatfield Reservoir	NZMS, Eurasian Watermilfoil
Cherry Creek Reservoir	Hybrid Eurasian Watermilfoil
Elevenmile Reservoir	NZMS, Eurasian Watermilfoil
Green Mountain Reservoir	Quagga Mussel (SUSPECT)
Lathrop State Park (Horseshoe & Martin Reservoirs)	Eurasian Watermilfoil
Navajo Reservoir	Eurasian Watermilfoil
Pueblo Reservoir	Eurasian Watermilfoil
Spinney Mountain Reservoir	NZMS, Eurasian Watermilfoil, Brazilian egeria
Stagecoach Reservoir	Rusty Crayfish
Standley Lake	Eurasian Watermilfoil
Trinidad Lake	NZMS



Chapter 2 – Biology Review

1. Why is it important to learn ZQM biology?

   _____

   _____

   _____

2. Which are the three characteristics of zebra and quagga mussels that make them invasive?
   a. Grow larger than other mollusks, reproduce quickly, clear the water
   b. Attach with byssal threads, rapid reproduction, filter feeding
   c. Alter water chemistry, attach with byssal threads
   d. Feed on aquatic weed beds and reduce native plant communities, attach with byssal threads, prolific or rapid reproduction

3. The larval life stage of a mussel in which they are a free-floating planktonic organism is called a _____. These juveniles then begin to develop shells and attach to solid surfaces, which are known as the _____stage. Upon maturation, _____ mussels are sessile, meaning fixed in one place or immobile.

4. What is the <u>primary</u> message we want boaters to learn?

   _____

5. In addition to ecological impacts ZQM and other ANS cause major _____and _____impacts to the state.

6. Because many lakes and reservoirs in the state will not have inspections, it is essential to:
   a. show the boaters how to inspect their boats themselves
   b. explain why inspection is critical to find mussel settlers and other ANS
   c. Impress on the boater how zebra and quagga mussels damage boats, ruin fishing opportunities, harm the environment and impair water infrastructure.
   d. All of the above

7. Where do mussels like to hide on watercraft?

   _____angles, _____or _____places. _____surfaces.

   Below the _____.

8. Mussel veligers are microscopic and can be transported in standing water. (Circle one) True or False?

9. The Asian Clam is a look-a-like invasive species that is fairly common in Colorado. What are two characteristics that make it different than ZQM?

_____

_____

10. Which group lists other ANS of concern for transportation overland on recreational watercraft?
    a. Northern Pike, Rainbow Trout, Pondweed, Brown Trout
    b. Eurasian watermilfoil, Rusty Crayfish, New Zealand Mudsnails
    c. Boreal Toad, Round Goby, Rusty Crayfish, Arkansas River Darter
    d. Northern watermilfoil, Bullfrog, Boreal Toad, Purple Loosestrife

11. Where is the transportation of live crayfish prohibited?

_____

_____

12. List ways that people commonly spread New Zealand mudsnails.

_____

_____

13. Which location had a new detection of New Zealand Mudsnails in 2018?
    a. Vallecito Reservoir
    b. Navajo Reservoir
    c. Trinidad Lake
    d. Jackson Lake

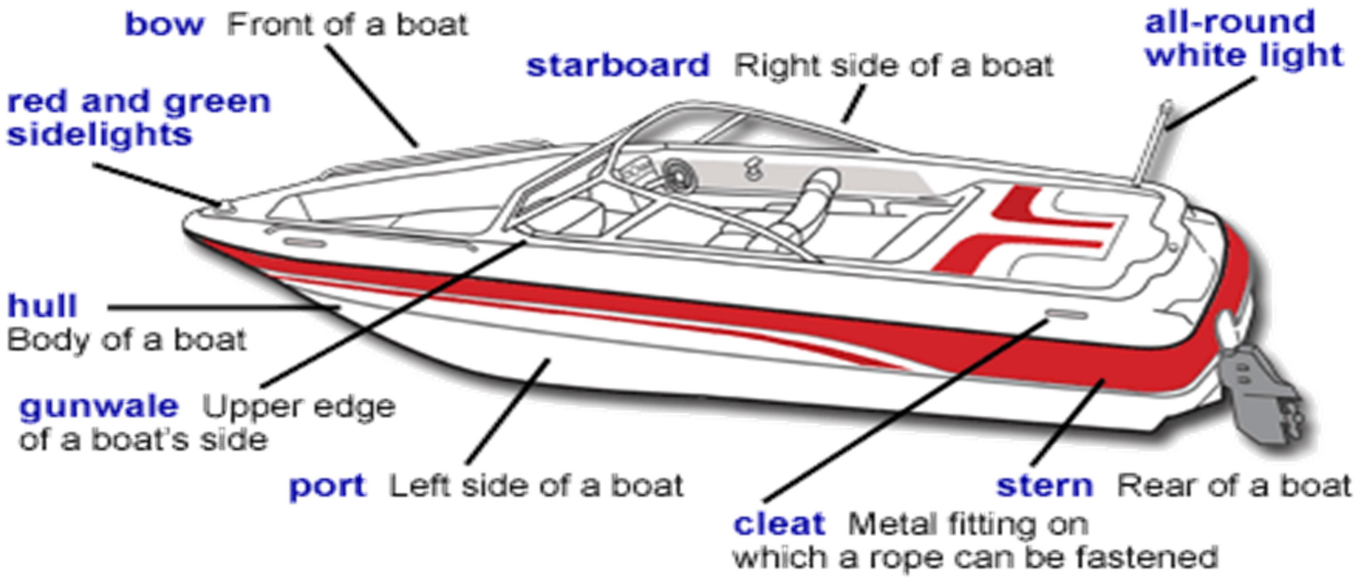
14. Rusty Crayfish make good prey for fish. True False (circle one)

15. Eurasian watermilfoil _____can spread on boats and infest new waters - which is why it's important that boats leaving EWM positive waters get inspected and don't transport plant parts.

16. This aquatic invasive plant was recently detected in Colorado and has a white flower on an elongated stalk.

_____

Chapter 3 – Watercraft 101- Table of Contents



Boat Terminology

aft—In naval terminology, means towards the stern (rear) of the boat.

anchor storage—An interior compartment area on the boat, typically in the bow of the boat, where the anchor is stored.

bait well—An interior compartment that specifically holds live aquatic bait. Sometimes it is a separate container on the boat or incorporated in the live well compartment. May also be a pull out bucket in a live well.

ballast tank—A compartment within a boat, ship or other floating structure that holds water. Adding water (ballast) to a vessel lowers its center of gravity, and increases the draft of the vessel. A ballast tank can be filled or emptied in order to adjust the amount of ballast force. Small sailboats designed to be lightweight for being pulled behind automobiles on trailers are often designed with ballast tanks that can be emptied when the boat is removed from the lake or reservoir.

bilge—The lowest compartment on a boat where the two sides meet at the keel. The word is sometimes also used to describe the water that collects in this compartment. Water that does not drain off the side of the deck drains down through the boat into the bilge.

bilge plug—A plug located either on the transom wall or on the bottom of the hull that keeps lake water from entering the boat. It is removed when exiting the water body to help drain any water that has accumulated during the time on the lake or reservoir.

bilge pump—A water pump used to remove excessive bilge water. The water that collects in the bilge must be pumped out to prevent the bilge from becoming too full and threatening to sink the boat on the lake or reservoir.

bow—A nautical term that refers to the forward part of the hull of a boat.

Anti-cavitation plate—A flat metal fitting mounted horizontally above the propeller of an outboard motor, which helps direct the flow of water into the propeller and reduces cavitation. Cavitation is the effect caused when air is drawn down into the water by a propeller, resulting in loss of power, overspending of the engine and propeller, and pitting of the metal surfaces of the propeller.

centerboard—A retractable keel which pivots out of a slot in the hull of a sailboat, known as a centerboard trunk.
A centerboard is used to provide lift to counter the lateral force from the sails.

complex boat—A boat that has one or more interior compartments **or** a closed hull **or** more than one motor.

daggerboard—A retractable keel used by various sailing craft. While other types of centerboard may pivot to retract, a daggerboard slides in a casing. The shape of the daggerboard converts the forward motion into a windward lift, countering the leeward push of the sail.

gimbal—A pivoted support that allows the rotation (up and down and side to side movement) of the outdrive of an I/O engine and outboard motor.

hull—The body or frame of a boat.

inboard engine—A marine propulsion system enclosed within the hull of the boat.

inboard/outboard engine—(I/O) is located inboard just forward of the transom (stern) and provides power to the drive unit which is located outside the hull. This drive unit (or lower unit or outdrive resembles the bottom half on an outboard engine.)

jet boat—A boat propelled by a jet of water ejected from the back of the craft. A jet boat draws the water from under the boat into a pump inside the boat, and then expels it through a nozzle at the stern

keel—Runs in the middle of the boat, from the bow to the stern, and serves as the foundation or spine of the structure, providing the major source of structural strength of the hull. Keels are different from centerboards and other types of foils in that keels are made of heavy materials to provide ballast to stabilize the boat. Keels may be fixed, or non-movable or they may retract to allow sailing in shallow waters.

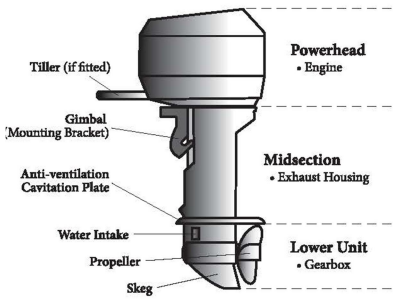
live well—An interior compartment found on many fishing boats that is used to keep caught fish alive. It works by pumping fresh water from the water body into the tank, as well as keeping the water aerated.

live well pump—A pump that assists in filling a live well with lake water.

lower unit—The bottom portion of an outboard motor or an inboard/outboard engine. The water found in this portion is lake water that has not been heated by the motor/engine.

macerator pumps—Pumps designed to empty holding tanks when fitted onto the plumbing in boats. The function of the pump is to suction the solids and liquids from the lines connected to the holding tanks and grind the effluent with the rotating cutter head down to a small particle size and discharge the waste.

outboard motor—A propulsion system for boats, consisting of a self-contained unit that includes engine, gearbox and propeller, designed to be affixed to the outside of the transom and is the most common motorized method of propelling small watercraft. As well as providing propulsion, outboards provide steering control, as they are designed to pivot over the gimbal (mounting bracket) and control the direction of the thrust. The skeg also acts as a rudder when the engine is not running.



pitot tube—A pressure instrument used to measure the velocity of a boat at a given point. The pitot tube is usually attached to the transom.

port—A nautical term that refers to the left side of the boat as perceived by a person who is in the boat facing the bow.

PWC—Personal Water Craft: A recreational watercraft that the user sits or stands on, rather than inside of, as in a boat. Models have an inboard engine driving a jet pump that has a screw-shaped impeller to create thrust for propulsion and steering.


PHOTO © FLORIDA MARINE GUIDE

rudder—A device used to steer a boat when moving through water. A rudder operates by redirecting water that has passed the hull, imparting a turning motion to the craft.

sailboat – A boat propelled partially or wholly by sail.

sea strainer – a device used to prevent solids from reaching internal pumps on engines, ballast tanks, etc.

simple boat – a boat with an open hull, no containers or compartments and a single outboard motor

skeg—A support at the bottom of a rudder.

starboard—A nautical term that refers to the right side of the boat as perceived by a person who is in the boat facing the bow.

stern—The rear or aft-most part of a boat.

transducer—An instrument that projects a sound wave into the water. When the wave strikes something such as a fish, it is reflected back and displays size, composition, and shape of the object on a screen inside the boat.

transom—The surface that forms the flat back panel of the stern of a boat.

transom well—A recessed area where water collects that is formed by the transom. Good examples of this are the stern of a pontoon boat or the area where an outboard motor is attached.

trim tabs—The small surfaces (shelves) that are connected to the transom on a boat. Trim tabs are mostly found on cruisers, sport fishing boats and center console boats ranging from 20 feet and up

Marine Propulsion Systems

The purpose of this section is to inform the boat inspector about the propulsion systems that are used to power watercraft. There are: electric and gas trolling motors, outboard motors, inboard/outboard engines (I/O), inboard engines, and jet drives for jet boats and PWCs

Trolling Motors
An **electric trolling motor** is a marine propulsion system consisting of a self- contained unit that includes an electric motor, propeller and controls, and is affixed to an angler's boat, either at the bow or stern.

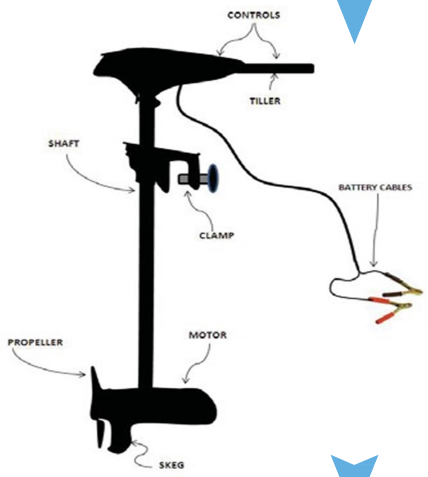
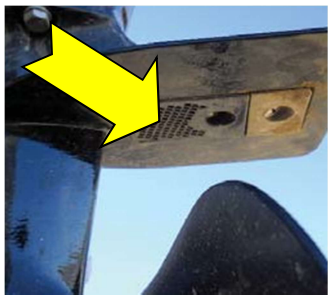


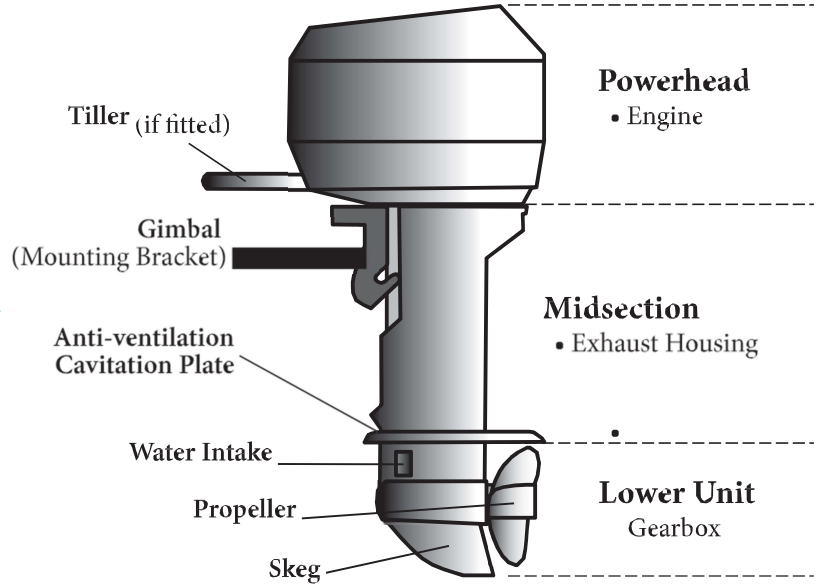
PHOTO © WIKIPEDIA

A **gasoline-powered outboard**, if it is not the vessel's primary source of propulsion, may also be referred to as a **gasoline trolling motor**. Small outboard engines are frequently used as trolling motors on boats with much larger engines that do not operate as efficiently or quietly at trolling speeds. These typically are designed with a manual pull start system, throttle and gearshift controls mounted on the body of the motor, and a tiller for steering. Trolling motors are often lifted from the water to reduce drag when the boat's primary engine is in operation.

As shown in the first photo, the intakes on some of the gas trolling motors are underneath the cavitation plate. Others are so close to the edge that most muffs do not cover them in order to perform a decontamination, as shown in the second photo.

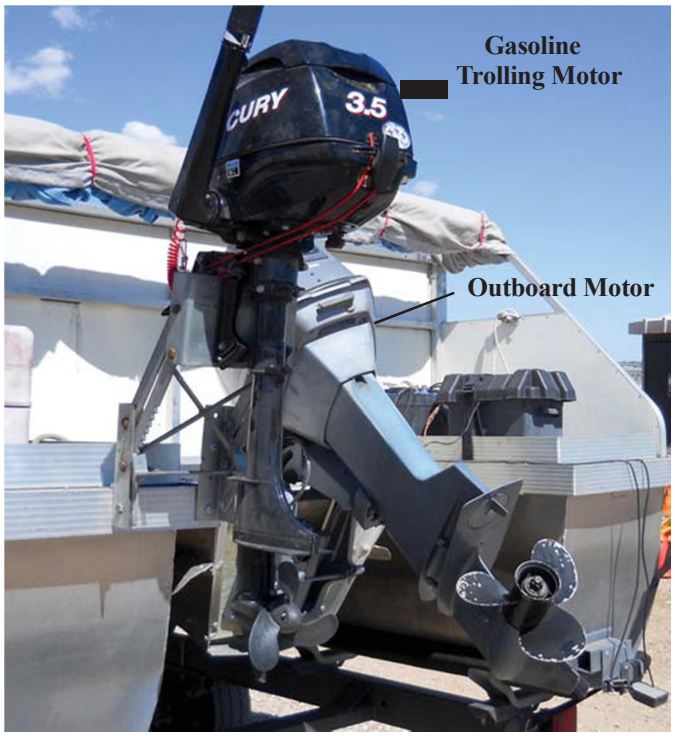


Outboard Engine
An **outboard engine** is a marine propulsion system for boats, consisting of a self- contained unit that includes engine, gearbox, and propeller, designed to be affixed to the outside of the transom
and is the most common motorized method of propelling small watercraft. As well as providing propulsion, outboards provide steering control, as they are designed to pivot over the gimbal (mounting bracket) and control the direction of the thrust. The skeg also acts as a rudder when the engine is not running.



The intakes on this Evinrude outboard motor are only on one side and are shown as the small rectangle.

This photo shows an outboard motor on a pontoon boat with a back up gas trolling motor.



Inboard/Outboard Engines
An **inboard/outboard (I/O) engine** is located inboard just forward of the transom (stern) and provides power to the drive unit located outside the hull. This drive unit (or lower unit or outdrive) resembles the bottom half of an outboard motor.

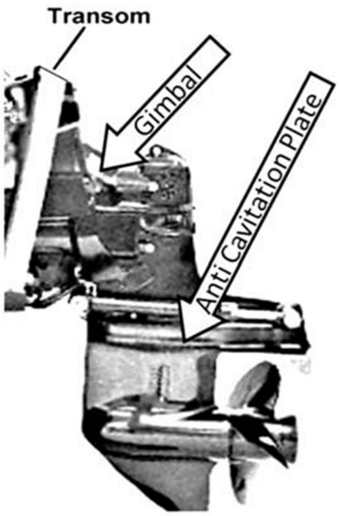
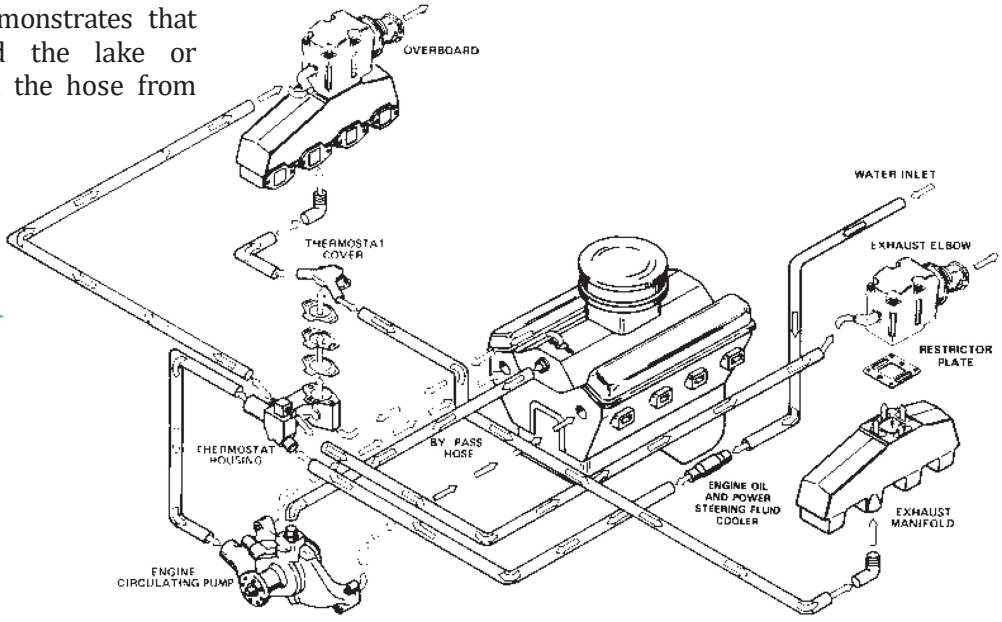


DIAGRAM © WEN BALDWIN,
PSMFC ANS TRAINING CONTRACTOR

The following diagram demonstrates that after an I/O has exited the lake or reservoir there is water in the hose from the water inlet to the engine circulating pump. When the engine is started in another water body, this water goes through the "cold" engine and is expelled into the water. If this water is from a positive reservoir the chance of live veligers being present in the water is very high.



Inboard Engines
An **inboard engine** is a marine propulsion system enclosed within the hull of the boat. Inboard engines have a raw water cooling system where water from the reservoir is pumped by the engine to cool it.

Attached to the hull of the boat is the propeller shaft and propeller which propels the boat through the water. The rudder acts as the "steering wheel" to guide the boat.

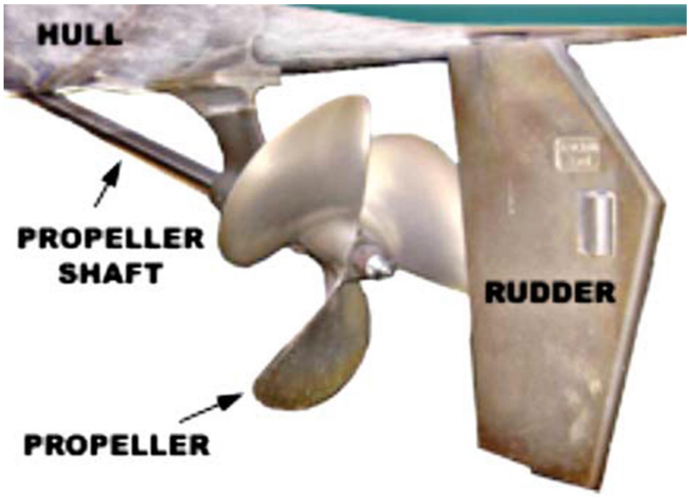


DIAGRAM © BOATCOURSE.COM

After opening the inboard engine compartment, the bilge area around the engine can be inspected and/or decontaminated for standing water.

PHOTO © GLASTRON

Closed Cooling System Water Flow
(Closed Cooled Models)—This diagram shows how water from the reservoir/lake is circulated throughout the engine. As with the I/O, when the boat is exiting the water body, water is left in this system and is expelled into the next water body.

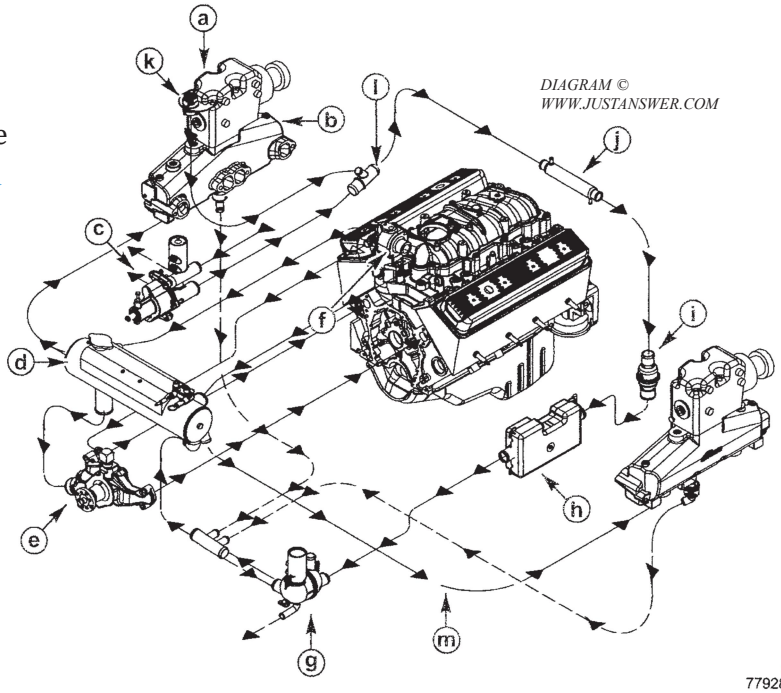


DIAGRAM © WWW.JUSTANSWER.COM

a Exhaust Elbow
b Exhaust Manifold
c Water Pump
d Heat Exchanger
e Water Circulating Pump
f Thermostat Housing
g Water Distribution Housing
h Cool Fuel Box
i Check Valve
j Power Steering Cooler
k Flush Fitting (Inboard Models)
l Flush Connection (Inboard Models)
m Shaft Log Seal Connection Point

Jetcraft

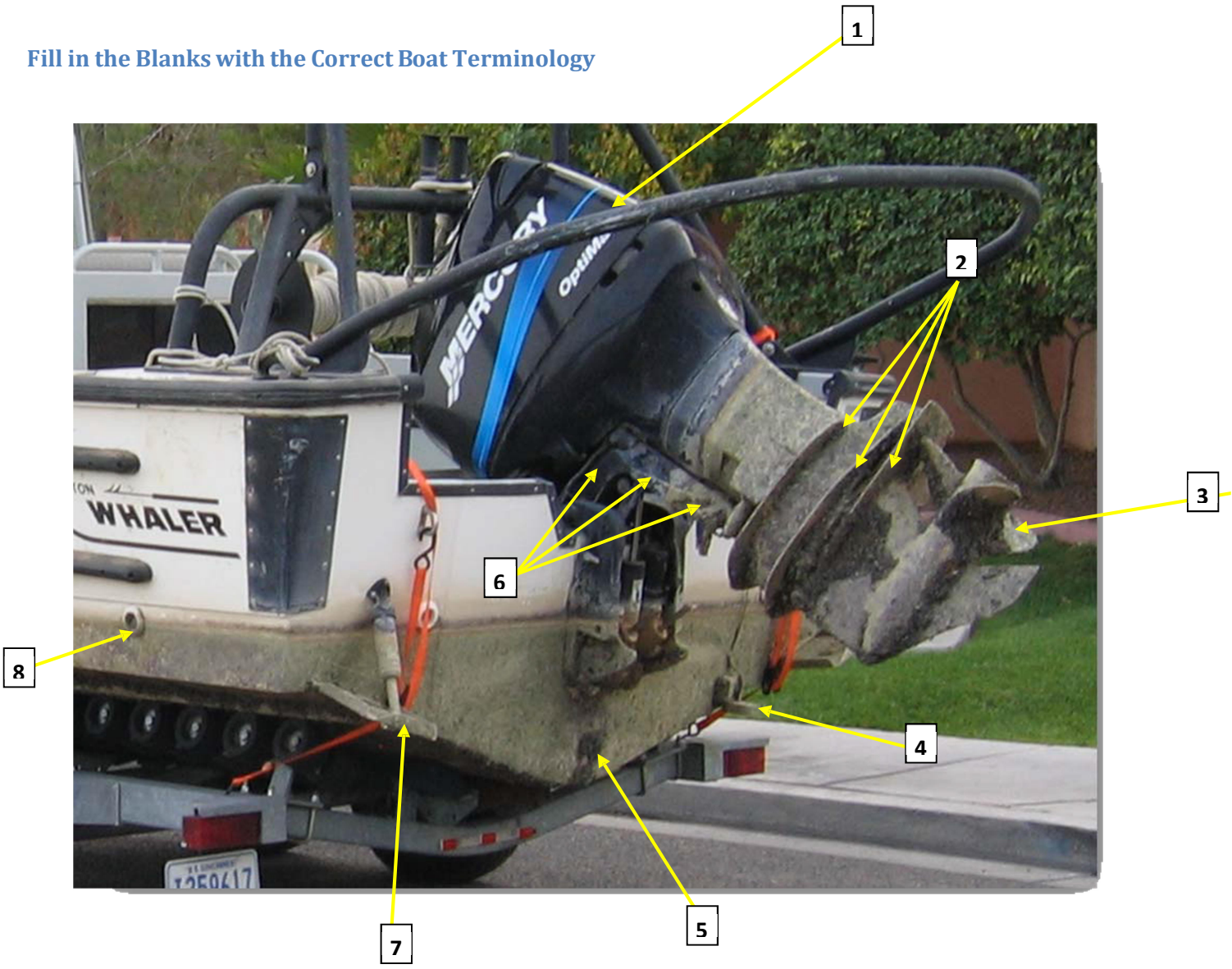
Since 1996, **Jetcraft** has been manufacturing fully welded, heavy gauge aluminum boats. They have two series that may be found in Colorado, the **Outboard** and **Jet** Series.

All of the models in both series have bow and anchor storage areas. All of the models in the Outboard Series have bilge pumps and transom wells. The three models of the Outboard Series that have a transom fish locker are the **2025 Discovery**, **2225 Discovery**, and the **2425 Discovery**.

A **jet boat** is a boat propelled by a jet of water ejected from the back of the craft. Unlike a powerboat or motorboat that uses a propeller in the water below or behind the boat, a jet boat draws the water from under the boat into a pump inside the boat. The water then passes through a series of impellers and stators—known as stages—which increase the velocity of the water flow. The water is then expelled through a nozzle at the stern. Most modern jets are single stage while older waterjets may have as many as three stages. The tail section of the waterjet unit extends out through the transom of the hull above the waterline. This jet stream exits through a small nozzle at high velocity to push the boat forward.

When inspecting or decontaminating a jet boat, the boat inspector must locate the intake port on the bottom of the hull. Also, as with a PWC, inboard, or inboard/outboard engine, the engine compartment must be inspected/ decontaminated.

Fill in the Blanks with the Correct Boat Terminology



1. (engine type)_____
2. _____
3. _____
4. _____
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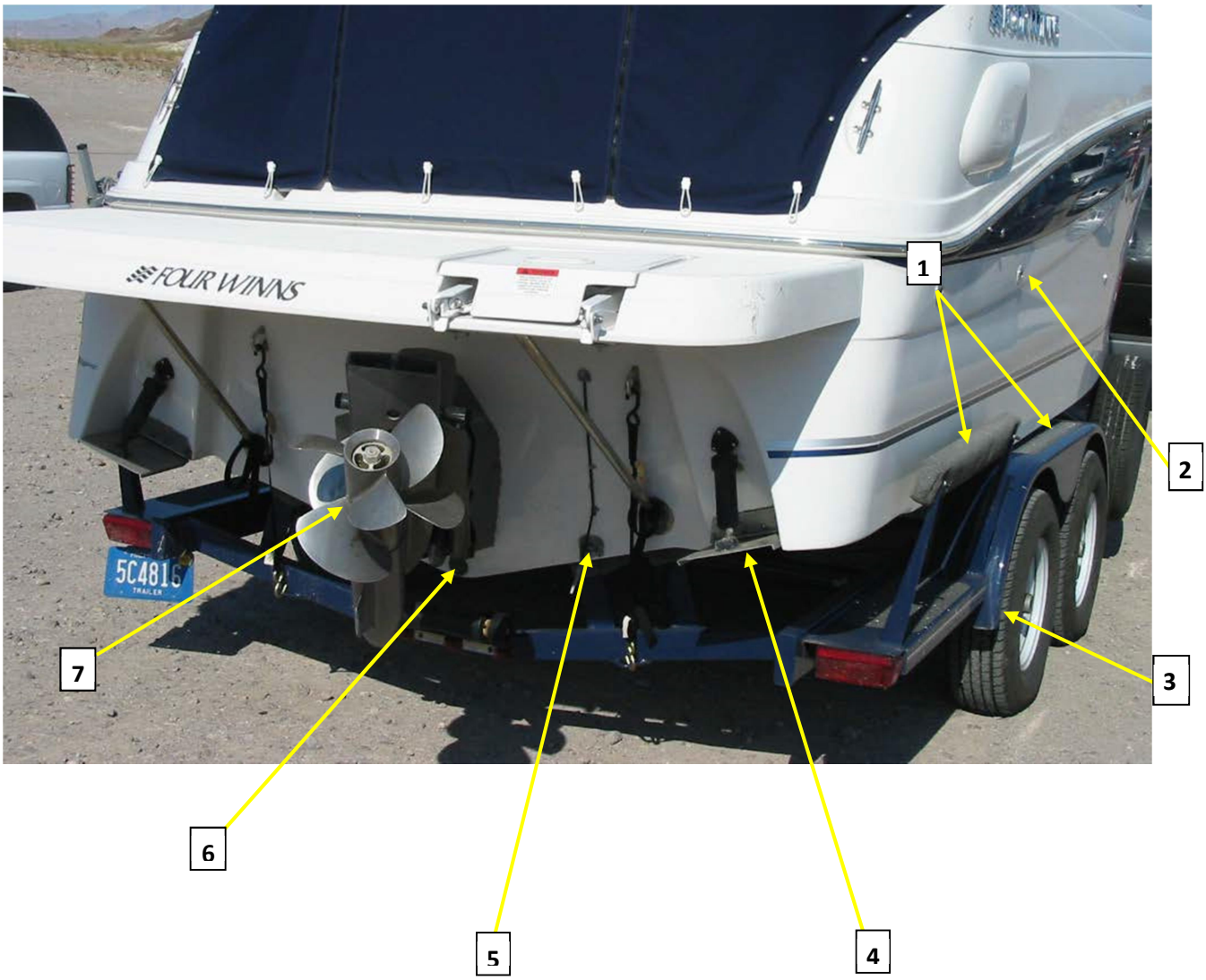

1. _____
2. _____
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8. (engine type)_____

1

2

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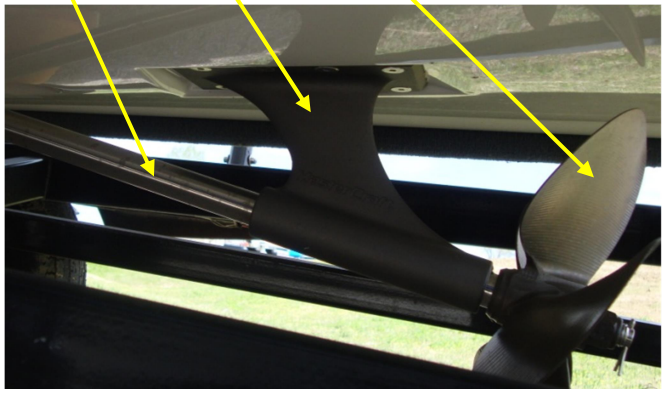
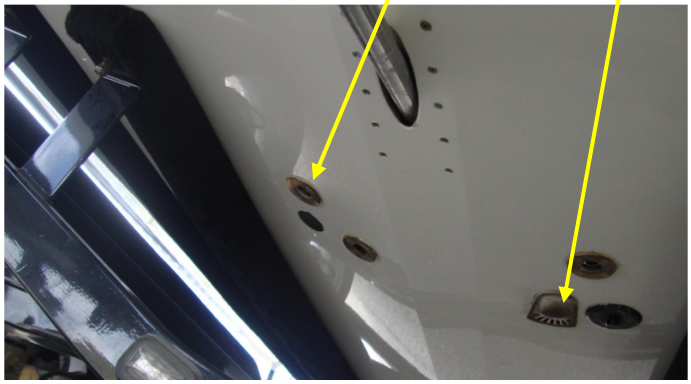




1. _____

2. (engine type)_____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

Watercraft Risk Assessment

Three Categories of Boats

- **Regulation Exempt Boats**
  - Does not need to be inspected unless they launch from a trailer OR have an engine/ motor.

- **Simple Boats**
  - A boat with an open hull
    AND no containers
    AND no compartments
    AND a single outboard motor
  - **Must be inspected**

- **Complex Boats**
  - A boat that has one or more interior compartments
    OR a closed hull
    OR more than one motor
  - The more complex a watercraft is, the more likely it is to be carrying water and ANS
  - **Must be inspected**

What Watercraft is Exempt from Mandatory Inspections?

Regardless of exemption, try to educate all boaters and recreationists about ANS!

The following ten watercrafts are exempt from inspection in Parks Chapter 8 Regulation #800K. These are the only watercraft in Colorado that are exempt from the mandatory inspection law and regulations. All others must be inspected.

1. Kayak
2. Canoe
3. Raft
4. Belly Boat
5. Windsurfer Board
6. Sailboard
7. Float Tubes
8. Inner Tubes
9. Paddle Boards
10. Foldable Plastic Boat

Marine propulsion systems must be inspected, regardless of the watercraft type. They are not exempt.

Any trailer that goes into the water must be inspected. Trailers are only exempt when they do not enter water and the watercraft on top of the trailer is one of the exempt hand-launched watercraft listed above.

What are the reasons for exempting the above 10 types of watercraft from inspection?

1. Hand-launched
2. Typically do not have a marine propulsion system
3. Typically do not have interior water holding compartments
4. Typically do not stay on the water long = short exposure time
5. Typically do not stay still on the water = short exposure time
6. Typically do not anchor or make contact with lake or reservoir bottom
7. Typically fully dried out before putting in a car or on top of a car for transport.
8. Provides a low-risk access option for boaters and anglers when inspections aren't present and boat ramps are closed.

Exempt Vessels

Raft

Windsurfer Boards / Sail-Board

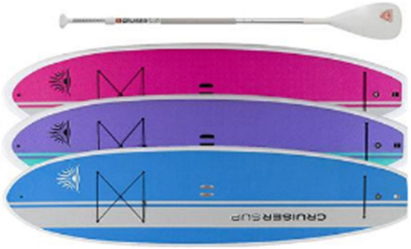
Kayak

Canoe

Belly Boat / Float Tube

Inner Tube

Paddle Board



Foldable Plastic Boat

What Boats Must be Inspected?

If the watercraft is not one of the ten exempt boats, it must be inspected.

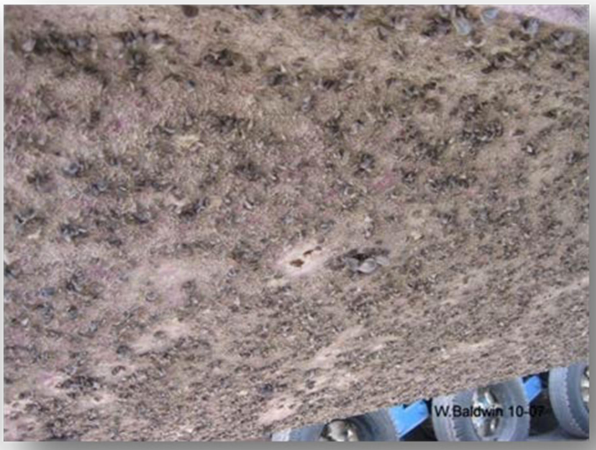
Watercraft Type	Risk Level
House Boats, Cabin Cruisers, Ski Boats and Wakeboard Boats with Ballast Tanks	Very High Biological Risk
Large Open Boats, Sailboats, Ski Boats and Wakeboard Boats with no ballast tanks, Personal Watercraft (PWC), Jet Boats	Medium to High Biological Risk
Simple Boats - Open Hull, Single Motors, No Interior Containers or Compartments	Low Biological Risk
(#800K) Exempt Watercraft: Canoe, Kayak, Windsurfer Board, Sail Board, Belly Boats, Rafts, Float Tubes, Inner Tubes Paddleboard, and foldable plastic boats	Very Low Biological Risk

Boat Anatomy - Where Do We Look?

H.E.A.D is an acronym that can help you remember where to look for mussels on boats during entrance and exit inspections.

H = Hull and Trailer
E = Engine or Motor (including Transom)
A = Anchor, Anchor Rope and Equipment
D = Drain Interior Compartments

THE HULL

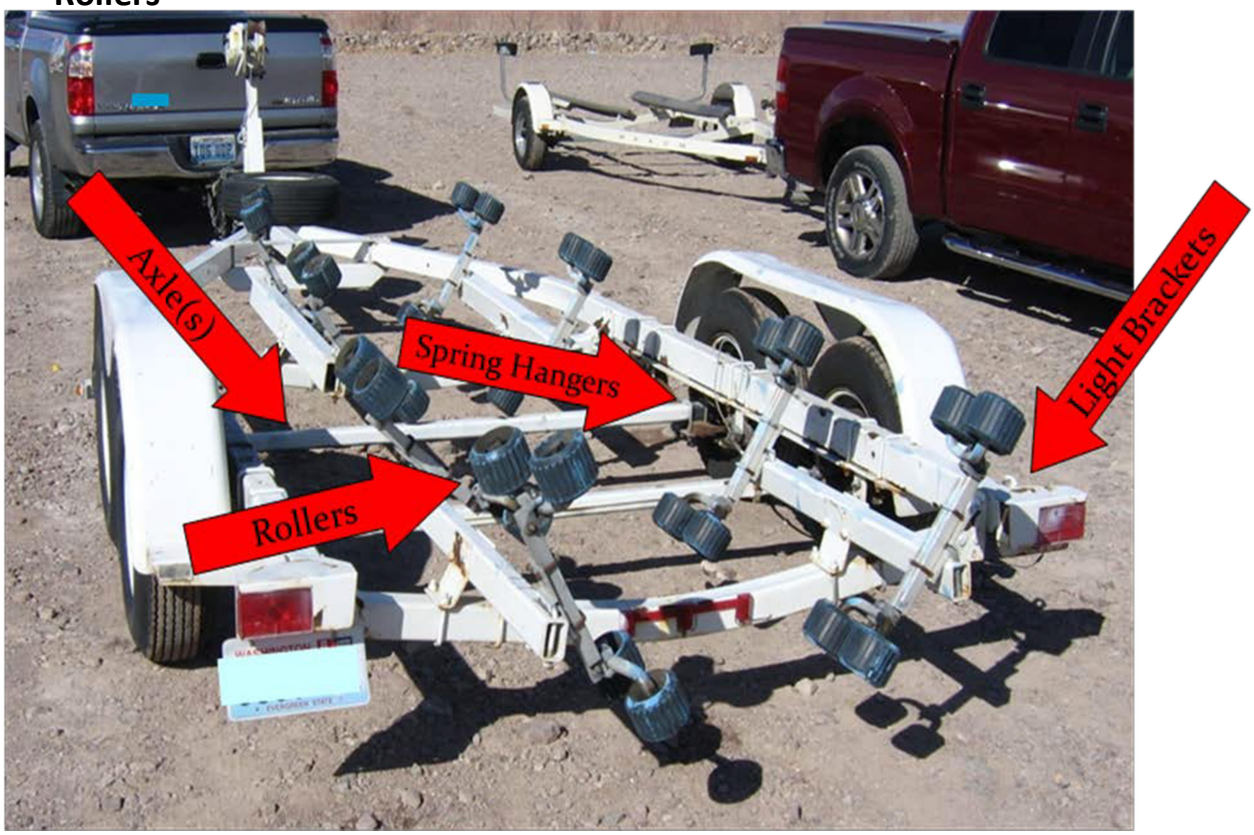


THROUGH HULL FITTINGS

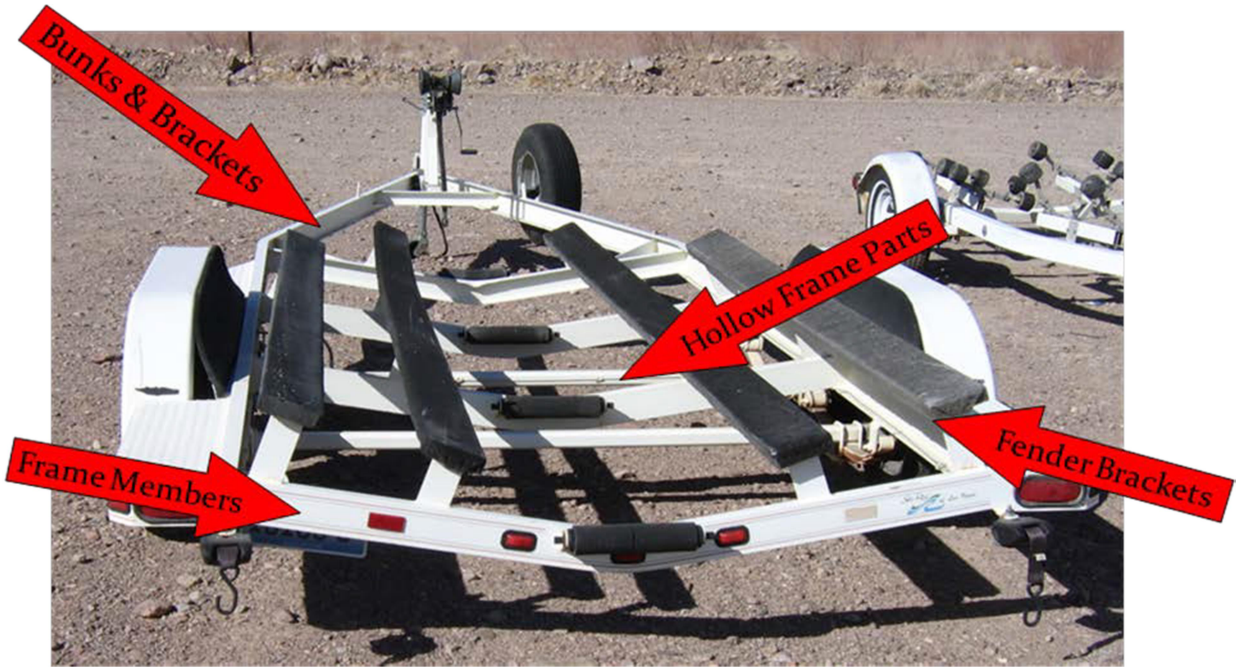
Use a flashlight!

TRAILERS

Rollers

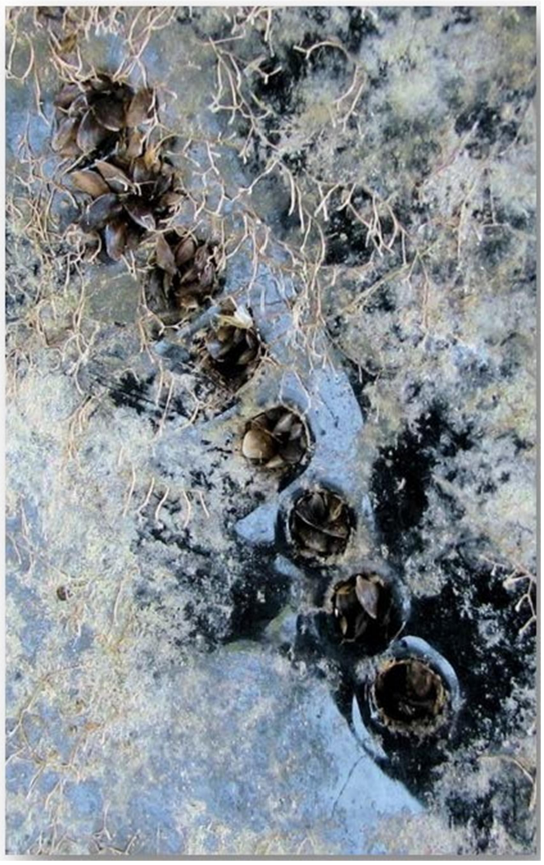


Carpeted Bunks

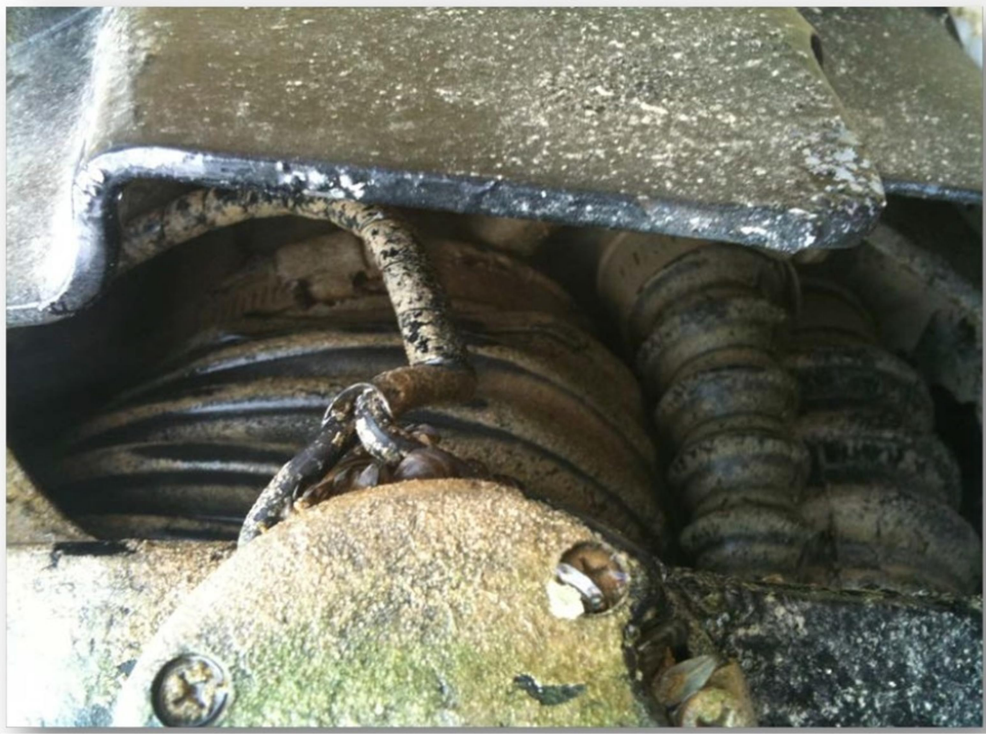


MARINE PROPULSION SYSTEMS

INTAKES



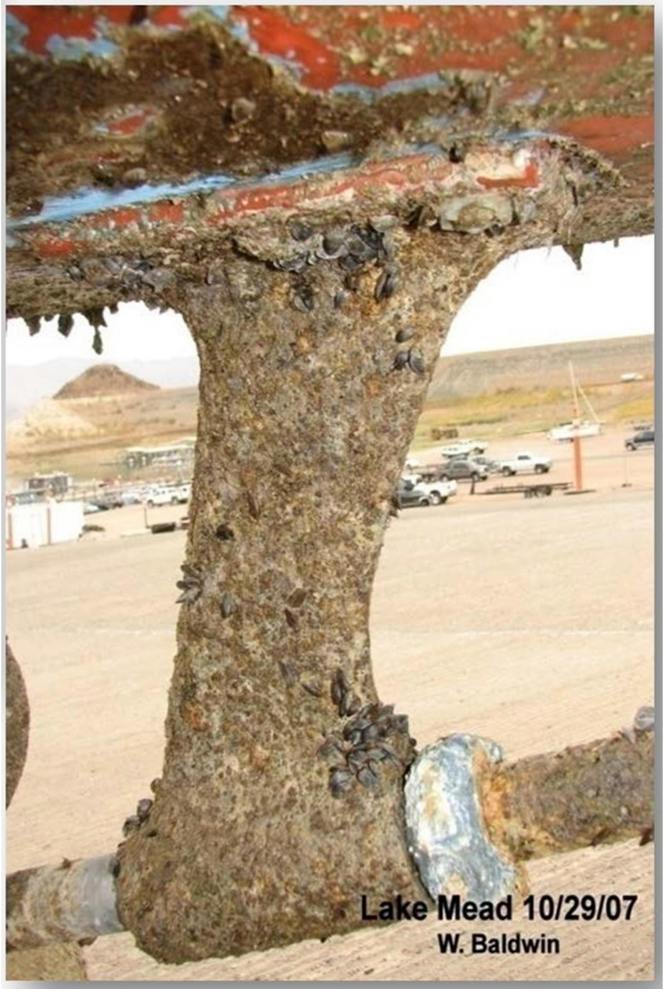
GIMBAL UNIT OF OUTBOARD OR INBOARD/OUTBOARD ENGINE



CAVITATION PLATES ON ENGINE or MOTOR

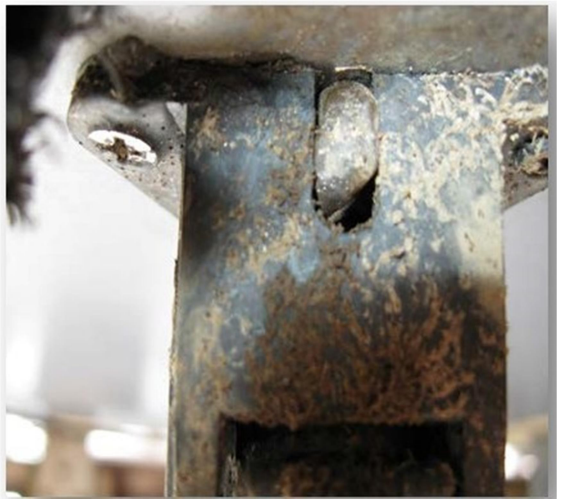
FASTENERS- NUTS AND BOLTS

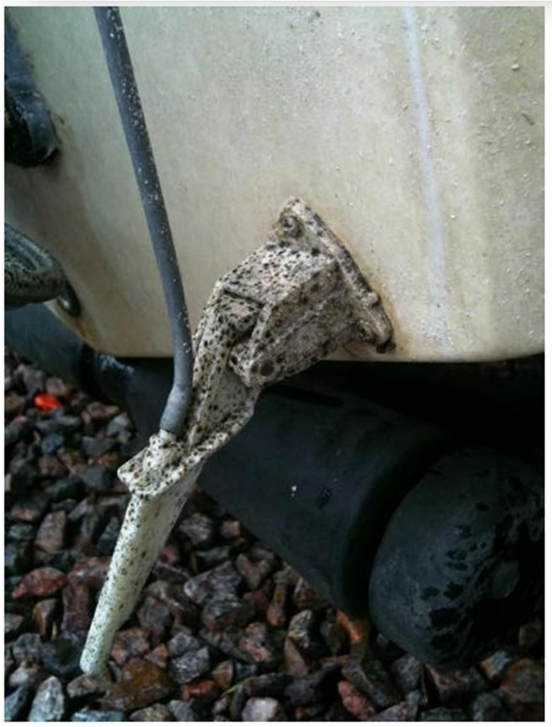
INBOARD ENGINE - PROP,PROP SHAFT and PROP SHAFT SUPPORT



TRIM TABS ON TRANSOM -TOP AND BOTTOM

TRANSDUCERS AND PITOT TUBES





ANCHOR, ANCHOR ROPE/CHAIN AND EQUIPMENT

BILGE (A lot of boats have more than one bilge access)

Sea Strainers

TANKS OR BLADDERS

<u>Invasive Mussel Survival in Ballast Systems Study; 2018</u>

In 2018 the Bureau of Reclamation collaborated with Utah Division of Wildlife Resources, Montana Fish Wildlife & Parks, the National Park Service & Mastercraft to document veliger and adult mussel survival in ballast systems. This study confirmed that ballast systems pose a significant risk for transporting both veliger and adult state zebra and quagga mussels. A summary of their findings can be found below.

Veligers:

- **90-99% of mussel larvae survived transport through two common ballast pumps**
- **Residual water and veligers were found in the ballast tank after drained with pump**
    - **Remaining veligers were alive after 2 hours**

Adults:

- **Adult mussels can be pumped into ballast tanks and survive**
    - **83% of adult mussels that passed through the Attwood, Tsunami pump survived**
    - **46% of adult mussels that passed through the Jabsco, Ballast King pump survived**

SAILBOATS

- Hull and Trailer
- Centerboard Box
- Motors
- Fittings
- Rudder
- Keel

OUTSIDE – Watercraft 101 Boat Anatomy Hands-On Session

Name That Boat Game

Underneath each photograph:

A. Circle if the watercraft is exempt, simple or complex
B. Circle the type of marine propulsion system
C. Use the WID Activity Log Key Below and Label the Boat Type

Boat Type	Activity Log Code
Administration / Agency Boat	A
Exempt Boat	E
Cabin Cruiser	CC
Fishing Boat	F
House Boat	H
Hunter	HU
Jet Boat	JT
Jon Boat	J
Other	O
Personal Watercraft	PWC
Pontoon	P
Sail Boat	SB
Simple Boat	S
Ski Boat	SK
Wakeboard Boat	WB

1.A. Exempt Simple Complex

1.B. Outboard I/O Inboard Jet

1.C. Boat Type:

2.A. Exempt Simple Complex

2.B. Outboard I/O Inboard Jet

2.C. Boat Type: _____

3.A. Exempt Simple Complex

3.B. Outboard I/O Inboard Jet

3.C. Boat Type: _____

4.A. Exempt Simple Complex

4.B. Outboard I/O Inboard Jet

4.C. Boat Type: _____

5.A. Exempt Simple Complex

5.B. Outboard I/O Inboard Jet

5.C. Boat Type: _____

6.A. Exempt Simple Complex

6.B. Outboard I/O Inboard Jet

6.C. Boat Type: _____

7.A. Exempt Simple Complex

7.B. Outboard I/O Inboard Jet

7.C. Boat Type: _____

8.A. Exempt Simple Complex

8.B. Outboard I/O Inboard Jet

8.C. Boat Type: _____

9.A. Exempt Simple Complex

9.B. Outboard I/O Inboard Jet

9.C. Boat Type: _____

10.A. Exempt Simple Complex

10.B. Outboard I/O Inboard Jet

10.C. Boat Type: _____

11.A. Exempt Simple Complex

11.B. Outboard I/O Inboard Jet

11.C. Boat Type: _____

12.A. Exempt Simple Complex

12.B. Outboard I/O Inboard Jet

12.C. Boat Type: _____

13.A. Exempt Simple Complex

13.B. Outboard I/O Inboard Jet

13.C. Boat Type: _____

14.A. Exempt Simple Complex

14.B. Outboard I/O Inboard Jet

14.C. Boat Type: _____

15.A. Exempt Simple Complex

15.B. Outboard I/O Inboard Jet

15.C. Boat Type: _____

Chapter 3 Review

1. List the ten watercraft exempt from inspections in Colorado

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

2. List three reasons why they are exempt from inspections

_____

_____

_____

3. Why are ballast tanks a big deal for inspection and decontamination?

4. Circle the one item you need to inspect on a sailboat that is different from other boats.

A. Hull and Trailer B. Centerboard Box

C. Rudder D. Motor

6. Match the watercraft type with the appropriate risk level.

A. Low Biological Risk **B.** Very Low Biological Risk

C. Very High Biological Risk **D.** Medium to High Biological Risk

	House Boats, Cabin Cruisers, Ski Boats and Wakeboard Boats with Ballast Tanks.
	Large Open Boats, Sailboats, Ski Boats and Wakeboard Boats with no ballast tanks, Personal Watercraft (PWC).
	Simple Boats - Open Hull, Single Motors, No Interior Containers or Compartments.
	Canoe, Kayak, Windsurfer Board, Sail Board, Belly Boats, Rafts, Float Tubes and Inner Tubes.

5. Match the definition to the engine or motor:

A – Inboard/Outboard Engine **B –** Outboard **C –** Trolling Motor
D – Inboard Engine **E –** Jet Engine

	A marine propulsion system consisting of a self-contained unit that includes a motor, propeller and controls, and is affixed to an angler's boat, either at the bow or stern. Typically electric but also gas powered.
	Enclosed within the hull of the boat. These have a raw water cooling system where water from the reservoir is pumped by the engine to cool it. Attached to the hull of the boat is the propeller shaft and propeller which propels the boat through the water. The rudder acts as the "steering wheel" to guide the boat.
	Located just forward of the transom (stern) and provides power to the drive unit located outside the hull. This drive unit (or lower unit or outdrive) resembles the bottom half of an outboard motor.
	This propulsion system draws the water from under the boat into a pump inside the boat. The water then passes through a series of impellers and stators—known as stages—which increase the velocity of the water flow. The water is then expelled through a nozzle at the stern. The tail section of the unit extends out through the transom of the hull above the waterline. This water stream exits through a small nozzle at high velocity to push the boat forward.
	A marine propulsion system for boats, consisting of a self-contained unit that includes engine, gearbox, and propeller, designed to be affixed to the outside of the transom and is the most common motorized method of propelling small watercraft. As well as providing propulsion, these provide steering control, as they are designed to pivot over the gimbal (mounting bracket) and control the direction of the thrust. The skeg also acts as a rudder when the engine is not running.

Chapter 4 – Inspection – Table of Contents

The Ideal Inspector

What characteristics, traits or qualities make up the Ideal Inspector?

1. _____
2. _____
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17. _____
18. _____

Role of the Authorized Agent (Inspector)

1. Inspection of watercraft for ANS.
2. Decontamination of watercraft for ANS.
3. Educate and Inform the public about ANS.

Education. Inspections. Decontaminations.

The inspector's role is to teach the public to inspect their own boats each time they launch through conducting inspections and decontaminations according to the procedures listed in this chapter.

Important Notes for Inspectors

- Wear Uniform, Appropriate Clothing and Personal Protective Equipment
- Show up on time or early for your shift.
- Stick to the talking points – learn the Boater's Guide and Audience Brochure!
- Smile!

ANS Can NOT Pay Inspectors to do the following:

(Parks - If you are instructed to do these things by your supervisor, be certain your time is not being charged to the ANS Fund.)

- Law Enforcement
- Campground Management
- Search and Rescue
- Fishing License or Area Enforcement
- Post Signage
- Manipulate the land in any way
- Boater Safety Checks
- Boat Registration Checks or Enforcement
- Bathroom cleaning
- Fee collections

What is NOT allowed in the workplace?

- Pets
- Sleeping on the Job
- Marijuana, Drugs or Alcohol of any kind
- Violence in the workplace
- Smoking while Boaters/Visitors are Present
- Concealed weapons (even with permit)

- Leaving the Ramp Unattended

Equipment

Equipment is for use at the inspection station, by the inspection employees for inspection and decontamination only.

- Report broken or missing equipment to your crew leader or supervisor.
- Do not remove equipment from the site.
- Do not use state equipment for any purpose other than what it was intended by your employer.
- We are not allowed to charge for inspection or decon.
- We are not allowed to accept $ tips.
- Please do not attempt to sell CPW or Authorized Location equipment.
- Be sure to return all equipment at the end of the season.

What Are The Mandatory Inspection Laws and Regulations in Colorado?

Resident boats must pass a state-certified watercraft inspection if:

- The watercraft has launched out of state.
- The watercraft has launched on any of the Colorado waters where ANS has been detected. The watercraft must be must be inspected prior to leaving.
- The watercraft is being launched in a lake or reservoir where inspections are required.
- Out-of-State boats must pass a state-certified inspection and/or decontamination if they plan on launching the watercraft in any Colorado lake, reservoir or waterway.

Types of WID Stations

- ***Negative Prevention Waters*** – Waters that have never had a verified detection of any ANS or have not had a detection within the time frame for de-listing.
- ***Other ANS Containment Water*** – Waters that are positive for an Other ANS. They have a verified presence of an ANS listed in Chapter 8 regulations other than zebra or quagga mussels. Most ANS Positive waters are also prevention waters for mussels and other ANS.
- ***ZQM Containment Water*** – Waters that have had a verified zebra or quagga mussel detection.
- ***Off Water WIDS*** – Authorized locations that are not located at a water body.

The Goal for Every Boat

Clean, Drain, Dry in between each and every use!

No Water. No Mud. No Plants. No Animals/Mussels.

What are My Priorities as a Watercraft inspector?

1. **Ensure Personal and Public Safety**
   Your safety and the safety of the public is your top priority at all times. Many vehicles and boats will be moving around the inspection area. People will be looking under wheels and through the watercraft. You will need to make sure all efforts are made to ensure the safety of all involved.

2. **Educate Boaters**
   Every contact you make with boaters must educate them about the importance of controlling zebra and quagga mussels and other ANS. Boaters must realize that ANS are spread by their actions (or inaction). They must understand that they have a lot to lose, in terms of access and recreational opportunities, if they do not help in this effort.

3. **Performing Inspections**
   By following the inspection procedure detailed later in this chapter, inspectors are ensuring watercraft is clean, drain and dry prior to launching and exiting.

4. **Draining Standing Water**
   Colorado's WID procedures are largely based on mitigating the risks associated with organisms that get transported from one water body to another in standing water. These organisms (e.g. mussel veligers, pathogens or plant fragments) are typically microscopic so it is of the highest importance that standing water be drained in between each and every use.

5. **Decontamination**
   If there is a known ANS or suspect ANS on a watercraft, or standing water that cannot be drained, sponged, pumped or toweled out, it must be decontaminated.

Education

The primary education message is **Clean, Drain, Dry**:

Clean—Remove all plants, animals, and mud. Thoroughly clean everything.
Drain—Drain every space or item that can hold water.
Dry—Make sure your watercraft is completely dry, which means sponging, toweling or pumping all water out.

What Equipment Do I Need?

Every inspector should have the following items when performing inspections:

Data Collector or Activity Log	Brochures and Educational Materials
L.E.D. Flashlight	Writing Utensil
Mirror	Digital Camera
Magnifier	Uniforms & Safety Vests
Wire Cutter	Sample Collection Kit

What Are The Types of Inspections?

There are three inspection protocols that will be described in detail later in this Chapter.

1. **Entrance Inspection**: This inspection procedure applies to all trailered, motorized watercraft before entering prevention or containment water bodies.
2. **Exit Inspection**
    a. **Negative and Other ANS Containment**: This procedure is for boats leaving a negative or other ANS positive reservoir. This inspection ensures that contact has been made with the boater before he/she leaves the boat ramp and verifies that the watercraft is clean and drained prior to leaving. Make sure the boater pulls all plugs, removes plants and live wells are empty.
    b. **ZQM Containment** This procedure is for boats leaving a water body listed as suspect, positive or infested with zebra or quagga mussels. Upon exiting, the inspector performs a full inspection and decontaminates those that can't be drained and are going to a different water body next.
3. **Off Water Inspection:** These inspections are mostly performed at offices and businesses that are not located at a water body. They could, however, be performed at a water body for someone needing a seal but not intending to launch at that location next. This is a hybrid entrance-exit inspection, which follows the entrance inspection procedure and ends with a seal application.

SEALS and RECEIPTS

A critical step in the entrance inspection procedure is to check for a seal and verify the receipt. The last step in the exit inspection procedure is to apply a seal and receipt. Therefore, it is critically important that inspectors understand the seal system before learning the full inspection procedures.

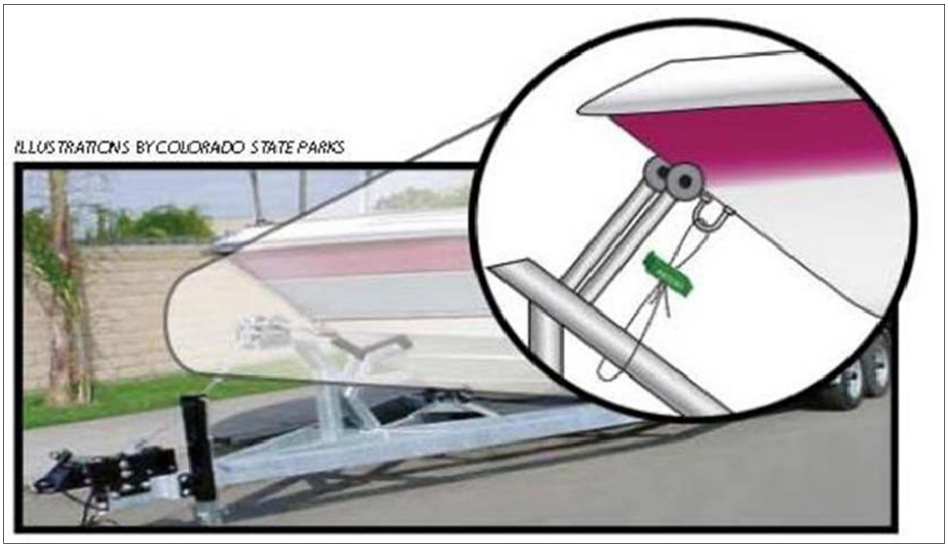
What is the green seal system?

Colorado uses a wire seal, coupled with a receipt, to communicate the location of the boat's last inspection or decontamination and associated information to the next inspector. The seal locks the watercraft to the trailer indicating to the last inspector it has not launched since the seal was issued. The receipt accompanies the seal and provides documentation regarding date of last inspection, protocol used, type of decontamination, if any and other important information.

It is imperative that you understand exactly how these seals are used and what they tell you about the risk level of that watercraft.

Where Are Green Seals Applied?

It is critical to attach the seal in a way that it will be broken if the watercraft is separated from the trailer. Typically, the wire seal goes between the eyebolt and hard, welded part of the trailer. Be advised that some winches can be unrolled completely and separated from the seal without breaking.



When Do Boats Get A Seal?

A. If a watercraft leaves a waterbody and pass an **exit** inspection or decontamination.
B. If a watercraft comes to an office or business WIDS and passes an off-water inspection or decontamination.

Exit Inspection with Seal Application Goals for WID Sites – 100%

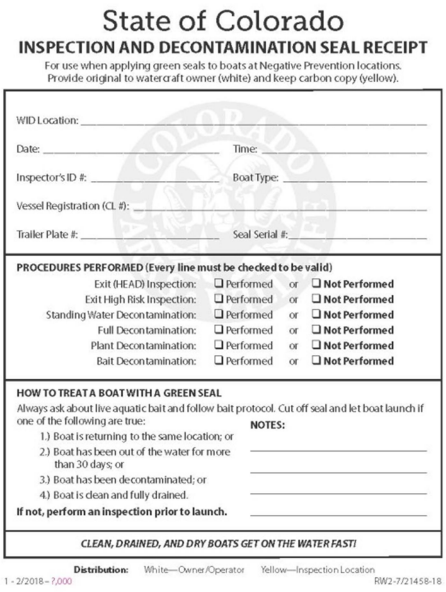
All WID Stations should strive to provide seals and receipts to **all** boaters exiting their sites.

Minimum Requirements for WID Exit Inspections:

- ***Prevention/Negative sites with pre-inspection*** must provide exit inspections with seals and receipts to <u>at least 80%</u> of boaters.
- ***Prevention/Negative sites without pre-inspection*** must provide exit inspections with seals and receipts to <u>at least 90%</u> of boaters.
- ***Other ANS Containment Waters*** must provide exit inspections with seals and receipts to <u>at least 90%</u> of boaters.
- ***ZQM Containment waters must provide exit inspections with seals and receipts to ALL boaters***

Seal Receipts

Seals are only valid with a matching receipt. The seal tells you that the watercraft has not launched since its last inspection. The receipt is very important because it tells you what kind of inspection and/or decontamination was performed at the last site, in addition to when it was performed and by whom. This information will tell you what level of inspection or decontamination, if any, is necessary for you to perform prior to launch.



State of Colorado

INSPECTION AND DECONTAMINATION SEAL RECEIPT

For use when applying green seals to boats at Negative Prevention locations.
Provide original to watercraft owner (white) and keep carbon copy (yellow).

WID Location: _____

Date: _____ Time: _____

Inspector's ID #: _____ Boat Type: _____

Vessel Registration (CL #): _____

Trailer Plate #: _____ Seal Serial #: _____

PROCEDURES PERFORMED (Every line must be checked to be valid)

Exit (HEAD) Inspection:	❑ Performed	or	❑ Not Performed
Exit High Risk Inspection:	❑ Performed	or	❑ Not Performed
Standing Water Decontamination:	❑ Performed	or	❑ Not Performed
Full Decontamination:	❑ Performed	or	❑ Not Performed
Plant Decontamination:	❑ Performed	or	❑ Not Performed
Bait Decontamination:	❑ Performed	or	❑ Not Performed

HOW TO TREAT A BOAT WITH A GREEN SEAL

Always ask about live aquatic bait and follow bait protocol. Cut off seal and let boat launch if one of the following are true:

1.) Boat is returning to the same location; or
2.) Boat has been out of the water for more than 30 days; or
3.) Boat has been decontaminated; or
4.) Boat is clean and fully drained.

If not, perform an inspection prior to launch.

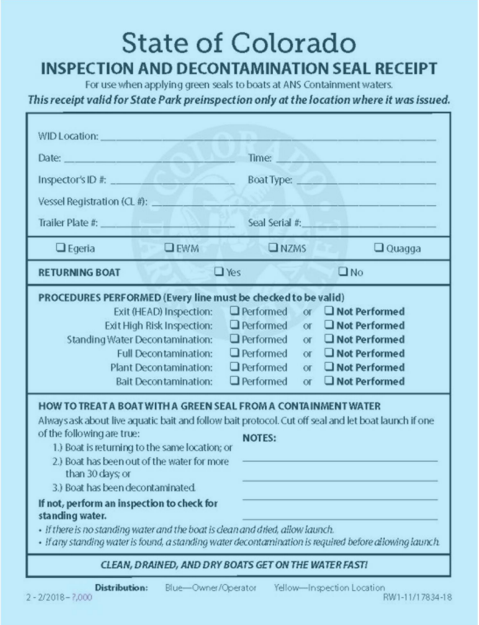
NOTES: _____

CLEAN, DRAINED, AND DRY BOATS GET ON THE WATER FAST!

Distribution: White—Owner/Operator Yellow—Inspection Location

1 - 2/2018 – 7,000 RW2-7/21458-18

Negative prevention waters *and* ***Off Water Locations*** will use white receipts with green seals.



State of Colorado

INSPECTION AND DECONTAMINATION SEAL RECEIPT

For use when applying green seals to boats at ANS Containment waters.
This receipt valid for State Park preinspection only at the location where it was issued.

WID Location: _____

Date: _____ Time: _____

Inspector's ID #: _____ Boat Type: _____

Vessel Registration (CL #): _____

Trailer Plate #: _____ Seal Serial #: _____

❑ Egeria ❑ EWM ❑ NZMS ❑ Quagga

RETURNING BOAT ❑ Yes ❑ No

PROCEDURES PERFORMED (Every line must be checked to be valid)

Exit (HEAD) Inspection:	❑ Performed	or	❑ Not Performed
Exit High Risk Inspection:	❑ Performed	or	❑ Not Performed
Standing Water Decontamination:	❑ Performed	or	❑ Not Performed
Full Decontamination:	❑ Performed	or	❑ Not Performed
Plant Decontamination:	❑ Performed	or	❑ Not Performed
Bait Decontamination:	❑ Performed	or	❑ Not Performed

HOW TO TREAT A BOAT WITH A GREEN SEAL FROM A CONTAINMENT WATER

Always ask about live aquatic bait and follow bait protocol. Cut off seal and let boat launch if one of the following are true:

1.) Boat is returning to the same location; or
2.) Boat has been out of the water for more than 30 days; or
3.) Boat has been decontaminated.

If not, perform an inspection to check for standing water.

NOTES: _____

- *If there is no standing water and the boat is clean and dried, allow launch.*
- *If any standing water is found, a standing water decontamination is required before allowing launch.*

CLEAN, DRAINED, AND DRY BOATS GET ON THE WATER FAST!

Distribution: Blue—Owner/Operator Yellow—Inspection Location

2 - 2/2018 – 7,000 RW1-11/17834-18

Listed waters will use blue receipts with green seals.

Boaters that lose their white receipt from prevention waters, or are returning to the same location with a valid white or blue receipt, and have an I/O, inboard or ballast tank will not be decontaminated per standing water rule 3A if the seal itself is intact and has no appearance of being tampered with. If these same circumstances are true but the boater does not have their receipt, the inspector must educate the boater to keep their receipt in the future.

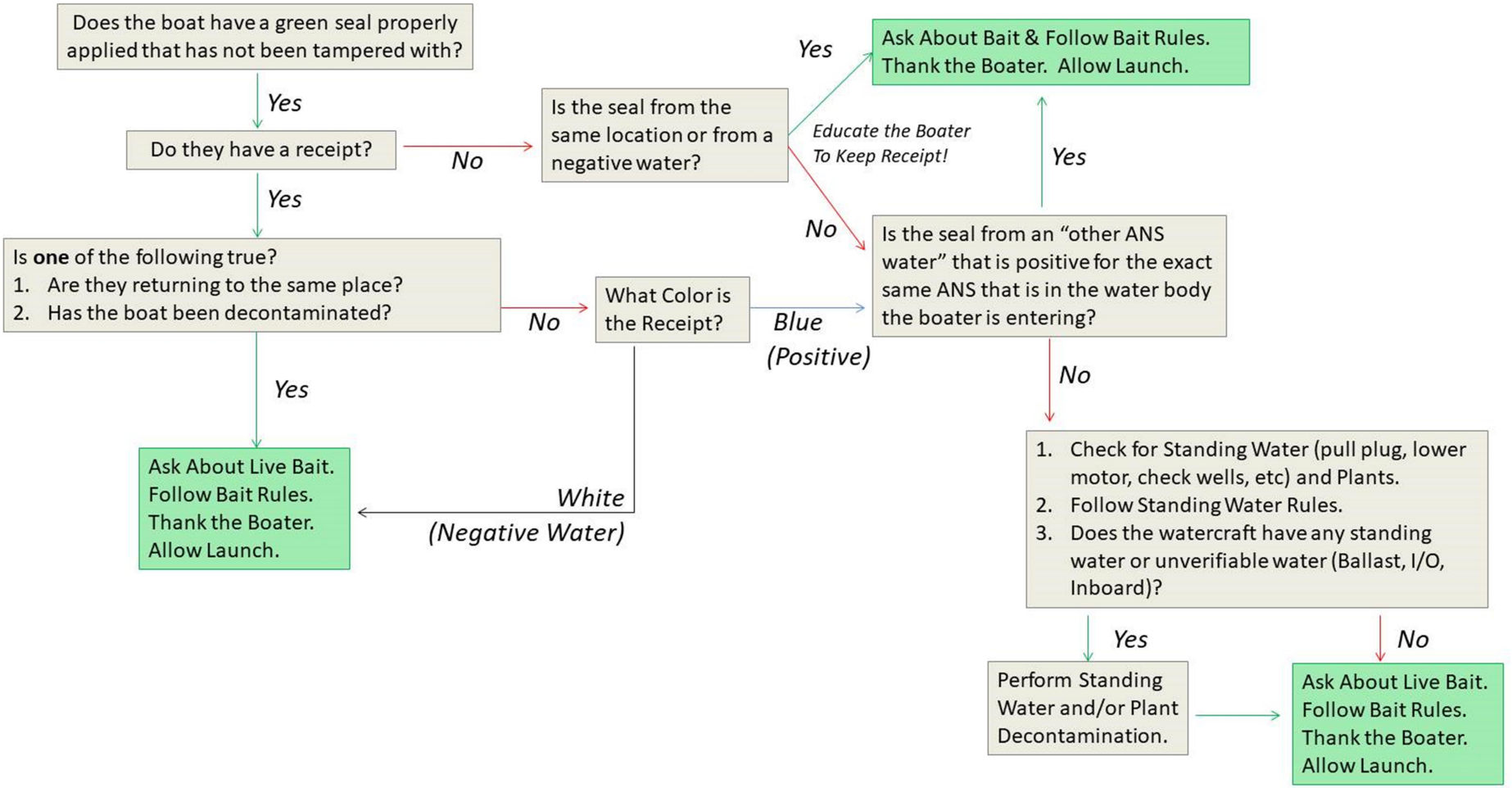
When applied properly, seals with receipts should greatly decrease the amount of time for the boater and the inspector. In most cases, the watercraft will not need to be re-inspected or decontaminated upon entry if they have a seal with a valid receipt.

Some state parks have a pre-inspection policy in place. Blue receipts are only valid for pre-inspection if they were decontaminated upon leaving the containment reservoir or if they are returning to the same location.

Seals Explained to the Public

- Green does NOT mean go!
- A green seal is proof of prior inspection.
- It will speed up your entry to the next water.
- You still have to stop at the inspection station and have the seal and receipt verified.
- You will be allowed to launch if you are returning to the same location or the watercraft is clean and dry.
- If you are not returning to the same location you may get a quick check prior to launching.
- If the watercraft is not clean and dry, you will most likely get re-inspected.
- Keep your watercraft clean and dry and get on the water fast!

Green Seal Removal Flow Chart 2019



How Do I Treat a CPW or Agency Boat with a Green Seal and Receipt?

As mentioned in Chapter 1, CPW staff is held to a higher standard than members of the public to ensure that CPW does not introduce an invasive species through work activities. ANS Sampling Staff, Aquatic Biologists and other CPW staff are required to perform a full decontamination on their boat, trailer and aquatic work equipment/gear between each water body. Depending on the work situation, there are multiple options for decontaminations and disinfection of equipment/gear detailed in CPW's *ANS Sampling and Monitoring Manual* (2019) and *Hazardous Analysis and Critical Control Point Plans* (2009-2012).

CPW staff must fully decontaminate their boats and trailers using a combination of high and low pressure hot water, following the step-by-step procedure detailed in Decontamination Chapter. No photos, samples or decontamination paperwork is required, except a seal and receipt. Decontamination units are assigned to a specific crew or biologist, typically stored with a portable water tank in the back of their trucks, or stored at a CPW office and shared among staff members.

CPW staff must be certified in inspection and decontamination. Following work activities on a water body, CPW staff must inspect their own boat, draining the watercraft and removing any mud or plant fragments during the inspection process (HEAD). Staff will decontaminate their watercraft. Staff has green seals that are labeled "CDOW BIO" or "CPW ANS" and they will seal the boat and issue a receipt.

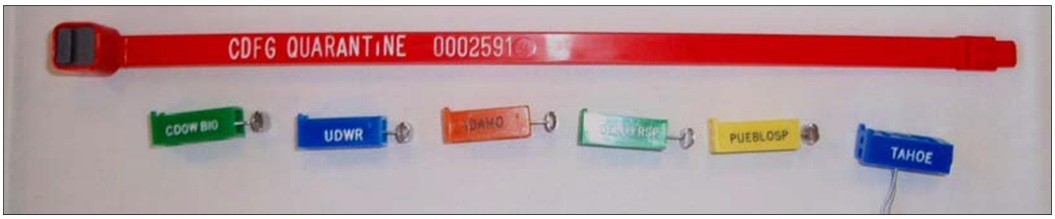
- When a **CPW Agency boat is entering** the lake or reservoir, staff will stop at the inspection station and give their seal receipt to the inspector. Inspectors must verify the seal and record the CPW boat as an "Agency" boat type on the Activity Log or Data Collector; and allow the staff to launch without inspection or further delay.
- When the **CPW Agency boat is exiting** the lake or reservoir, they are not required to stop for an exit inspection. They should be allowed to exit without delay, knowing the staff member is required to inspect and perform decontamination before the boat, trailer, gear and equipment is launched or used in a different water body. If the next water body is an Authorized Location, the staff member will issue the boat a green seal and receipt following decontamination.

  NOTE: With permission, CPW staff will often use the decontamination area at an Authorized Location for their decontamination before exiting and going to their next water body.

What Other Colored Seals Are Being Used in Colorado?

Color	Used By	Meaning
Blue	City of Aurora	City of Aurora Watercraft Access Pass Holders Only.
Red	City of Aurora	Quarantined boats that failed inspection (less than 5 per year)
Clear	City of Westminster	Standley Lake Permit Holders Only. 35 day quarantine and full decontamination required before launch. If boater intends on boating elsewhere, a full decontamination will be performed and a green seal and receipt applied. **POSITIVE FOR EWM!**

How Do I Treat a Seal That Is NOT Green?



Colorado greatly appreciates seals with receipts from all jurisdictions across the nation. This physical documentation indicates that a boat has not launched since the seal was applied and enables the inspector to adequately determine risk according to Colorado procedures.

Colorado inspectors must utilize the information on the receipt to properly determine risk. Colorado is concerned about stopping the spread of all ANS, and not just zebra or quagga mussels. Therefore, inspectors should inspect the watercraft and follow standing water procedures as if the watercraft is incoming from an Other ANS Positive Water (and you do not have the same ANS in your water body).

If the watercraft is from a jurisdiction outside of Colorado, inspectors must perform an inspection and follow standing water rules and triggers for decontamination.

Inspectors must use the accompanying seal paperwork, if any exists, to complete data requirements on the Activity Log or Data Collector.

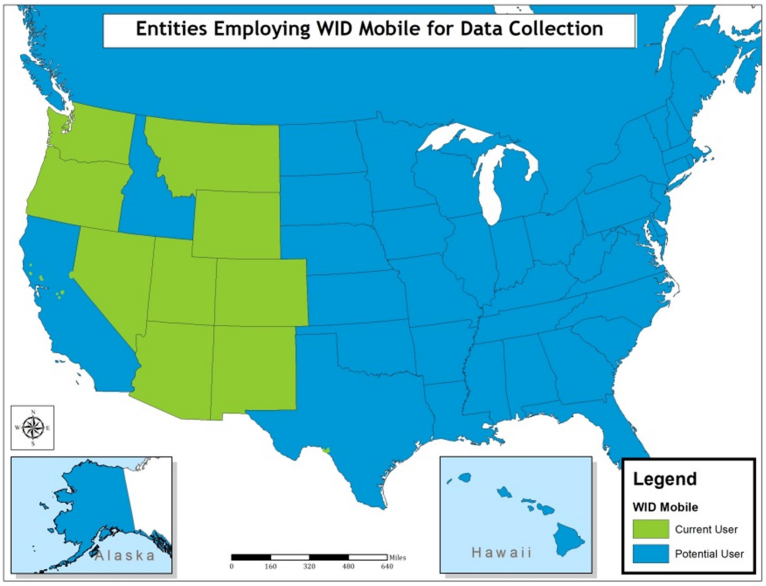
What Other Colored Seals Are Being Used in the West?

Entity	Seal Color	Description
California	Red	Red seals are for quarantined boats from border inspection stations. Paperwork/Receipt Given. *Note: Various local governments in CA have their own seals that are being used for a variety of purposes. To learn about a specific seal, visit https://www.wildlife.ca.gov/Conservation/Invasives/Quagga-Mussels and click on the last link under the Information Resources heading.*
Colorado	Green	Statewide Seal - Boat Passed a Successful Inspection and/or Decontamination. Receipt Given. *Note: The City of Aurora uses blue seals with no receipts, and the City of Westminster uses clear seals with no receipts for returning permit holders.*
Idaho	Orange	Boat Passed a Successful Inspection and/or Decontamination. ID will only issue a receipt if the boater indicates that they are going out of state. In-state boats are recorded electronically without giving the boater a paper receipt (ID uses a boater passport).
Lake Tahoe	Blue	Boat Was Last in Tahoe OR Passed a Successful Inspection and/or Decontamination. No Receipt Given.
Montana	White	Boat Passed a Successful Inspection and/or Decontamination. Receipt given.
New Mexico	Yellow	Boat passed Successful Inspection or Decontamination. Receipt Given.
Oregon	Red	Boat Passed a Successful Full Decontamination at Roadside Station. Boat is required to submit to quarantine after decontamination and red tagged boats have not yet completed the quarantine. Receipt Given.
Oregon	Yellow	Boat Passed a Successful Inspection at Roadside Station. Receipt Given.
Utah	Blue	Boat Passed a Successful Full Decontamination. Receipt Given. Seals are not given for inspection alone.
Utah – **Lake Powell**	Orange	Passed an inspection or decontamination. Receipt given.
Washington	N/A: No Seal	Receipt is given following inspection and/or decontamination.
Wyoming	Brown	Boat Passed a Successful Inspection and/or Decontamination. Receipt Given.

WID Data Collection

CPW utilizes the WID Mobile data collection system at more than 50 authorized locations within the state of Colorado. This application is compatible on all iOS and Android devices and also provides for much greater reliability in data collected at inspection stations.

Colorado leads the way in mobile data collection at a regional and national level. New Mexico has been using the Colorado system since 2014 and Utah since 2015. In 2016, the CPW Invasive Species program, with the help of a grant from U.S. Fish & Wildlife Service through the Quagga Zebra Action Plan for Western Waters (WRP, 2010), deployed a western regional version of the mobile data collection system for WID stations. In 2018, Montana, Washington and Wyoming joined Arizona, Nevada, New Mexico, Utah and the Lake Tahoe Regional Planning Agency in employing WID Mobile as their primary form of data collection. With the benefits of regional data sharing proving to be abundant, the states of Arizona, Nevada and Utah have been using the Colorado developed data collection system to send out notices of watercraft leaving their infested waters. This increased timely communication has directly increased the number of infested watercraft being intercepted within the western region. Many more states and agencies, such as NPS waters, are anticipated to join in 2019 and it is expected that all western states and potentially Canadian provinces will be using this system and sharing data by 2020. As user numbers continue to increase, this system will continue to improve communications amongst jurisdictions and assist watercraft inspectors in assessing the risk of watercraft intending to launch at their water body!



Demonstration – WID Mobile Regional Data Collection System

INSPECTION PROCEDURES

These procedures have been proven effective in identification and interception of watercraft that have zebra or quagga mussels, New Zealand mudsnails, rusty crayfish and noxious weeds. Following these protocols and educating the boater WILL prevent the spread of ANS.

Entrance Inspection Step-By-Step Procedure: All Waters

All stations regardless of status (positive or negative) perform entrance inspections for boats coming into the lake or reservoir.

Step 1 – Safety

- To ensure personal and public safety, you must ask the driver to turn off the engine, put on the parking brake and step out of the vehicle.
- Consider putting chocks under the wheels of the vehicle and the trailer. The inspector will have to climb on the watercraft and under the trailer, so it is important to prevent boats or trailer from rolling.

Step 2 – Greeting & Education

- Introduce yourself
- Provide the boater with a brochure or educational item
- Provide a brief verbal explanation of the purpose of inspection
- Inform the boater that you are looking for ZQM, and other invasive plants and animals, and what you are looking for (e.g. bumps on boats)
- Tell the boater that you are making sure their boat is clean, drained, and dry.

Step 3 – Initial Assessment

- Record on the Activity Log or in the Data Collector the following information:
  - In or Out
  - Registration Number
  - Trailer License Plate
  - ANS Stamp
  - Vessel Type
  - Propulsion Type

Step 4 – Check for Seal and Receipt to determine if boat is high or low risk:

Low Risk Boats are defined as those with:

- Green Seal + Matching receipt from same location
- Green Seal + Matching receipt (White – Negative Location)
- Green Seal + Matching Receipt (BLUE – Same ANS; Different Location)

Perform Seal Removal for Low Risk Boats:

- Verify seal and receipt match
- Ask about live aquatic bait and follow bait protocol
- Thank the boater and allow launch.

High Risk Boats are defined as those that:

- do NOT have a seal with matching receipt
- have a seal that is not from Colorado
- have a seal that is not green from a jurisdiction within Coloradohave a green seal + matching BLUE receipt from different location with other ANS

**Continue onto steps 5-8 for high risk boats.

Step 5 – Boating History

- Has the boat launched out of state in the last 60 days?
  - If yes, where?

- Where has the boat launched in the last 60 days?
  - Listen carefully and pay to notice if any of the locations listed are positive, suspect, or infested and record those in the data collector.

Note: Inspectors must ask both of the above questions!
There are reservoirs in other states that are named the same as ours (e.g. Sylvan Lake State Park in South Dakota or Cherry Creek Reservoir State Park in Illinois). If the inspector asks only one of the above questions, or combines these two questions into one "Where has the boat launched in the last 60 days?", it is likely the inspector will not get complete information, which could result in a mussel boat being allowed to launch and infest Colorado!

Step 6 – Live Aquatic Bait

- Ask boaters if they have live aquatic bait
  - If yes, follow bait protocol
  - If no, continue with inspection

Step 7 – Perform the visual and physical (tactile) entrance inspection of the watercraft, using the acronym H.E.A.D. to ensure that the watercraft is properly inspected.

Hull and Trailer – Rapid Exterior Inspection

- Look over (visual) and feel (tactile) the entire watercraft on both sides of hull and trailer
- Physically inspect the through hull fittings and document those that are for ballast tanks
- Check trailer bunks or rollers, tire wells, lights and electrical

- Remove any plants or plant fragments that are present
- Ask the boater to remove the bilge plug when inspecting the transom
- Physically and visually inspect the bilge area (e.g. feel the bilge area) and use a flashlight to visually see if any ANS are present
- If applicable, have the boater activate the bilge pump
- If the watercraft has an inboard engine, be certain to inspect the prop, prop shaft and rudder

Note: It is important to explain what you are looking for and educate boaters so that they can inspect their own boats. It is important to start and end inspection at the same place on each watercraft. Look the boat over and feel the hull with the boater. Both you and the boater should feel the ridges, seams, and recessed bolts of the craft. The young mussels may feel like bumps or sandpaper on the craft. If you or the boater feels a rough spot, look for attached mussels. Trailers can pose as high a risk as boats, so carefully check trailer rails, lights and electrical wires, as well as the license plate and trailer pads. This is a good opportunity to use your inspection mirrors and flashlights to help look into difficult nooks and crannies along the underside or hull and trailer.

Engine or Motor

- Ask for the outboard or I/O to be lowered
- Visually and physically inspect the engine with a flashlight
- Visually and physically inspect the gimbal area of the outboard or I/O with a flashlight
- Visually and physically inspect the transom or rear of the boat including instruments such as pitot tubes or transducers

Anchor and Equipment Checked

- Ask to see the anchor and anchor rope or chain
- Visually and physically inspect the anchor and rope or chain for mud, plants and/or ANS
- Check any additional equipment such as life vests, buoys, paddles, ropes, nets, etc.
- Ensure all equipment is clean and dry

Drain and Check Interior Compartments

- Ask for permission to board the watercraft and ask the boater to climb in first. Follow the boater into the watercraft in the same way they entered. Be careful to prevent the boater(s) and inspection staff from falling or getting hurt
- Ask the boater to open up compartments so you can see all bait wells, live wells, equipment lockers and ballast tanks or bags
- If the watercraft has standing water in the bait well or in any container, the inspector should work with the boater to remove standing water from the watercraft using a pump, sponge, or towel
- Ballast Tanks and Bags – physically and visually ballast tanks and bags
- I/O or Inboard Engine: carefully inspect the engine compartment and its bilge
- Ensure that the compartments are fully drained and dry

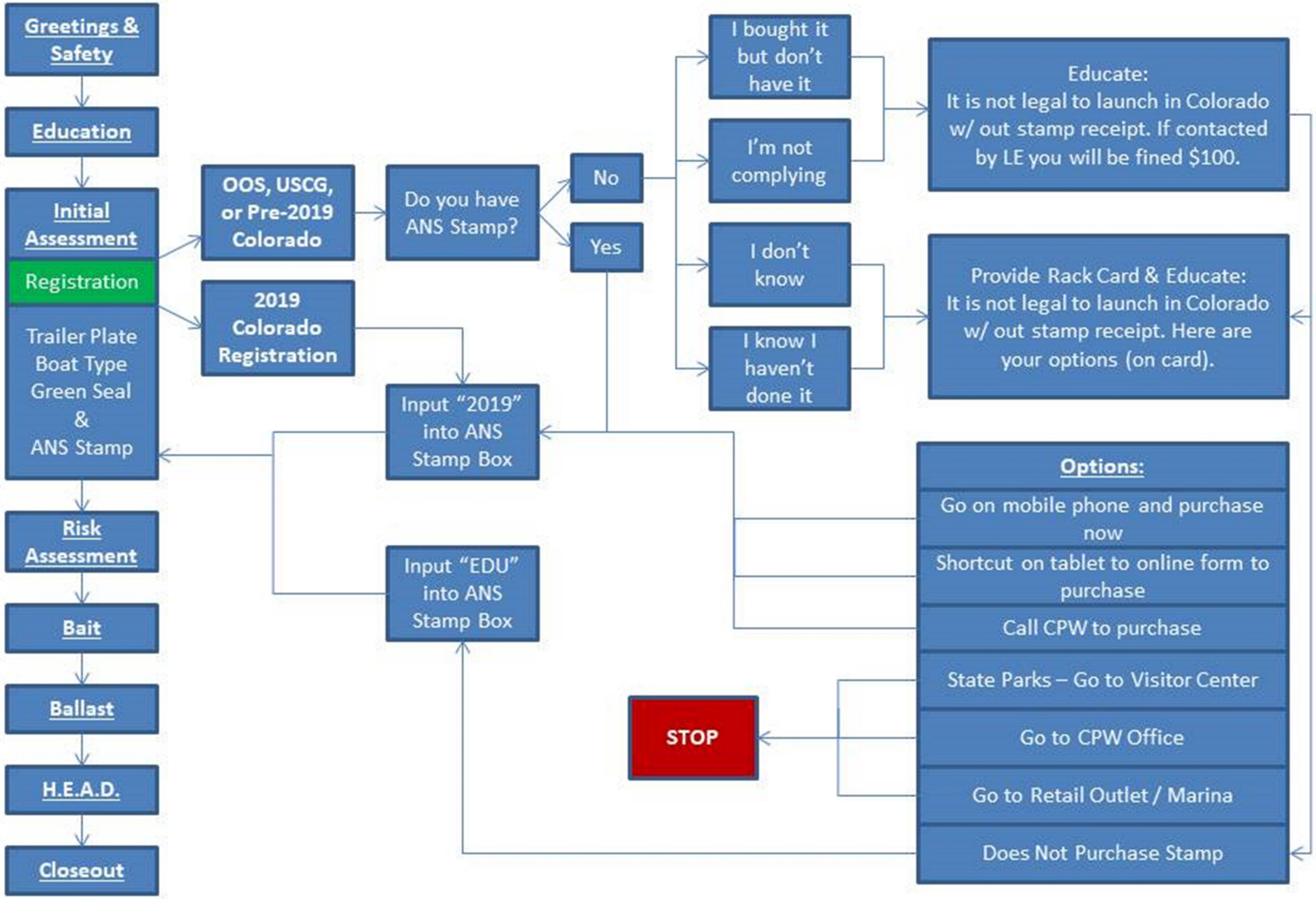
Note: Mandatory standing water decontamination for I/O engines, Inboard engines and ballast tanks or bags. Any other compartment with water that can't be drained must be decontaminated.

Step 8 - Encourage Exit Inspection and Closeout

- Remind the boater to replace bilge plug
- Ask the boater to raise the engine or motor to avoid damages during transport
- Ensure all inspectors are finished looking at the watercraft and document what was found
- Yell "stand clear" to ensure the safety of staff and the public
- Remind boater to get an exit inspection with a green seal and receipt on the way out to make the inspection process much quicker next time around

- Either instruct the boater on decontamination requirements – OR –
- Thank boater for keeping their boat Clean, Drain, and Dry and allow them to launch
- Complete the WID Activity Log or submit the Data Collector record

ANS Stamp Inspector Protocol



Exit Inspection Step-By-Step Procedure:

Exit Inspections are important to make an additional educational contact with the boater reinforcing that watercraft should be clean, drain and dry in between each use. It also verifies that the boater has followed the proper procedures to clean off the watercraft and completely drain all compartments prior to leaving. Lastly, it is required to obtain a seal and receipt.

Remind the boater of the negative impacts of zebra and quagga mussels and other ANS. Repeat the primary educational message Clean/Drain/Dry and explain why boaters need to do it each time they use their watercraft.

For exit inspections, the same procedure applies as on entrance. The exception is that the *Determining Risk Factors* portion is not performed.

Step 1 – Safety

- To ensure personal and public safety, you must ask the driver to turn off the engine, put on the parking brake and step out of the vehicle.
- Consider putting chocks under the wheels of the vehicle and the trailer. The inspector will have to climb on the watercraft and under the trailer, so it is important to prevent boats or trailer from rolling.

Step 2 – Greeting & Education

- Introduce yourself
- Provide the boater with a brochure or educational item
- Provide a brief verbal explanation of the purpose of inspection
- Inform the boater that you are looking for ZQM, and other invasive plants and animals, and what you are looking for (e.g. bumps on boats)
- Tell the boater that you are making sure their boat is clean, drained, and dry.

Step 3 – Initial Assessment

- Record on the Activity Log or in the Data Collector the following information:
  - In or Out
  - Registration Number
  - Trailer License Plate
  - ANS Stamp (for out of state boats and Colorado exempt boats only)
  - Vessel Type
  - Propulsion Type

ZQM & Other ANS Containment -- Ask the boater where they intend to launch the watercraft next?

If they plan to go to a different location, explain that their watercraft may need to be decontaminated before launching on a negative water body. Give them the rack card with additional information to review while you perform the exit inspection and issue the seal and receipt.

Other ANS Waters - Offer to provide them a decontamination before they leave your lake if resources allow.

ZQM Containment Waters – All watercraft destined for another location require a MANDATORY decontamination prior to leaving the containment body of water.

Step 4 – Check for Live Aquatic Bait

- Ask boaters if they have live aquatic bait.
    - If yes, recommend the boater properly dispose of bait in the trash or follow bait protocol in Chapter 5. If not, continue with inspection

Step 5 – Perform the visual and physical (tactile) entrance inspection of the watercraft, using the acronym H.E.A.D. to ensure that the watercraft is properly inspected.

Hull and Trailer – Rapid Exterior Inspection

- Look over (visual) and feel (tactile) the entire watercraft on both sides of hull and trailer
- Physically inspect the through hull fittings and document those that are for ballast tanks
- Check trailer bunks or rollers, tire wells, lights and electrical
- Remove any plants or plant fragments that are present
- Ask the boater to remove the bilge plug when inspecting the transom
- Physically and visually inspect the bilge area (e.g. feel the bilge area) and use a flashlight to visually see if any ANS are present
- If applicable, have the boater activate the bilge pump
- If the watercraft has an inboard engine, be certain to inspect the prop, prop shaft and rudder

Note: It is important to explain what you are looking for and educate boaters so that they can inspect their own boats. It is important to start and end inspection at the same place on each watercraft. Look the boat over and feel the hull with the boater. Both you and the boater should feel the ridges, seams, and recessed bolts of the craft. The young mussels may feel like bumps or sandpaper on the craft. If you or the boater feels a rough spot, look for attached mussels. Trailers can pose as high a risk as boats, so carefully check trailer rails, lights and electrical wires, as well as the license plate and trailer pads. This is a good opportunity to use your inspection mirrors and flashlights to help look into difficult nooks and crannies along the underside or hull and trailer.

Engine or Motor

- Ask for the outboard or I/O to be lowered
- Visually and physically inspect the engine with a flashlight
- Visually and physically inspect the gimbal area of the outboard or I/O with a flashlight

- Visually and physically inspect the transom or rear of the boat including instruments such as pitot tubes or transducers

Anchor and Equipment Checked

- Ask to see the anchor and anchor rope or chain
- Visually and physically inspect the anchor and rope or chain for mud, plants and/or ANS
- Check any additional equipment such as life vests, buoys, paddles, ropes, nets, etc.
- Ensure all equipment is clean and dry

Drain and Check Interior Compartments

- Ask for permission to board the watercraft and ask the boater to climb in first. Follow the boater into the watercraft in the same way they entered. Be careful to prevent the boater(s) and inspection staff from falling or getting hurt
- Ask the boater to open up compartments so you can see all bait wells, live wells, equipment lockers and ballast tanks or bags
- If the watercraft has standing water in the bait well or in any container, the inspector should work with the boater to remove standing water from the watercraft using a pump, sponge, or towel
- Ballast Tanks and Bags – physically and visually ballast tanks and bags
- I/O or Inboard Engine: carefully inspect the engine compartment and its bilge
- Ensure that the compartments are fully drained and dry

Step 6 – Apply Seal and Provide Valid Receipt

- Properly apply a green seal to watercraft and trailer.
- Hand the boater a copy of the green seal receipt.
- Explain that the seal is valid only if the receipt is kept and the seal has remained intact.

Step 7 - Closeout

- Ask boater to leave the bilge plug out during transport to ensure extra drain time.
- Ask boater to raise the engine or motor to ensure no damage to motor takes place.
- Ensure all inspectors are finished looking at the watercraft and that nothing was found.
- Thank the boater and remind them the importance of Clean, Drain, and Dry.
- Complete the WID Activity Log or submit the Data Collector record

Off-Water Inspection Procedure: All Waters

These inspections are mostly performed at offices and businesses that are not located at a water body. They could, however, be performed at a water body for someone needing a seal but not intending to launch at that location next. This is a hybrid entrance-exit inspection, which follows the entrance inspection procedure and ends with a seal application. Follow steps 1 – 7 of the Entrance Inspection protocol and complete the inspection with a seal application & closeout. For full explanations of these steps, please refer to the previous sections on Entrance & Exit Inspection procedures.

Step 1 – Safety

Step 2 – Greeting & Education

Step 3 – Initial Assessment

Step 4 - Check for Seal and Receipt to determine if boat is high or low risk

Step 5 – Boating History

Step 6 – Live Aquatic Bait

Step 7 - Perform the visual and physical (tactile) entrance inspection of the watercraft, using the acronym H.E.A.D. to ensure that the watercraft is properly inspected.

Step 8 – Apply Seal and Provide Valid Receipt

Step 9 - Closeout

Additional Considerations for Inspecting a Personal Watercraft (P.W.C.)

Personal Watercraft (P.W.C.) have a unique configuration and specific components that require additional considerations when performing an inspection. While the majority of the inspection protocol is unchanged when inspecting a P.W.C., the following modifications to Step 7 – The Visual and Tactile inspection of the watercraft should be implemented to ensure a fully cleaned, drained, and dry watercraft.

Step 7 – Perform the visual and tactile entrance inspection of the watercraft, using the acronym HEAD to ensure that the PWC is properly inspected.

Hull and Trailer – Rapid Exterior Inspection

1. Look over (visual) and feel (tactile) the entire watercraft on both sides of hull and trailer.
2. Physically inspect the through hull fittings.
3. Check trailer bunks or rollers, tire wells, lights and electrical.
4. Inspect the intake grate on the underside of the PWC.

5. Remove any plants or plant fragments that are present.
6. Ensure the boater has removed the bilge plug(s) when inspecting the transom. There are often two bilge plugs on a P.W.C. – one on each side of the jet.
7. Physically and visually inspect the bilge area (e.g. feel the bilge area) and use a flashlight to visually see if any ANS are present.
8. If applicable, have the boater activate the bilge pump.

Jet Engine

1. Visually and physically inspect the jet (Steering nozzle) with a flashlight.
2. Visually and physically inspect the transom or rear of the watercraft with a flashlight.
3. Stand clear and ask the operator to start the P.W.C.
4. Once started, have the operator rev the engine 2-3 times to ensure the engine and exhaust cooling systems are free of water.
5. If water is expelled from the jets during this process the watercraft should be sent for decontamination.

Anchor and Equipment Checked

1. Ask to see the anchor and anchor rope or chain.
2. Visually and physically inspect the anchor and rope or chain for mud, plants and/or ANS.
3. Check any additional equipment such as life vests, buoys, paddles, ropes, nets, etc.
4. Ensure all equipment is clean and dry.

Drain and Check Interior Compartments

1. Ask the operator to raise the seat of the P.W.C.
2. Inspect the engine compartment for mud, water, plants and mussels using a flashlight
3. Ask the boater to open the compartment in front of the handlebars.
4. Inspect the engine compartment for mud, water, plants and mussels using a flashlight
5. If the watercraft has standing water in either of these compartments, the inspector should work with the operator to remove standing water from the watercraft using a pump, sponge, or towel. If the watercraft can't be drained, it should be decontaminated.
6. Ensure that the compartments are fully drained to the best of your ability prior to launch.

Standing Water Rules

Again, it is very important that standing water be drained from watercraft to prevent the movement of microscopic mussel larvae or veligers, plant fragments, diseases and other animals from being transported. You must pay careful attention to all trailered watercraft that cannot be completely drained and therefore, contain standing water. Zebra and quagga mussel veligers are microscopic and capable of surviving up to 27 days in closed interior compartments.

Two Types of Water on Boats

Verifiable Water – This is water in compartments that you can see, feel or visually inspect, such as in wells or bilges. This is most of the water on most of the boats you will encounter.

Unverifiable Water – This is water in compartments (mostly ballast tanks) that you cannot see, feel or visually inspect. Inboard and Inboard/Outboard engines have unverifiable water in them.

Rule #1 –Watercraft from Other ANS Positive or ZQM Containment Reservoirs

A. ***If the watercraft has been in positive, infested or unknown waters and has any standing water, it is mandatory to send the watercraft to decontamination.***
    1. Even in cases where watercraft has an engine or a ballast tank that cannot be drained completely, it is mandatory to send the watercraft to decontamination and thoroughly flush those compartments.

Rule #2 –Boats with Verifiable Water

Incoming watercraft that is not green sealed from prevention waters should be clean, drained and dry. Sponge, pump or towel out standing water, or decontaminate, prior to allowing launch.

On exit from prevention and other ANS positive reservoirs, drain to the best of your ability and remind boater to dry.

Rule #3 –Boats with Unverifiable Water (Ballast, Inboards and I/O)

A. Boats with no green seal and receipt must get a mandatory standing water decontamination.
B. Boats returning to the same location do not need decontamination
C. Boats moving between Colorado prevention locations must be fully pumped out and no longer require decontamination in between launches

Educate all boaters to get green seals and receipts when exiting the reservoirs!

Live Aquatic Bait (see decontamination chapter)

What do the regulations say about live aquatic bait?

Colorado regulations require that **all live aquatic bait fish must be purchased from an authorized Colorado bait dealer** and must be accompanied by a **dated receipt**. The receipt is valid for ANS inspections for **seven days**.

- Live fish are only allowed for use as bait on the East Slope below 7,000 feet and at Navajo Reservoir.
    - In those areas, the transportation of live fish as bait is prohibited between waters unless it was purchased from a Colorado bait dealer, as described above.
    - Fish harvested in the wild for use as live bait can only be used in the water in which it was caught and can no longer be transported and stored for later use.
        - The exception is fish harvested within Baca, Bent, Crowley, Kiowa, Otero, or Prowers counties which can be transported and used only within those five counties.
- The transportation of live crayfish is prohibited on the west slope and from Sanchez Reservoir.
- It is unlawful to transport live bait across state lines without an importation permit.

What is the protocol for live aquatic bait treatment?

If a vessel has live aquatic bait in a container or a well with standing water, be sure to check the "Live Bait Present' field on the mobile application. Then ask the boater for a bait receipt.

NOTE: Under Colorado Fishing Regulations only live fish bait mandates a receipt that lists the name of the bait and the number. Other live aquatic bait, i.e. crayfish, salamanders, etc. will only have a basic store receipt without that information.
At authorized locations where live bait is allowed, the inspection or treatment will vary depending on the location and type of bait. If the boater has bait in a container or in a well with standing water, allow the boater to proceed and launch with the bait as is if:

- The receipt is from a Colorado bait dealer and
- The receipt is dated no more than seven days and
- The species listed on the receipt matches up with the bait in question

If the receipt is older than seven days, perform a bait treatment to remove the threat of ANS in the bait-water. Ask the boater to **remove** the bait from the vessels live well or container and **place it into a holding container**. The live well or container must be drained and decontaminated

using standard decontamination procedures (120*F water rinse with low pressure) before the bait is returned. If entering, the container or well water will be replaced with water from the lake or reservoir the boat is launching in.

If the boater DOES NOT have a receipt the live aquatic bait will not be permitted for use and will have to be properly disposed of in the trash. However, the following scenarios will result in a bait treatment being performed and the bait will be permitted for use following treatment:

- If the bait is fish and was harvested within ½ mile of the reservoir from man-made ditches or canals.
- If the bait is fish and was harvested within the SE six county exemption (John Martin Reservoir only).
- If the bait is wild harvested non-fish bait (frogs, salamanders, crayfish).

Out of state bait is not permitted for use. Do not allow it to be used at your water body.

When the boater leaves your waters, encourage him/her to properly dispose of bait in the trash, never in the water. Completely drain the live/bait well and any other containers. You may need to sponge or hand pump the water from the live/bait well out so that no water leaves your site.

What options does the angler have if the live aquatic bait is not allowed?

If the live aquatic bait is not allowed, the angler has a few options:

- Leave the bait in the car or truck.
- Dispose of the bait in the trash.
- Go fishing at a different lake or reservoir where that bait is allowed.

Reporting

All persons have a duty to immediately report a suspect ANS per the requirements set forth in the ANS Law. If you see something that you think is an ANS while you are fishing, boating or enjoying the outdoors, please call the ANS Program office and let them know.

There are two options for reporting:

1. State ANS Program Office: 1-303-291-7295
2. Email: Invasive.Species@state.co.us
3. Website: www.cpw.state.co.us

WIDS Reporting

For questions about data collection or submittal, please contact Robert.Walters@state.co.us.

WID Supervisors must send Activity Logs to CPW Invasive Species Program at 6060 Broadway, Denver, CO 80216 at the end of each month OR enter the data into the excel template provided and email excel files to Robert Walters.

WIDS using the mobile application on data collectors will send data into the online database via cellular or MiFi.

If you suspect that there is an **ANS on a watercraft** (e.g. mussel boats) or in the reservoir (e.g. plants or animals in the reservoir), it is required that you collect the specimen, properly document and report prior to decontamination. See Chapter 5 for detailed procedures regarding suspect watercraft and intercepting "mussel boats". You or your supervisor must call Robert or Elizabeth immediately. Documentation, samples and photographs must be sent in within 24 hours.

- Report
- Document
- Collect
- Decontaminate

Do not allow a known mussel boat to leave the WIDS without decontamination. Call Law Enforcement if the boater is not compliant and you need help!

State Parks Pre-Inspection Program

Pre-Inspection is a program in place at select State Parks to provide access outside of inspection hours. Boaters that launch during pre-inspection hours must have a valid green seal and receipt prior to launching or will be subject to fines.

1. Green seals with white receipts from negative prevention locations are valid for pre-inspection anywhere.
2. Green seals with blue receipts from containment locations are only valid for pre-inspection at the same site it was issued or following decontamination.
3. Out of State Seals are NEVER valid for pre-inspection.

Criteria for Pre-Inspection

- State Park must have law enforcement patrol available, preferably overnight, but definitely outside of inspection station hours of operation
- State Park is prohibited from closing or locking the ramps outside of inspection hours
- State Park has never had a zebra or quagga mussel detection or has been de-listed
- State Pre-Inspection is approved by the water body and/or water owner

In State Parks with pre-inspection, the certified "Agent" must inspect boats when the inspection station is open. When the inspection station is closed, boats must show proof of prior inspection by entering their own information into a log book and placing their seal and receipt into a drop box at the boat ramp.

Procedure for Pre-Inspection

1. Boaters cut off their seal and place seal and receipt in the drop box and fill out the log prior to launching.
2. Inspectors or Law Enforcement Officers compare log and seals to trailers.
3. Non-Compliant boaters are intercepted by law enforcement officers either on the water, or as they come off the water, and issued a $100.00 ticket.

Regulations for Citation

#103-n.5 pursuant to Title 33-10-106(2) (d) C.R.S. Unlawful [(launching) (attempt to launch) (operating) (removal)] of any [(vessel) (floating device)] without first submitting the [(vessel) (floating device) (specific equipment name) (associated equipment)] to inspection. V-Code: 6292L **Fine: $50.00.**

Title 33-10.5-105(1) (c) C.R.S.: No person shall knowingly or willfully refuse to comply with a proper order issued under this article. (First Offense) V-Code: 6292X **Fine: $150.00**

Chapter 4 Review

1. Our goal as inspectors for every boat is no _____, _____, _____and _____.

2. Rank the following in order of priority as an inspector (1-5, with one being most important)

_____Drain

_____Inspect – Assess Risk

_____Safety

_____Educate the boater

_____Decontaminate

3. Name three items that are mandatory equipment for an inspector during an inspection?

4. Which of these vessels should be impounded according to the Colorado protocol?

   a. The vessel with confirmed ANS and the boater refuses decontamination.
   b. The boater who is unhappy with the inspection process.
   c. The boater just came from WY with standing water and it's raining on the boat ramp.
   d. The boater has 6 gallons of ice and pop in the built-in cooler in their boat.

5. Circle true or false for the following statements about green seals.

   a. Green means go! True or False
   b. A green seal is proof of prior inspection. True or False
   c. It will speed up your entry to the next water. True or False
   d. You do not have to stop at the inspection station and have the seal and receipt verified. True or False
   e. You will be allowed to launch if you are returning to the same location or the watercraft is clean and dry. True or False
   f. If the watercraft is not clean and dry, you will most likely get re-inspected. True or False

6. As a civilian "authorized agent" you have the authority to:
   a. Impound watercraft
   b. Order a decontamination
   c. Search watercraft for alcohol and drugs
   d. Perform an inspection or decontamination with the permission of the operator
   e. None of the above

7. Which of the following is a way to remember how to do the hands-on part of an inspection?
    a. H.E.A.D. – **H**ull/Trailer, **E**ngine/Motor, **A**nchor and Anchor Rope, **D**rain Interior Compartments
    b. B.O.A.T. – Bait, Outboard, Anchor, Transom
    c. F.I.S.H. – Front, Interior, Sails, Handrails
    d. C.D.D. – Clean, Drain, Dry

8. At Other ANS Positive Containment reservoirs, it is ___that all boats be inspected upon exit.
    a. Mandatory
    b. Voluntary
    c. Optional

9. Which boats get a mandatory decontamination after boating in a containment reservoir? (circle all that apply)
    a. Boats with verifiable water that you can easily sponge out
    b. Boat with unverifiable water in a single ballast tank
    c. A canoe with an electric motor
    d. A cabin cruiser that has an inboard engine

10. When should you ask about live aquatic bait?
    a. Only when the boater does not have a green seal..
    b. Only when you see fishing poles on the boat entering the reservoir.
    c. Every time a boater enters or leaves your location, even when they have a green seal attached.
    d. Never. Checking for live aquatic bait is not part of the inspection process.

11. Boats with unverifiable water are required to get a standing water decontamination if they do not have a valid seal and white receipt from a negative reservoir (ballast, I/O, inboards) and are launching in a different water body next. True False (circle one)

12. What should you do if you suspect you have a mussel boat? (circle all that apply)
    a. Report
    b. Document
    c. Collect
    d. Decontaminate
    e. Panic

13. Name the three roles of the inspector and decontaminators:
    1. _____
    2. _____
    3. _____

14. Colorado Parks and Wildlife staff trains boat inspectors and decontaminators (a.k.a. Authorized Agents). It is the job of the Agents to train whom?

a. Boaters
b. Anglers
c. Members of the Public
d. All of the Above

15. How long are bait receipts from Colorado authorized dealers valid for?

a. 3 days
b. 5 days
c. 7 days
d. 10 days

16. What are the names for the two types of water found on boats?

a. Fresh water and salt water
b. Distilled water and spring water
c. Dirty water and clean water
d. Verifiable water and unverifiable water

17. Use or possession of live fish as bait is allowed West of the continental divide except at Navajo Reservoir?
True or False

18. Which of the following watercraft are considered "High Risk"? (Select All That Apply)

a. A boat that DOES NOT have a matching seal & receipt
b. A boat with a seal that is not green
c. A boat with a green seal and a blue receipt from a location with ANS not present at your WID station

Day 1 Homework

1. Memorize the 8-Step Entrance Inspection Procedure
2. Answer the Questions at the End of Chapter 1-4

Chapter 5
Decontamination Procedures

Content updated from the *CDOW Aquatic Nuisance Species (ANS) Watercraft Decontamination Manual, 2011*.

Made possible by a grant from

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CPW does not endorse any products or brands pictured or mentioned in this manual/chapter.

Chapter 5: Decontamination Procedures

Table of Contents

Why watercraft decontamination?

Invasive species, such as zebra or quagga mussels, are able to travel great distances over land by "hitchhiking" on watercraft. They can survive up to 30 days out of water depending on temperature and/or humidity. Through a comprehensive education, inspection and decontamination program, we can stop the spread of these costly invasives in Colorado and the West. Once detected on watercraft, zebra or quagga mussels and other aquatic nuisance species (ANS) can safely and effectively be killed and removed from the watercraft by certified personnel. The State of Colorado protocol requires the use of hot water with high or low pressure to decontaminate boats, motors/engines, trailers, personal gear, and other equipment. The objective of decontamination is to **kill** and **remove**, to the extent practical, all visible mussels or suspected ANS. Killing ANS prevents establishment of new populations as a result of watercraft/equipment transfer.

When will decontamination be required?

Most inspections will not result in a decontamination being performed. In fact, less than 1% of inspections resulted in decontamination from 2009–2014. However, there are many different circumstances that may result in a decontamination being performed:

- If zebra or quagga mussels are found attached to a watercraft.
- If any other ANS is positively identified or suspected on a watercraft.
- If suspect unidentifiable bumps are detected on a watercraft.
- If the watercraft is from a suspect, positive or infested water and has any water in it and has not been decontaminated.
- If the watercraft has unverifiable water (e.g. ballast tank, inboard or inboard/outboard engine) and does not have a green seal and valid receipt.
- If the watercraft or trailer has plants attached that can't be removed by hand.
- If the watercraft has live aquatic bait without a valid receipt.
- If the inspector deems a decontamination is necessary.

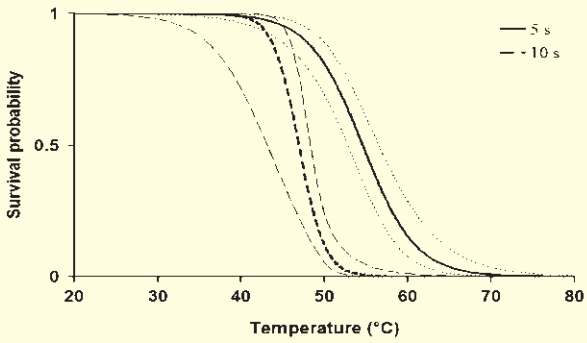
What does watercraft decontamination generally consist of?

Watercraft decontamination consists of a very hot water rinse or spray at high or low pressure. There are no soaps, bleaches or chemicals used or recommended at this time. The hot water kills the mussels and other ANS, and the high pressure spray removes them from the watercraft.

The general recommendation is to use 140ºF water at high pressure (3,000 psi) to decontaminate the hull and 140ºF water at low pressure to decontaminate motors/engines. Interior compartments are decontaminated with 120ºF at low pressure to avoid damaging pumps.

The graph below tells us that a 140ºF (60ºC) hot water rinse for ten seconds to each spot will kill all adult mussels. A 176ºF (80ºC) rinse for five seconds to each spot will kill all adult mussels. However, higher temperatures are not recommended for the protection of the watercraft.

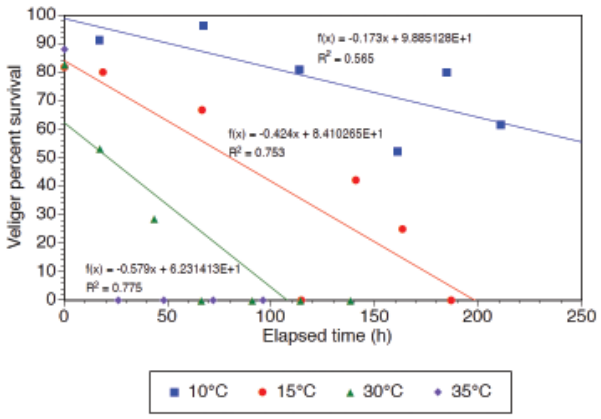
This graph shows the relationship between hot water temperature, time of rinse and survival probability of adult mussels.



Morse, John T.(2009) 'Assessing the effects of application time and temperature on efficacy of hot-water sprays to mitigate fouling by Dreissena polymorpha (zebra mussels Pallas)', Biofouling, 25:7, 605-610

The graph on the next page shows that there was 0% survival of quagga mussel veligers in water temperatures of 95ºF (35ºC). Therefore, the reduced temperature of 120ºF for interior compartment standing water decontaminations for the protection of the watercraft is more than sufficient to kill veligers in those interior compartments. This research also reinforces the importance of standing water decontaminations for boats leaving positive waters, even if no adults or settlers are found on the vessel, because it shows that veligers can live in standing water for up to 24 days at 50ºF (10ºC), 8.5 days at 59ºF (15ºC) or 4.5 days at 86ºF (30ºC).

The graph below shows the combined effects of time and temperature on the percentage survival of quagga mussel veligers held at 10, 15, 30, and 35°C (50°F, 59°F, 86°F and 95°F).



Christopher D. Craft and Christopher A. Myrick, Ph.D. (2011) Evaluation of Quagga Mussel Veliger Thermal Tolerance Final Report, prepared for Colorado Division of Wildlife, Invasive Species Program, p. 19.

What types of decontaminations will I do?

There are four different types of ANS decontaminations. Each of these will be described in great detail later in the manual.

Decontaminations performed must be documented on the *Watercraft Inspection And Decontamination Activity Log* under the "Results" headings.

Standing Water Decontamination
This protocol is performed to kill veligers or other microscopic ANS in standing water that can't be fully drained from the watercraft. This decontamination applies to interior compartments that contain water or have equipment that have come in contact with the water body. The interior compartments include but are not limited to: live wells, bait wells, bilge areas, and ballast tanks. The equipment includes but is not limited to: anchor, mooring and anchor lines, PFD's, swim platform, inflatables, down-riggers planning boards, water skis, wake boards, ropes, ice chests (used for bait or for holding fish), fishing gear, drift socks, bait buckets, and stringers. Standing water decontamination also includes flushing the outboard motor, inboard/ outboard engine, or inboard engine of a watercraft.

Standing water decontamination is mandatory if the:
- Watercraft did not get a decontamination when leaving a suspect, positive or infested water body and has **ANY** water in it.
- Watercraft has unverifiable water (ballast, I/O or inboard engines) and does **NOT** have a valid seal and receipt.
- If the watercraft is unable to be fully drained and the water can't be sponged, toweled or pumped out.

The standing water decontamination protocol requires that pump temperature ratings are taken into account when flushing or rinsing a compartment for standing water. Some, but not all, marine pumps are rated to withstand temperatures above 140°F. If the pump is rated to a lower temperature and is flushed with 140°F water, damage could occur. For this reason, the protocol requires turning the temperature down to 120°F for all interior compartment flushes or standing water decontaminations. Standing water decontaminations of engines are performed at 140°F at low pressure.

Plant Decontamination
This decontamination is performed whenever plant material cannot be removed from the watercraft or trailer by hand. This decontamination is localized and only requires using 140°F hot water for 15 seconds on the areas where plant material is located.

Bait Decontamination
This decontamination prevents the potential transfer of ANS being used as bait, or as contaminants in standing water in a bait well or bucket. Strict step-by-step procedures must be followed if the bait receipt is older than seven days. If the bait is from out of state, or the bait is not permitted, the bait should be disposed of in the trash. If the boater has no receipt, and the bait is allowed, follow the bait decontamination procedure found later in this book.

Full Decontamination for Suspected or Known Mussels or Other ANS
This protocol is performed when adult or settler mussels, unidentifiable bumps or other ANS are detected on the watercraft. This decontamination is the most complicated and ensures that the boat has been completely decontaminated inside and out. The inspector must complete a high risk inspection form prior to and after the decontamination, in addition to the four-page *(ANS) Documentation and Vessel Decontamination Form*. The inspector must take photos and samples for identification prior to doing a full decontamination.

In rare instances, you may require the assistance of law enforcement personnel to decontaminate or impound a boat. A few of the situations that would require a qualified peace officer to assist include an

uncooperative boat owner, an unavailable or broken decontamination unit, or instances in which an inspector simply can't get a fully encrusted watercraft decontaminated in one day.

Where should watercraft decontamination stations be located?

Ideally, watercraft inspection, draining, and decontamination should be located in the same general area. The location should be far enough from the water or boat ramp that drained bilge/ballast/well water and water from the decontamination unit cannot flow into the water body. This site is ideally on an access road where all boats must pass prior to launch and after exiting the boat ramp. The site should be far enough away from the ramp to allow users, especially overnight campers, to move through the interior of the state wildlife area or park without going through the inspection and decontamination station unnecessarily.

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Decontaminations should be conducted "high and dry," away from the water. The minimum requirements for decontamination unit placement include:

- Must be in a location where the water does not run off into the reservoir or lake.
- Must be on semi-permeable surface (gravel or dirt) where water absorbs into the ground or evaporates off.
- Must be in a location where the inspector can maintain visual and auditory contact with the inspection station (which in many instances is the boat ramp but not always).
- Must be in secure facility where the decontamination unit is locked up over night or when inspectors are not present.
- Must be protected from the elements—rain, wind, excessive cold.
- Must be in compliance with all waste water disposal requirements in local and state laws and regulations.

When should a portable water containment pad be used?

If a suitable site (high and dry, away from the water source, and on a semi-permeable surface) is not available, you will be required to use a water containment pad to ensure waste water is collected and properly disposed of.

If using a portable water containment pad, follow the protocol below for set up:

Roll out containment pad
1—Note how the pad is rolled up, so you can fit it back in the bottom bunk of the trailer.
2—Set up the waste collection pad so that the driver can drive straight on, without excessive wheel turning.
3—Ensure drainage to the waste water pump location on pad.
4—Ensure the waste water pump location is close to trailer.

Set up air pump
1—Connect the air pump to the battery.
2—Turn on the air pump to inflate the outer rim of pad quickly.
3—Remove the air pump and store it in the trailer.

Set up waste water pump
1—Put a small rock or piece of wood under one side of the pump to keep the pump from sucking up the mat.
2—Plug waste water pump into outlet on the side of the trailer.

Run the hose from pump into waste water recovery tank (or to drain area if not using tank)

What are the requirements for a decontamination unit?

- Adjustable temperature ranging between 120–140ºF
- Minimum flow of five gallons per minute
- Preferred pressure of 3,000 psi (minimum 2,500—maximum 3,500)

What are the standard operating procedures for a decontamination unit?

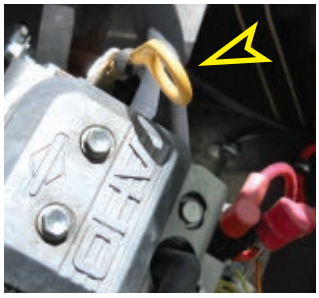
Be sure to follow the manufacturer's operating procedures specific to your unit.

Step-by-Step Operating Instructions for Trailered Hydro Tek Decontamination Units

Before start up

1—Check pump oil. Check pump oil by locating the yellow oil dip stick on top of the pump.

2—Check fluid levels. Check engine oil by locating the yellow dip stick on the engine. Check gasoline and diesel fuel levels in the tank.



3—Roll out the hose and double check all quick connects.

4—Connect the water supply and turn water on. Maintain an adequate supply of water using a 3/4 inch I.D. hose with a pressure between 25 and 60 psi. Burner power switches should be off before starting. If the decontamination unit is tank fed, be sure there is water in the tank and valve is switched for supply tank feed. **Do not run dry.**

Operation

1—Starting. Pull out choke and turn the key to start position only until engine starts. Push the choke in immediately after engine starts.

2—Purge air from system. Squeeze the trigger on the spray gun until a constant stream of water comes out. (Purging works best with the nozzle removed from the wand and/or dual wand in the low-pressure mode).

3—Select desired nozzle. Connect a 40° nozzle securely to the spray wand. Hold the gun firmly, squeeze the trigger for high-pressure spray. ***CAUTION: gun kicks back—hold with both hands.***

Step-by-Step Operating Instructions for Trailered Hydro Tek Decontamination Units (cont.)

4—Start the burner. To create hot water on high pressure washers equipped with heat exchangers, release the trigger on the gun, turn the burner to the "on" position, and turn the thermostat to the desired temperature.

Squeeze the trigger on the spray gun and the burner will begin heating the water. The burner will stop heating the water whenever the water spray is off or if the temperature setting is exceeded.

Be sure to test the water temperature prior to decontaminating to ensure you are working at the correct temperature for that procedure (either 140°F or 120°F).

5—Bypass mode. System will go into bypass mode when the machine is left running and the trigger gun is released. Bypass mode is when the inlet water coming into the pump re-circulates through the unloader across the pump head. If left in bypass too long—more than five minutes—friction created by the movement of the water will begin to heat the water at a rapid rate. If equipped with a bulk water tank, water can be bypassed back through the tank allowing for a larger volume of water to be re-circulated through the pump head, thus reducing heat on the pump seals.
WARNING: Do not leave in bypass for longer than five minutes to prevent the pump from overheating. Shut off the unit when not spraying water.

6—Perform appropriate decontamination protocol.

Shut down
WARNING: Cool down the burner before shutting off the decontamination unit.
1—Turn the burner switch to the off position.
2—Squeeze the trigger on the spray gun until the water becomes cool.
3—Turn the engine switch off.
4—Turn off water supply.
5—Squeeze the trigger to release any trapped pressure in discharge hose.
6—Drain water out of the hose and roll up.
7—Disconnect attachments and store properly.

What is included in the standard decontamination protocols?

To ensure that zebra and quagga mussels and other ANS are killed and removed, watercraft decontamination protocols include:

Safety!
Ensure staff and the public's safety by wearing all personal protective equipment, taking care to avoid slips, trips, falls, and burns. Use caution when operating the high pressure spray wand.

Education
Explain to the boater why decontamination is important and why we are doing it. You can direct them to the decontamination page of the *Boaters Guide to ANS Inspections* brochure and have them read it in a safe location while you perform the decontamination.

Removal
All mud, plants, water, and organisms must be removed from the vessel.

© PHOTO BY ELIZABETH BROWN

© PHOTO BY ELIZABETH BROWN

Decontamination
Thoroughly flush the interior compartments and spray the exterior of the watercraft with hot water.

- All discharge ports must be flushed with **120ºF** water at **low pressure** for one minute or until the water back flushes.
- All interior compartments that may hold water, including, but not limited to: live/bait wells, ballast, bilge areas and intakes must be flushed at **low pressure** with **120ºF** water.
- If a bilge pump is present, then it must be run until the bilge appears to be empty.
- The lower unit of the engine should be thoroughly flushed with **140ºF** water at **low pressure** until exiting water temperature is 140ºF.
- The Gimbal area must be sprayed with **low pressure 140ºF** water for 2 minutes.
- The exterior of the watercraft and trailer must be thoroughly decontaminated with **140ºF** water with **low** and **high pressure**.

Note: *Low pressure can be achieved with the wand by removing the nozzle and turning the handle away from you.*

When doing a full decontamination for suspect or known ANS, be sure to fill out all required paperwork, take photos before and after decontamination, collect samples and do a high risk inspection both before and after the decontamination.

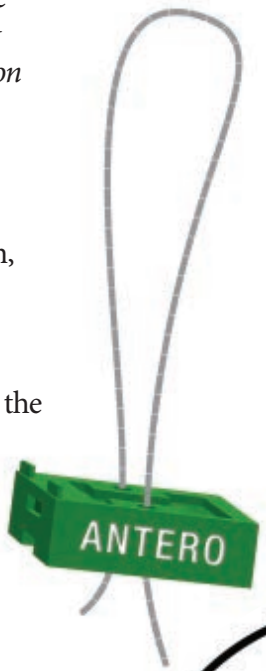
Bait
Depending on the location and type of live aquatic bait, the inspection or treatment will vary. See the bait treatment section.

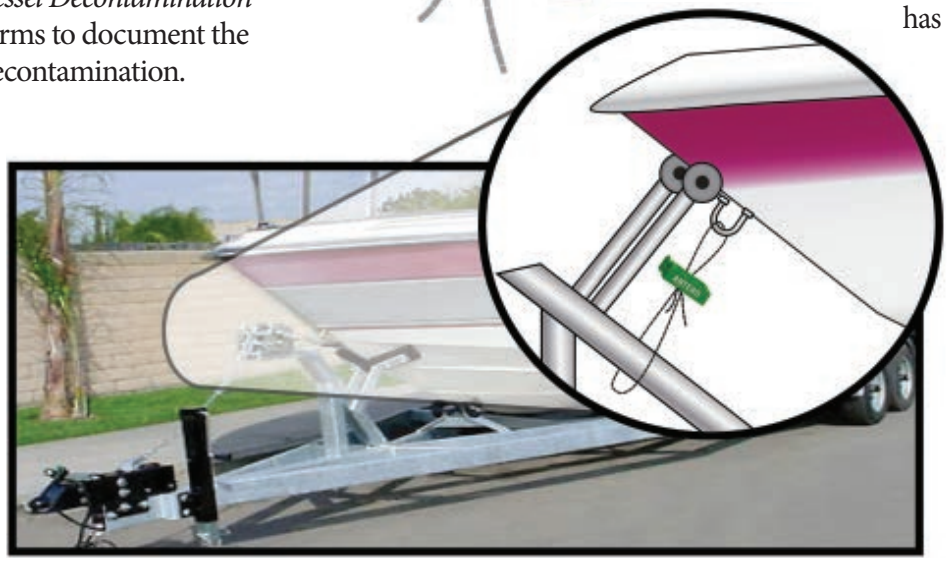
Report
Inspectors must report all full decontaminations by emailing Elizabeth.Brown@state.co.us. In addition, mail a copy of the four-page (ANS) Documentation and Vessel Decontamination Form, two High Risk (ANS) Inspection Forms and all photos to:

Colorado Parks & Wildlife
Attn: Invasive Species Coordinator
6060 Broadway, Denver, CO 80216

All other decontaminations are documented on the *Watercraft Inspection And Decontamination Activity Log*.

Green Seals
If the boat is leaving your site following any decontamination, apply a green inspection seal and give the boat operator a seal receipt. If you did a full decontamination, also provide the boater with the pink copies of the *High Risk (ANS) Inspection* and four-page *(ANS) Documentation and Vessel Decontamination* forms to document the decontamination.





What is the protocol for standing water decontaminations?

Zebra and quagga mussels start off life as microscopic, free-floating organisms called veligers that are too small to see with the naked eye. They can be transported to new locations in standing water in live wells, bilge areas, and other interior compartments on boats. Mussels aren't the only unseen invasive species. Others, such as the waterflea, are also microscopic and transported in the water from the lake or reservoir. Small plant fragments that get sucked up in water onto the boat could start a new infestation in another lake. To prevent the overland movement of all invasive species through standing water on boats, the lake or reservoir water must be fully drained out of the boat in between each use. If the standing water cannot be fully drained, the compartment needs to be decontaminated.

This protocol is used to force infested water out of the boat while killing veligers and other ANS in the water. The water must reach 120ºF coming out of the boat for interior compartments, or 140ºF for engines and motors. The high pressure wand is never used in this protocol.

If boats have been drained to the fullest extent possible and still contain standing water in the bilge, ballast tanks, live/bait wells, or engines, then you will need to follow the rules below to determine if decontamination is required.

- A boat from suspect, positive or infested water that was not decontamination upon exit, and has not been out of the water for more than 30 days, and has **ANY** standing water present, must be decontaminated. This includes water in ballast tanks, inboards and I/O engines.
- An undocumented boat (no seal and receipt) with unverifiable water (ballast tanks, inboards and I/O engines) **must** get a **mandatory** standing water decontamination.

- Colorado protocol requires that a boat must be clean, drained and dry before it is allowed into waters of the state. Therefore, if a boat has small amounts of standing water and the boat has **not** been in suspect, positive or infested waters, you must still get the water out of the boat. The inspector should have a small pump and sponges/towels available at the inspection station to assist with the draining of boats. If using these tools does not ensure a fully drained vessel (e.g. gravity emptied live wells with long discharge hoses) then the interior compartments with water remaining must be flushed with 120ºF water.

Be extremely cautious with OUT OF STATE BOATS because some other states do not have extensive sampling programs focused on early detection. We do not know which lakes are or are not infested in those states.

Interior compartments that may hold water, including, but not limited to live/bait wells, ballast, anchor compartments, bilge areas and their corresponding intake ports, must be flushed with 120ºF water at **low pressure**. This can be accomplished by removing the nozzle from the end of the wand or using a diffuser attachment.

Due to our research findings about ballast, bilge, or live/bait well pumps it is important to adjust the temperature of the decontamination unit to 120ºF to ensure that no damage is done to the pump during the decontamination process. Please keep in mind that the veligers will die at temperatures that exceed 95ºF.

Note: *Prior to decontaminating interior compartments with pumps, be sure that you have tested the temperature of the water to ensure that your unit is operating at 120ºF and verify using a digital thermometer that the water reaches 120ºF exiting the boat. Engines and motors are flushed using 140ºF low pressure hot water.*

Pump Temperature Rating Table	
Manufacturer	**Temperature Rating**
Atwood Corporation	130ºF
Johnson Pumps of America	170ºF
SHURflo Pumps	140ºF
ITT Manufacturers	120ºF

What are pump temperature ratings?

Pump manufacturers were consulted during the drafting of this manual. In rare occasions, marine transfer pumps could be damaged by the use of hot water temperatures during the decontamination process. More research is needed in this arena. The following is a list of some popular manufacturers, pump types and their recommended temperature ratings. Due to the complexity of pumps and the various brands and ratings, it is required that interior compartments are decontaminated at 120ºF with low pressure.

Attwood Corporation. Makers of bilge pumps. Models include: Sahara, Heavy Duty, and Tsunami. They also carry the Tsunami Aerator for live wells. Pumps are rated at 130ºF. However, they can withstand 140ºF for approximately five minutes before damage may occur.

Johnson Pumps of America. All of their pumps are rated for 170ºF.

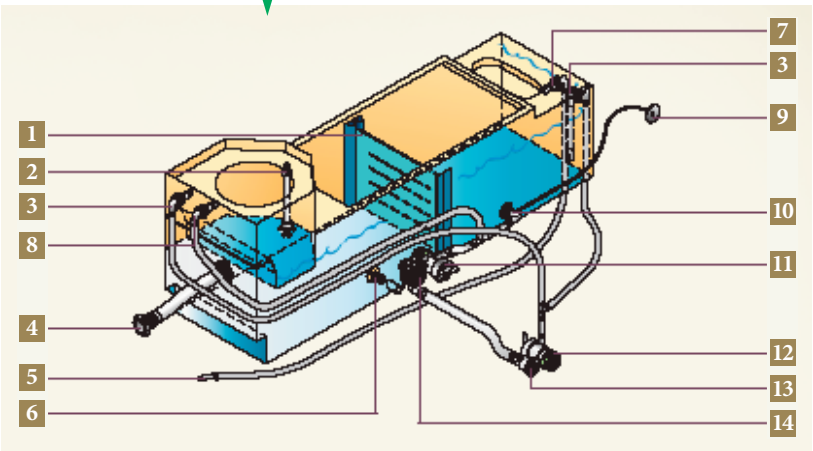
SHURflo Pumps. All of their current pumps will tolerate 140°F. However, they will incur damage at temperatures of 145°F and above due to the ABS plastic that they use.

ITT manufacturers. They make Rule pumps. Their pumps are rated for 120°F. Extended exposure at hotter temperatures will cause damage.

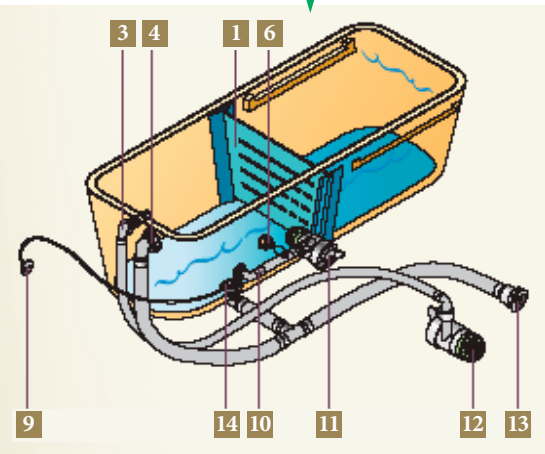
Examples of live well and aerator pump diagrams
Below are some examples of live/bait wells from the Lund Boat Company. This section is intended to provide decontaminators additional information regarding the complexities of wells.

Only low pressure and 120°F water can be used when decontaminating a live/bait well to ensure no damage is done to any of the numerous parts.

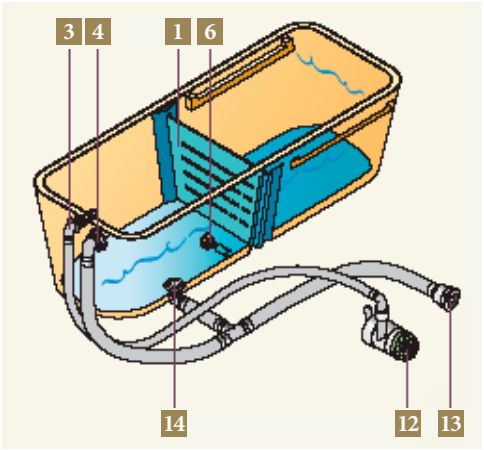
The **ProLong Plus** is designed with a freshwater pickup integrated into the bottom of the hull where it forces a steady flow of water into the live well while the boat is running.



This a **two-pump design**. One pump fills and aerates the well from above the fish while the other recirculates and injects fresh air via the Max-Air system for the oxygenation.



This live well features a **single pump** with a single-switch control. The aerator pump can be run continuously in manual mode or intermittently in automatic mode when equipped with a timer.



The numbers on the following list refer to individual parts shown in all three diagrams.

1—Removable divider
2—Baitwell drain
3—Fill spray head
4—Overflow
5—Freshwater pickup
6—Waterproof light
7—Freshwater pickup spray head
8—Recirculating spray head
9—Max-Air intake
10—Recirculating outlet
11—Recirculating pump with filtration screen
12—Aerator pump with filtration screen
13—Through-hull drain
14—Drain with plug

Step-by-Step Procedure for Standing Water Decontaminations

Standing Water Decontamination of Interior Compartments

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

- Check all fluid levels of the decontamination unit. With the trigger squeezed, start the unit and purge the water until it runs clear.

2—Turn on the burner, and measure the temperature of the water.

3—Start the decontamination by placing the tip of the wand (nozzle removed) or the diffuser on the through hull discharge port(s) and flush this for one minute or until the water back flushes. Diffuser attachment shown.

4—Turn off the decontamination unit by turning the burner off first and then turn off the key so that the unit does not stay in the bypass mode too long while you are climbing into the boat to flush the interior compartments.

5—Next, have the boat operator open all interior compartments that need to be decontaminated and remove plugs. Restart the decontamination unit and flush the compartment. Use a thermometer and measure the temperature at the through hull discharge port for that compartment. Continue flushing until the exit temperature of the water is 120ºF. Be sure to keep the tip of the attachment close to the sides of the compartment to prevent temperature loss. Start at the bow of the boat and work your way to the stern.

6—If equipped, have the boater turn on the discharge pump for the compartment.

7—Turn off the decontamination unit when you have completed decontaminating all necessary interior compartments. Turn the burner off first, run some water through the boiler and then turn off the key. Follow the standard operating procedures for shutting down your decontamination unit.

8—On the *Watercraft Inspection And Decontamination Activity Log*, be sure to mark "Standing Water Decontamination" under the "Results" section.

9—If exiting, apply a green seal and give the boater a properly filled out receipt. Remind the boater to dry.

Step-by-Step Procedure for Standing Water Decontaminations (cont.)

Standing Water Decontamination of Outboard Motors and Inboard/Outboard Engines

Outboard Motor


Inboard/Outboard Engine

All decontamination stations should have at least two models of decontamination muffs; a type for the newer Mercury engines that threads through the intake ports that are completely open; and another clamp style muff for all other engines.

- 140°F exit temperature
- Low pressure

The following photos show the use of the threaded Mercury muffs.

1—Attach the hose to the end of the wand (quick connect fitting).

2—Then attach the muff attachment to the hose.

3—Make sure the motor/engine is completely lowered. Place the muffs so that all the intake openings are completely covered. When threading the Mercury muffs, place the wire through the center opening to ensure all openings are covered.

4—Start the decontamination unit following the standard operating procedures.
5—Start the water by engaging the trigger. Check to make sure the intake openings are still covered on both sides and that the muffs are tight.

6—Stand clear of the propeller and have the boat operator start the motor/engine in **Neutral**.

7—Flush the engine until the water temperature is 140°F when measured by a thermometer at the discharge port(s).

8—Have the boat operator turn off the motor/engine.
9—Turn off the decontamination unit by turning the burner off first, run some water through the boiler and then turn off the key. Follow standard operating procedures for shutting down your decontamination unit.
10—Remove the muffs and allow the motor/engine to drain; have boat operator raise and lower the motor/engine twice.
11—On the *Watercraft Inspection And Decontamination Activity Log*, be sure to mark "Standing Water Decontamination" under the "Results" section.
12—If exiting, apply a green seal and give the boater a properly filled out receipt. Reminder the boater to dry.

Step-by-Step Procedure for Standing Water Decontaminations (cont.)

Standing Water Decontamination of Inboard Engines and their Bilges

Note: *Most inboards, but not all, that have the engine in the center of the boat do not have ballast tanks.*

- Engine: 140°F exit temperature
- Bilge: 120°F exit temperature
- Low pressure

All inboard intakes, which are located on the bottom of the hull directly under the engine, have a cover over the opening that protects the engine from sucking up large particulates. Some inboards have a hose attachment in the engine compartment for decontamination. However, this boat still needs to have hot water flushed between the intake hull fitting and the hose that connects to the engine for thorough decontamination.

1—Attach the hose to the end of the wand (quick connect fitting) and then attach the fake-a-lake attachment.

2—The fake-a-lake must be placed snuggly against the bottom of the hull covering the intake port for the inboard.

3—Start the decontamination unit following the standard operating procedures.
4—Start the water by engaging the trigger.
5—Stand clear of the propeller and have the boat operator start the engine in Neutral.
6—Flush the engine with low pressure water until the exit temperature of the water is 140ºF when measured with a thermometer at the discharge port(s).
7—Have the boat operator turn off the engine.
8—Turn off the decontamination unit by turning the burner off first and then turn off the key.
9—Remove the fake-a-lake from under the boat; disconnect the hose from the wand.
10—Flush the bilge with 120ºF low pressure water.

a. Make sure that the bilge plug, located in the center access area, is **in**.

b. Add **4–5** gallons of water into the bilge by putting the wand (nozzle removed) down behind the engine next to the floor.

c. Then **remove** the bilge plug and continue to flush until the exiting water reaches 120ºF.

11—Turn off the decontamination unit by turning the burner off first, run some water through the boiler and then turn off the key, and have the boat operator run the pump to assist in water removal. Follow the standard operating procedures for your decontamination unit.
12—On the *Watercraft Inspection And Decontamination Activity Log*, be sure to mark "Standing Water Decontamination" under the "Results" section.
13—If exiting, apply a green seal and give the boater a properly filled out receipt. Remind the boater to dry.

Step-by-Step Procedure for Standing Water Decontaminations (cont.)

Standing Water Decontamination of Ballast Tanks

Note: *Most inboards, but not all, that have the engine in the center of the boat do not have ballast tanks.*

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

- Check all fluid levels of the decontamination unit. With the trigger squeezed, start the unit and purge the water until it runs clear.

2—Turn on the burner, and measure the temperature of the water.

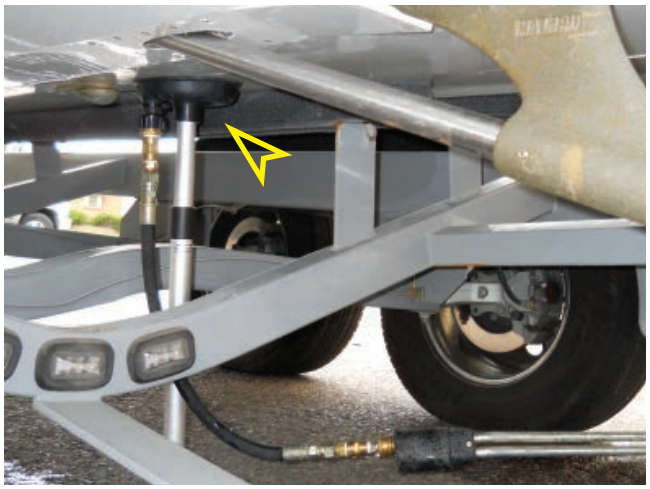
- 120°F exit temperature
- Low pressure

3—Once the water temperature reaches 120°F, start the decontamination by placing the tip of the wand or the diffuser on the through hull discharge port(s) and flush this for **one** minute or until the water back flushes.

4—Turn off the decontamination unit by turning the burner off first and then turn off the key so that the unit does not stay in the bypass mode too long while you are changing the attachments.

5—Attach the hose to the end of the wand (quick connect fitting) and then attach the fake-a-lake attachment.

6—The fake-a-lake must be placed snuggly against the bottom of the hull covering the intake port for the ballast tank.



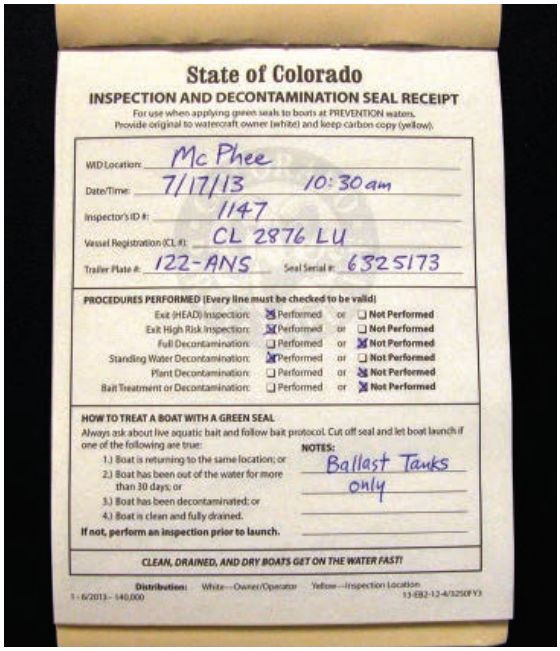
7—Start the decontamination unit and then start the water by engaging the trigger.

8—Have the boat operator turn on the intake ballast pump. Fill it up with low pressure or until the exit water temperature reaches 120ºF. If there is no ballast tank discharge pump, flush the ballast tanks with 120ºF water for at least 3–5 minutes.

If you have a "mussel boat" and are doing a full decontamination, fill up each ballast tank and drain it twice with hot water at 120ºF.

All other scenarios, ballast tanks will be flushed until the decontamination water temperature exiting the watercraft is 120ºF.

9—Have the boat operator turn off the intake ballast pump. Release the trigger to stop the water flow.
10—Turn off the decontamination unit by turning the burner off first, run some water through the boiler and then turn off the key so that the unit does not stay in the bypass mode too long while you are changing the location of the fake-a-lake.
11—Have the boat operator turn on the ballast tank discharge pump to drain the tank as much as possible.
12—Repeat these steps for every ballast tank.
13—On the *Watercraft Inspection And Decontamination Activity Log*, be sure to mark "Standing Water Decontamination" under the "Results" section.
14—If exiting, apply a green seal and give the boater a properly filled out receipt. Remind the boater to dry.



State of Colorado
INSPECTION AND DECONTAMINATION SEAL RECEIPT
For use when applying green seals to boats at PREVENTION waters.
Provide original to watercraft owner (white) and keep carbon copy (yellow).

WID Location: Mc Phee
Date/Time: 7/17/13 10:30 am
Inspector's ID #: 1147
Vessel Registration (CL #): CL 2876 LU
Trailer Plate #: 122-ANS Seal Serial #: 6325173

PROCEDURES PERFORMED (Every line must be checked to be valid)

Exit (HEAD) Inspection:	☒ Performed	or	☐ Not Performed
Exit High Risk Inspection:	☒ Performed	or	☐ Not Performed
Full Decontamination:	☐ Performed	or	☒ Not Performed
Standing Water Decontamination:	☒ Performed	or	☐ Not Performed
Plant Decontamination:	☐ Performed	or	☒ Not Performed
Bait Treatment or Decontamination:	☐ Performed	or	☒ Not Performed

HOW TO TREAT A BOAT WITH A GREEN SEAL
Always ask about live aquatic bait and follow bait protocol. Cut off seal and let boat launch if one of the following are true:
1.) Boat is returning to the same location; or
2.) Boat has been out of the water for more than 30 days; or
3.) Boat has been decontaminated; or
4.) Boat is clean and fully drained.
If not, perform an inspection prior to launch.

NOTES: Ballast Tanks only

CLEAN, DRAINED, AND DRY BOATS GET ON THE WATER FAST!

Distribution: White—Owner/Operator Yellow—Inspection Location
1 - 6/2013 - 140,000 13-EB2-12-4/3250F V3

What is the protocol for plant decontamination?

True aquatic plants are defined as plants that are normally completely or mostly submerged in water and are unable to survive for long periods outside of water. Submerged aquatic weeds are commonly transported via watercraft, usually by getting tangled around motors, engines, and anchors. Most aquatic weeds can establish new populations with only a tiny fragment of the parent plant. Those tiny fragments can be carried overland on watercraft, trailers, anchors, fishing equipment, water ski equipment, etc. It is the inspectors and the boaters responsibility to ensure plants are not transported on boats.

During the entrance and exit inspection, any plant or plant fragment must be hand removed and properly disposed of away from the lake or reservoir by the inspector or boat operator. However, there may be a situation when plant material is caught between the hull of the vessel and the trailer bunk or roller, or is wrapped around the propeller or transducer, and can't be completely removed by hand.

It then becomes mandatory for the boat inspector to decontaminate those areas of the vessel where the plant fragments remain. **Remember**—heat kills.

- 140°F exit temperature
- Low or high pressure
- 15 seconds

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Step-by-Step Procedure for Plant Decontamination

1—Start the decontamination unit using the standard operating procedures for your unit.
2—Apply low pressure 140°F water directly to the plants or plant fragments for 15 seconds.
3—Decontaminate areas where plants are located and can't be removed:

If plant material is found on a boat with ballast tanks, the tanks must be flushed to eliminate possible fragments within.

a. **Trailer's carpeted bunk.** Use 140°F water at low pressure. Move the wand/diffuser **slowly** along the length of the bunk. Keep the tip of the wand/diffuser close to the bunk to maintain an even temperature.
b. **Trailer's frame, and rollers.** Use 140°F water at high pressure. Move the wand/diffuser **slowly** along the length of the trailer. Keep the tip of the wand/diffuser close to the trailer to maintain an even temperature.

c. **Propeller.** Use 140ºF water at high pressure. Be thorough and remove 100% of the plant material. In order to avoid too much spray when decontaminating the propeller, the boat decontaminator can turn the wand handle one quarter turn away from him/herself to lower the pressure.

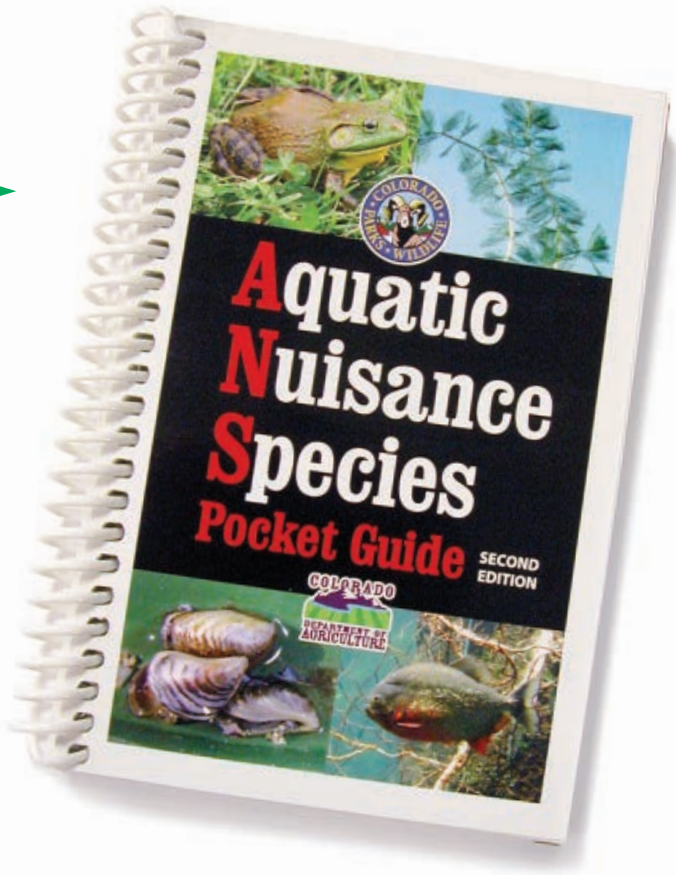
d. **Transducer.** Use 140ºF water at low pressure. The wiring and "water wheel" attached to this instrument dictate that low pressure is used in order to prevent damage.

e. **Interior compartments.** Follow standing water decontamination protocol.

4—Turn off the decontamination unit by first turning off the burner, engage the trigger to run water through the burner to cool it, and then turn off the key. Follow the standard operating procedures.
5—Put a check under the "Results" heading under "Plant Decontamination" on your *Watercraft Inspection And Decontamination Activity Log*.
6—If exiting, apply a green seal and give the boater a properly filled out green seal receipt. Remind boater to dry.

Note: *If a boat from a reservoir/lake that is not known to be positive for that plant species (Eurasian watermilfoil for example) comes to your station and has plant material that you believe is an ANS, please take a sample following the protocol on the page 4* (ANS) Documentation and Vessel Decontamination Form. *Send plant samples to:*

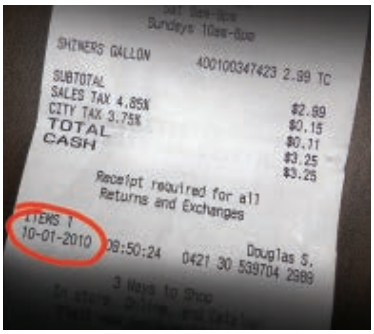
Invasive Species Coordinator
Colorado Parks & Wildlife
6060 Broadway
Denver, CO 80216
(303) 291-7362



Remove all plant material and put it in the trash. If a complete removal is not possible, decontaminate the sections of the watercraft that are affected.

What do the Colorado regulations say about live aquatic bait?

Colorado Parks & Wildlife regulations require that **all live aquatic bait must be purchased from an authorized Colorado bait dealer** and must be accompanied by a **dated receipt**. The receipt is valid for ANS inspections for **seven days**.



- Live fish are only allowed for use as bait East of the Divide below 7,000 feet and at Navajo Reservoir.
  - In those areas, the transportation of live fish as bait is prohibited between waters unless it was purchased from a Colorado bait dealer, as described above.
  - Fish harvested in the wild for use as live bait can only be used in the water in which it was caught and can no longer be transported and stored for later use.
    - *The exception is fish harvested within Bent, Crowley, Kiowa, Otero, or Prowers counties which can be transported and used only within those five counties.*
- The transportation of live crayfish is prohibited West of the Continental Divide and from Sanchez Reservoir.
- It is unlawful to transport live bait across state lines without an importation permit.

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What is the protocol for live aquatic bait treatment?

If a vessel has live aquatic bait in a container or a well with standing water, be sure to check the *Watercraft Inspection and Decontamination Activity Log* box under "Live Bait' in the "Determine Risk Factors" section. Then ask the boater for a bait receipt.

Remember: Under Colorado Fishing Regulations only live fish bait mandates a receipt that lists the name of the bait and the number. Other live aquatic bait, i.e. crayfish, salamanders, etc. will only have a basic store receipt without that information.

In places where live bait is allowed, the inspection or treatment will vary depending on the location and type of bait.

If the boater has bait in a container or in a well with standing water, allow the boater to proceed and launch with the bait as is if:

- The receipt is from a Colorado bait dealer **and**
- The receipt is dated no more than seven days **and**
- The species listed on the receipt matches up with the bait in question

If the receipt is older than seven days, perform a bait treatment to remove the threat of ANS in the bait-water. Ask the boater to remove the bait from the vessels live well or container and **place it into a holding container**. The live well or container must be drained and decontaminated using standard decontamination procedures (120ºF water rinse with low pressure) before the bait is returned. If entering, the container or well water will be replaced with water from the lake or reservoir the boat is launching in.

If the boater DOES NOT have a receipt the live aquatic bait will not be permitted for use and will have to be properly disposed of in the trash. However, the following scenarios will result in a bait treatment being performed and the bait will be permitted for use following treatment:

- If the bait is fish and was harvested within 1⁄2 mile of the reservoir from man-made ditches or canals.
- If the bait is fish and was harvested within the SE five county exemption (e.g. John Martin Reservoir).
- If the bait is wild harvested non-fish bait (crayfish, frogs, and salamanders).

Out-of-state bait is not permitted for use.
When the boater leaves your waters, encourage them to properly dispose of bait in the trash, never in the water. Completely drain the live/bait well and any other containers. You may need to sponge or hand pump the water from the live/bait well out so that no water leaves your site.

Note:** Any live aquatic bait purchased from an out-of-state dealer is illegal and must be disposed of in the trash. **Do not allow it to be used at your water body.

What options does the angler have if the live aquatic bait is not allowed? If the live aquatic bait is not allowed, the angler has a few options:

- Leave the bait in their car or truck.
- Dispose of the bait in the trash.
- Go fishing at a different lake or reservoir where that bait is allowed.

Step-by-Step Procedure for Bait Treatment

As much as possible, **minimize transferring water to the holding container**. The live/bait well or container must be drained and decontaminated using 120°F low pressure water before the bait is restocked in the container that has been re-filled with water from the lake the boat will be entering. If a decontamination unit is unavailable or not working properly, completely dry out the original container using a paper towel or cloth. If exiting, do not allow water from any reservoir, especially a containment reservoir, to leave in a bait bucket or live well.

1—Using a net, transfer the bait to a holding container filled with reservoir water. Minimize the transfer of water from the original container as much as possible.

2—Drain the original container or compartment (e.g. live well).

3—Follow standard operating procedures for your decontamination unit.

- Check all fluid levels of the decontamination unit. With the trigger squeezed, start the unit and purge the water until it runs clear. Turn on the burner, and measure the temperature of the water.

4—Flush the live/bait well, compartment or container with low pressure until the exit temperature of the water reaches 120°F. Be sure to keep the tip of the attachment close to the sides of the compartment to prevent temperature loss. If using the wand, be sure to **remove the nozzle** so that you are using low pressure.

- If there is a discharge pump for the live/bait well, you can use a thermometer and measure the temperature exiting the through hull discharge port for that compartment.

5—Follow standard operating procedures for shutting down your decontamination unit.

- Turn off the decontamination unit; turn the burner off first, run some water through the boiler and then turn off the key.

6—Whenever possible, water from the reservoir the boat is entering should be used for restocking the bait. Do not use tap water, as chlorinated water can kill live aquatic bait.

7—If exiting, the container or well water will be replaced with water from a sealed container or non-chlorinated source. Do not allow water from any reservoir, especially a containment reservoir, to leave in a bait bucket or live well.

Full Decontamination for Suspect or Confirmed Mussels or Other ANS

If you suspect that you have found mussels or another ANS, or you know you have a mussel boat, the following are the steps that you must perform in order to comply with Colorado State protocol. If only one single adult mussel shell is found, you must do a full decontamination. Any evidence or suspicion of adult or juvenile mussels requires a full decontamination.

Remember it is required that you **report, document, collect, and decontaminate**. Follow these documentation and reporting procedures and do not allow the boater to leave with mussels or other ANS attached to the boat.

If a watercraft is highly encrusted with zebra or quagga mussels, it can be quite difficult to effectively remove all the mussels from the watercraft. It can take several days for the dead mussels' byssal threads to detach and for gravity to pull them out of the watercraft. Always try to remove all mussels from the watercraft prior to releasing it. If a boat is too highly infested to fully remove mussels at the inspection station, make arrangements for the boat to be serviced at a certified marina or marine business prior to releasing it. If the boat owner is not cooperative, you will need the assistance of law enforcement to quarantine or impound the watercraft or escort it to a certified marina or marine business to ensure all mussels are dead and removed.

Report

Use one of the following three options to report your suspected ANS discovery immediately:

1—Telephone. (303) 291-7295
2—Email. Elizabeth.Brown@state.co.us
3—Website. www.cpw.state.co.us

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The initial report can be brief but should include the following essential information:

- Date/Time
- Location—**both** the boat's current location and the boat's history (i.e. waters visited in the last 30 days)
- Home state of the boat
- Location where the boat became infested
- Suspected species of ANS
- Name of Reporter (Inspector)
- Name and contact information of the boat owner

Document

1—Once mussels are found (or suspect mussels or other ANS), a full decontamination is required. You must first conduct a **high risk inspection** on the vessel to identify all areas that are infested on the vessel. You must fill out the *High Risk (ANS) Inspection Form*. Be as accurate as you can and inspect and complete every item on the form that applies to the boat.

2—Take **digital photos** of the entire boat before, during (if possible), and after the decontamination. Always have extra batteries ready for the camera, set the date on the camera, and practice taking close up photos.

- Start taking photos at the CL number and work your way around the boat to end at the same CL number. Note any damage or ANS on the boat. If available, take a video of the boat while you walk around it. Both video and photos are desired. Photograph an overview of the entire boat, the registration number, the rear of the boat (to verify the name of the boat), and note any areas where existing damage occurs on the boat, and the area(s) of the boat where the specimen is detected. End with a photo of the CL number. The standard number of photos is 10, but there is no maximum.
- For boats with gimbals (inboard, inboard/outboard, stern drives, etc.) get good photos of gimbal boots from several angles to document before and after condition.
- Take **digital photos** of the ANS specimen. Take both far away and close up photos of the specimen on the boat. Take photos of where the specimens are located on the boat. There may be numerous places, so be sure to photograph each location. Change your camera setting to close up mode (icon is a flower) and then take close up photos. If specimen is a zebra or quagga mussel try to get a good close up photo of the byssal threads. Next, place a common object such as a pencil or penny next to the specimen and photograph the combination to demonstrate the relative size of the specimen.
- **You must photograph the vessel after decontamination** in the same fashion and same locations as you photographed the boat before the decontamination.

3—Fill out the first two pages of the *(ANS) Documentation and Vessel Decontamination Form*.

- Start at the top right by filling in the water code, date, and boat registration number.
- Under "Reason for Decontamination," be sure to check all that apply in the following list:
  - Possible Mussels (bumps that look like mussels)
  - Zebra/Quagga Mussels Visible
  - Other (for suspected ANS).

Use page 2 of the *(ANS) Documentation and Vessel Decontamination Form* to document your findings: who, when, where, and how it was found, etc. Be sure to document any existing damage on the boat in the area provided.

Be sure to document specifically where the boat has been launched, along with where it became infested and any waters it was launched in since infestation. If it is not known where it became infested, document all waters the boat visited in the last six months. Record as much information about the boat's history as possible. Email the photos and description to Elizabeth.Brown@state.co.us and call within 24 hours at (303) 291-7295.

4—Use page 3 of the *(ANS) Documentation and Vessel Decontamination Form* to document the placement of the ANS on the vessel. Again, be as accurate as possible when filling out this form.

Collect

After photographing the vessel, collect several **samples** of the mussels or suspect ANS and fill out page 4 of the *(ANS) Documentation and Vessel Decontamination Form*. Make sure your focus on the many close up digital photos is clear before the samples are detached from the boat. If possible, take photos of the collection

being done. Be sure to properly preserve the samples following the instructions on the top of page 4 of the *Decontamination Form*, utilizing supplies from the CPW-provided sampling kit. After the sample is removed, take photos of the infested area. All samples and the white copy of page 4 must be sent to the Aquatic Animal Health Lab (AAHL) within 24 hours.
1—Only fill 50% of the vial with 70% ethanol or grain alcohol, **not rubbing alcohol**. (Alcohol for samples can be ordered through the program office. Even trace amounts of chlorine from tap water, or "de-chlorinated" tap water can completely destroy sample DNA.) Remove as many specimens as will fit in the specimen vial without the vial overflowing. It is acceptable to send more than one vial.
2—Tightly seal the vial. Write the date/location/contact information on the vial's label with a pencil. If there are numerous areas of attachment on the boat, take samples from those numerous areas as well.
3—Place the vials in a Ziploc® bag and wrap in bubble wrap to help protect it during shipment.
4—Complete the lower half of page 4, the *Suspected ANS Collection Form For Watercraft Inspection Stations* and place in the padded envelop with the sample(s).

© PHOTO BY JIM GREFFLY

5—FedEx the envelope ASAP (within 24 hours) to:
Colorado Parks & Wildlife
Aquatic Animal Health Lab
122 E. Edison St.
Brush, CO 80723
6—Email Elizabeth.Brown@state.co.us to notify CPW that the sample is being shipped.

Decontaminate
For a full decontamination, all parts of the vessel must be exposed to hot water at the appropriate temperature and pressure to ensure the ANS are killed and removed.

Almost all sites have a hot water high pressure decontamination system to decontaminate the boat and trailer. If you do not, and you know you have a mussel boat, call for help and do not allow that boat to leave without decontamination. If needed, get a qualified peace officer (Wildlife Manager, Park Ranger, Sheriff, etc.) to escort the watercraft to a nearby decontamination unit or quarantine the vessel until a decontamination unit can be brought to you. Call the program office at (303) 291-7295 for help finding an available decontamination unit, if needed.

Similar to inspection, it is critically important that you perform full decontaminations in a standardized and repeatable fashion every single time. Use the acronym TIME to help you remember the order of a full decontamination. **Use your HEAD to inspect. Take your TIME to decontaminate.**

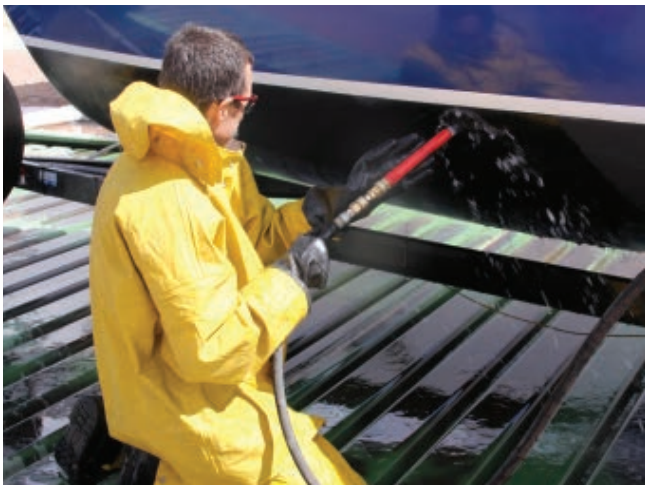
T—Through Hull Fittings
Flush all discharge ports with 120ºF hot water at low pressure for one minute or until the water back flushes.
I—Interior Compartments
Bilge area and pump, live or bait wells and other interior compartments must be flushed with 120ºF water at low pressure. This includes soaking all carpets, anchors, ropes, chains, gear, life jackets, fenders, drift socks and other equipment that has come into contact with the water with 120ºF water at low pressure.
M—Motor or Engine
The motor must be flushed with 140ºF water at low pressure. The gimbal unit on an outboard or I/O must also be soaked. The engine compartment for an inboard must get a standing water decontamination also.
E—Exterior
The hull must be first rinsed with 140ºF water at low pressure to kill the ANS, and then sprayed with high pressure to remove the ANS. The trailer must be sprayed and carpets soaked with 140ºF water. If the boat has an inboard engine, be sure to decontaminate the prop, prop shaft, and prop shaft support also.

Only state-certified authorized agents should operate decontamination units. Personal and public safety should always be top priority. Never allow a member of the public or a non-certified employee

to decontaminate a boat. Be sure to document all procedures used to decontaminate the boat. Photograph or take video of the decontamination being performed if more than one inspector is present.

It is required that you decontaminate in the following order:

a. Flush the **Through hull discharge ports**.
b. Flush the **Interior compartments on the boat**.
c. Flush the **Motor/engine**.
d. **Rinse the Exterior of the boat and trailer** with 140°F water to kill the mussels or ANS. **High pressure spray the hull** or infected areas to remove the mussels or ANS.



© PHOTO BY ELIZABETH BROWN

Step-by-Step Procedure for Full Decontamination

Once you have reported, completed the paperwork, photographs and sample collection, you are ready to begin the hot water decontamination procedure. Remember the acronym **TIME** to guide you through the procedure:

1—Follow the standard operating procedures for your decontamination unit. Check all fluids on the decontamination unit to make sure it is ready to operate.
2—Connect the wand to the trigger to the hose. Start the decontamination unit using the proper operating procedures for your unit.
3—Check the temperature of the water and adjust the temperature depending on the procedure being performed at that time.
4—Before beginning decontamination, follow the boat owner into the boat. Work with the boater to prepare the interior compartments that will be decontaminated. With help from the boat operator, identify the discharge ports for the interior compartments.

5—T = Through Hull Fittings
Decontaminate the through hull discharge ports. Press the wand (no nozzle attached) or diffuser up against the opening of the through hull discharge ports and decontaminate each port with 120°F water under low pressure for one minute or until the water back flushes. Turn off the decontamination unit. (Turn the burner off first and then turn off the key.)

6—I = Interior Compartments

Decontaminate the interior compartments. Reposition the hose and wand to the forward interior compartments. Start the decontamination unit and work from the front to the back of the boat using low pressure 120°F water to decontaminate every compartment that has standing water or has equipment that has come into contact with the water body.

- If the boat has an inboard/outboard or inboard engine have the boater raise the lid of the engine compartment and put the wand behind the engine to decontaminate the floor of this area.

- Turn off the decontamination unit. After all interior compartments have been decontaminated have the boat operator activate the pumps to drain the interior compartments as much as possible.

7—M = Motor or Engine

Decontaminate the motor/engine. Turn the temperature of the unit to 140°F.

- ***Procedure for outboard motors and inboard/outboard engines.***
  - Have the boat operator lower the motor/engine to a vertical position. Attach the hose to the end of the wand using the quick connect fitting.

  - Attach the muffs to the hose and place over the intake holes on the lower end of the motor/engine.

  - Start the decontamination unit and start the water flowing through the muffs. Check to make sure the intake holes are completely covered. Have the boater start the motor/engine in **Neutral**. Run until the existing water reaches 140°F. Turn off the decontamination unit.

  - The gimbal area of the inboard/outboard engine must be soaked for 2 minutes with 140°F water under low pressure to ensure adequate exposure time.

- ***Procedure for inboard engines***
  - Find the engine inlet: This intake always has a screen cover and is located directly under the engine on the hull.

  - Attach the fake-a-lake to the hose. Adjust the fake-a-lake so that it covers the engine intake port.

  - Start the decontamination unit and start the water flowing. Have the boater start the engine in **Neutral**. Run until the exiting water reaches 140°F. Turn off the decontamination unit.
  - Flush the bilge with 120°F low pressure water.
    a. Make sure that the bilge plug, located in the center access area, is **in**.
    b. Add **4–5** gallons of water into the bilge by putting the wand (nozzle removed) down behind the engine next to the floor.

    c. Then **remove** the bilge plug and continue to flush until the exiting water reaches 120°F.

- On an inboard engine, the strut bearing and the rudder port must be decontaminated.
    a. Flush the strut bearing with low pressure; use high pressure if attached mussels are found.

    b. Flush the rudder port.

8—E = Exterior
Decontaminate the exterior of the hull and trailer. First, rinse the hull and trailer with 140°F hot water at low pressure to kill the ANS.

Next, connect the 40° nozzle with the quick connect to the end of the wand so you can use high pressure spray to remove the ANS. Start the decontamination unit. Keep the wand at a 45° angle and work methodically in one direction. Do not use the wand to "scrub" the hull. Keep the tip of the wand approximately 12 inches of the hull and trailer as you move around the boat. Water temperature decreases approximately 15 to 20° per foot of distance when sprayed from a power nozzle.

WARNING: Use low pressure on all carpeted areas, decals, electrical connections, gimbal area on the inboard/outboard engine, interior compartments, transducers, and depth sounders and their wiring.

Step-by-Step Procedure for Full Decontamination (cont.)

On trailers, be sure to decontaminate the openings of the tubular frames.

Turn off the decontamination unit. Turn the burner off first, run some water through the boiler and then turn off the key. Follow the standard operating procedures for your unit.

9—The gimbal area of the inboard/outboard engine must be decontaminated for two minutes with 140ºF water under low pressure to ensure adequate exposure time.

10—Following full decontamination, give the boat some time to fully **drain the water**. In most cases of badly infested vessels, dead mussel shells will be released from the vessel and will drain out in the water following decontamination.

- If mussel shells are still coming out of the areas draining or can be seen in interior compartments, you will need to **re-flush** those areas to get the mussels out of the vessel.

11—Conduct a **final high risk inspection** of the vessel using the *High Risk (ANS) Inspection Form*. Be sure to check all areas that were previously noted as infested prior to inspection. Also check all other areas of the boat to be sure that there are no mussels (dead or alive) remaining on the vessel. Be as accurate as possible when checking the numerous areas of the boat. If staff allows, it is preferable that the second high risk inspection following decontamination is done by someone other than the person who did the initial inspection and decontamination.

a. If there's any evidence that mussels or other ANS remain—begin decontamination again!
b. If it's a highly encrusted watercraft you may consider quarantining the vessel to allow the byssal threads to release and the mussels to be removed by subsequent decontaminations. You may also want to consider sending the boat with an escort to a certified marine business for servicing. If the boater is not cooperative with these options and you feel they are necessary, you may require the assistance of a qualified peace officer to order the quarantine or escort the watercraft to the dealer.

12—Be sure to **provide the boater the pink copies** of the two *High Risk Inspection Forms* and four-page *Decontamination Form* and the white copy of the seal receipt. **The inspection station keeps the yellow copies** of all these documents.

13—**Within 24 hours**—email the photos of the ANS specimens to Elizabeth.Brown @state.co.us. If you have the ability to scan the forms please email them also. Mail in the **white copies** of the two *High Risk (ANS) Inspection forms* and pages 1–3 of the *(ANS) Documentation and Vessel Decontamination Forms* to:

Colorado Parks & Wildlife
Aquatic Animal Health Lab
122 E. Edison St.
Brush, CO 80723

14—**Apply a green seal** and give the boat operator the white copy of the seal receipt. Be sure to fill out all procedures that were and were not performed on the seal receipt.

- If this was a highly encrusted mussel boat, write "MB" in the upper right corner of the seal receipt.
- Remind the boater to fully dry.

15—Be sure to mark "Full Decontamination" under the "Results" section on the *Watercraft Inspection And Decontamination Activity Log*, and enter the seal code of the green seal applied.

16—If known, notify the lake or reservoir inspection station where the boater plans to launch next.

What if the boater will not allow an inspection or decontamination?

The goal is to gain the boater's support of the program and process. Do everything that you can to get the boater's approval to inspect the boat and decontaminate. If the owner is unwilling to cooperate, you will need the assistance of law enforcement officers. Only qualified peace officers can order decontamination, impound, or quarantine a boat when a boater is not cooperative.

Guidelines concerning impoundment

- If a boater is entering a water body and there is no evidence of mussels or other ANS on the boat, and the boater refuses an inspection, the boat should be turned away but not impounded.
- If the boater is leaving a suspect, positive or infested water body and the boater refuses an inspection, then state laws and regulations require that the boat be inspected prior to launching in another water body. If the boat owner is not compliant, call law enforcement to impound the vessel until proper inspection and/or decontamination can be performed.
- If suspected or known mussels or other ANS are present on a boat and the boater will not consent to an inspection or decontamination, or if decontamination equipment is not available or working, then the boat should be impounded until decontamination can be performed. Call a qualified peace officer.

Do not let an infested vessel leave the inspection station without a peace officer escort if it is infested or you suspect it is infested! If you are not able to detain the vessel until law enforcement can arrive, be sure to have all of the boater's information and a physical description of the boater, the watercraft, and the towing vehicle so an officer can follow up.

What options does the boater have if the decontamination unit is broken or if our site doesn't have a decontamination unit?

Possession of zebra mussels, quagga mussels or other ANS is illegal. A boat cannot be allowed to transport zebra or quagga mussels or any ANS. If there is a reasonable belief that the watercraft has ANS present, call the nearest peace officer (e.g. Wildlife Manager, Park Ranger, County Sheriff, etc.) and call your supervisor. If zebra or quagga mussels are confirmed, do not allow the boat to leave until law enforcement officials arrive. Options include:

- Quarantine the boat on site until a working decontamination unit can be brought there.
- Escort the boat to the nearest decontamination station.
- As an absolute last resort for a boat with standing water and **no** confirmed or suspected mussels or ANS, you could direct the boater to the nearest decontamination station, although this option is not preferred.

Watercraft inspection and decontamination stations are placed at various locations throughout the state and western U.S. For the most updated list of these sites, call (303) 291-7295 or visit www.cpw.state.co.us.

© PHOTO BY ELIZABETH BROWN

State Standard Forms

The following pages contain the standard forms used by the Colorado Parks & Wildlife and their partners.

State of Colorado

HIGH RISK (ANS) INSPECTION FORM

For use before and after a Full Decontamination.

Inspection/Sample #: ☐☐☐☐ - ☐☐☐☐☐☐ - ☐☐☐☐☐☐☐☐
Water Code | Date (month, day, year) | Boat Registration Number

Inspection Location: _____ Date/Time: _____

Vessel Registration #: _____ Vehicle Tag #: _____ Trailer Tag #: _____

REASON FOR HIGH RISK INSPECTION and FULL DECONTAMINATION: (check all that apply)

- ❑ Zebra or Quagga Mussel Infested Boat
- ❑ Suspected ANS: _____
- ❑ Known ANS: _____
- ❑ Other: _____

CHECK ALL PARTS OF WATERCRAFT WHERE AN ANS IS DETECTED OR SUSPECTED (H.E.A.D.)

❑ **Vessel Exterior: Hull**

- ❑ Entire hull
- ❑ Transom
- ❑ Water holding pockets
- ❑ Trim tabs (top and bot.)
- ❑ Transducers
- ❑ Depth sounders
- ❑ Recessed bolts
- ❑ Through hull fittings
- ❑ Pitot tubes
- ❑ Water intakes/outlets
- ❑ PWC—foot recesses
- ❑ Lights

Sailboats:

- ❑ Centerboard box
- ❑ Rudder and transom
- ❑ Keel
- ❑ Fittings

❑ **Vessel Exterior: Trailer**

- ❑ Rollers, bunks, pads
- ❑ Trailer springs
- ❑ License plate
- ❑ Fenders
- ❑ Trailer lights
- ❑ Pockets and hollows
- ❑ Trailer wiring
- ❑ Wheels and tires
- ❑ Trailer axles
- ❑ Hangers

❑ **Engine or Motor**

- ❑ Exterior housings
- ❑ Rudders
- ❑ Propeller and assembly
- ❑ Propulsion system
- ❑ Propeller shaft
- ❑ Lower unit
- ❑ Prop., shaft supports
- ❑ Gimbel area
- ❑ Propeller guards
- ❑ Water intake/outlets
- ❑ Anti-Cavitation plates

❑ **Anchor and Equipment**

- ❑ Anchors and anchor rope/chain
- ❑ Rope and equipment lockers
- ❑ Bait and live wells
- ❑ Drift sock(s)
- ❑ Motor well
- ❑ Internal ballast tanks
- ❑ Waterfowl decoys
- ❑ PFD's
- ❑ Nets
- ❑ Float cushions/belts
- ❑ Water skis and ropes

❑ **Drain Interior Compartments**

- ❑ Bilge
- ❑ Drain inboard engine compartments and bilge
- ❑ Bait and live wells
- ❑ Ballast tanks
- ❑ Drain water cooled generators, swamp coolers with plugs
- ❑ Drain motor or engine lower unit

INSPECTION COMPLETED IN ACCORDANCE WITH STATE PROCEDURES:

Inspected by (print full name and inspector ID #): _____

Inspected by (signature): _____

DISTRIBUTION: White—Inspection Location Yellow—Statewide Invasive Species Coordinator Colorado Parks & Wildlife Pink—Owner/Operater 4/2014 14-EB2-2422/3079-14

State of Colorado

Inspection/Sample #: ☐☐☐☐ - ☐☐☐☐☐☐ - ☐☐☐☐☐☐☐☐
Water Code | Date (month, day, year) | Boat Registration Number

(ANS) DOCUMENTATION and VESSEL DECONTAMINATION FORM *(pg. 1)*

For use on Watercraft with Identified or Suspected ANS

❑ Call Law Enforcement Officer if boat owner is not willing to submit boat to required decontamination

VESSEL/OWNER INFORMATION

Inspection Location: _____ Date/Time: _____

Vessel Registration #: _____ Vehicle Plate #: _____ Trailer Plate #: _____

Vessel Owner/Operator Name: _____

Vessel Owner/Operator Date of Birth: _____

Vessel Owner/Operator Address: _____

Vessel Owner/Operator Phone Number and Email: _____

REASON FOR FULL DECONTAMINATION

❑ Possible Mussels (bumps that look like mussels)—Location(s) on boat _____

❑ Zebra\Quagga Mussels Visible—Location(s) on boat _____
Estimated # of Mussels Present (check box): ❑ <10 ❑ 10–100 ❑ >100

❑ Other: _____

SPECIMEN COLLECTION AND REPORTING PROCEDURES

❑ **Photos:** Take digital photo closeups of ANS **before** sample is detached from the boat
Photos taken (take several for all 3 if possible):
❑ **Before** ❑ **During** ❑ **After** Decontamination

Photo #'s/notes: _____

❑ **Write description** on page 2 of findings: who, when, where, and how it was found; if the suspected mussels were attached to a surface or not; and all locations the boater has been in the last 6 months. Describe any existing damage to vessel.

❑ **Email** photos and description immediately to:
Elizabeth.Brown@state.co.us

❑ **Sample:** Carefully remove mussels or suspected ANS. Place samples in a sample jar with ethanol provided in the station's sampling kit.
Overnight samples to CPW AAHL-ANS, 122 E. Edison Street, Brush, CO 80723

❑ **Decontaminate**—do not allow the boat to leave until complete.
❑ Quarantined ❑ Impounded

Comments: _____

_____

DECONTAMINATION COMPLETED IN ACCORDANCE WITH STATE PROCEDURES:
(Vessel must be reinspected using the *High Risk (ANS) Inspection Form*)

Decontaminated by (print State Certified Decontaminator # and name): _____

Decontaminated by (signature): _____

DISTRIBUTION: White—Statewide Invasive Species Coordinator Colorado Parks & Wildlife Yellow—Inspection Location Pink—Owner/Operater 4/2014 14-EB2-2422/3079-14

State of Colorado

Inspection/Sample #: ☐☐☐☐☐ - ☐☐☐☐☐☐ - ☐☐☐☐☐☐☐☐
Water Code | Date (month, day, year) | Boat Registration Number

(ANS) DOCUMENTATION and VESSEL DECONTAMINATION FORM *(pg.2)*

Write a description of the Aquatic Nuisance Species discovery: who, when, where, and how it was found; if the suspected mussels (or other ANS) were attached to a surface or not; and all the places the boat has been launched in the last six months.

Describe any existing damage to vessel:

DISTRIBUTION: White—Statewide Invasive Species Coordinator Colorado Parks & Wildlife Yellow—Inspection Location Pink—Owner/Operater 4/2014 14-EB2-2422/3079-14

State of Colorado

Inspection/Sample #: ☐☐☐☐ - ☐☐☐☐☐☐ - ☐☐☐☐☐☐☐☐
Water Code | Date (month, day, year) | Boat Registration Number

(ANS) DOCUMENTATION and VESSEL DECONTAMINATION FORM *(pg.3)*

VESSEL EXTERIOR: HULL (check all that apply)	**Mussels**	**Vegetation**	**Other** (describe)
❑ Entire Hull	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trim Tabs (top and bottom of hinges)	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Through Hull Fittings	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Motor Well	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Transom	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Transducers	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Pitot Tubes	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Depth Sounders	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Water Intakes	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Water Outlets	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Lights	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Water Holding Compartments (pockets, etc.)	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Foot Recesses—PWC	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Centerboard Box—*Sailboat*	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Rudder and Transom—*Sailboat*	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Keel—*Sailboat*	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Fittings—*Sailboat*	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Other (describe below): _____	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____

VESSEL EXTERIOR: TRAILER (check all that apply)	**Mussels**	**Vegetation**	**Other** (describe)
❑ Trailer Rollers and Bunks	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer License Plate	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer Lights	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer Wiring	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer Axles	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer Springs	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer Fenders	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer Pockets and Hollow Spaces	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Trailer Wheels and Tires	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Hangers	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Other (describe below): _____	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____

ENGINE OR MOTOR (check all that apply)	**Mussels**	**Vegetation**	**Other** (describe)
❑ Exterior Housings	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Propeller and Assemblies	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Propeller Shafts	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Propeller Shaft Supports	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Propeller Guards	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Rudders	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Propulsion Systems	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Lower Units	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Gimbal Areas	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Water Intakes and Outlets	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Anti-Cavitation Plates	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Other (describe below): _____	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____

INTERIOR COMPARTMENTS AND EQUIPMENT (check all that apply)	**Mussels**	**Vegetation**	**Other** (describe)
❑ Anchors and anchor rope/chain(s)	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Ropes and Lines	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Water Pump Systems	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Bait and Live Wells, Internal Ballast Tanks	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Equipment and Rope Lockers	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Personal Gear: Ski Gloves, Diving Gear, Clothing and Footwear	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Floats: Float Belts, PFDs, Float Cushions, Water Weenies, Torpedoes, Tubes, Inflatable Pontoons, etc.	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Water Skis and Ropes	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Fishing and Hunting Equipment: Nets, Downriggers, Decoys, Blinds, Drift Socks, and other gear that has entered the water	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Evaporative Coolers	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____
❑ Other (describe below): _____	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No _____

DISTRIBUTION: White—Statewide Invasive Species Coordinator Colorado Parks & Wildlife Yellow—Inspection Location Pink—Owner/Operater 4/2014 14-EB2-2422/3079-14

State of Colorado

Inspection/Sample #: ☐☐☐☐ - ☐☐☐☐☐☐ - ☐☐☐☐☐☐☐☐
Water Code | Date (month, day, year) | Boat Registration Number

(ANS) DOCUMENTATION and VESSEL DECONTAMINATION FORM *(pg. 4)*

Specimen Collection and Shipping Instructions

1. Collect specimen carefully to obtain entire organism. Use clean, sterile tools to prevent contamination.
2. Place specimen in screw-capped sample vials.
3. Immediately fill vial (with specimen) with 70% ethanol.
    a. Only fill 50% of vial with 70% reagent alcohol to cover specimen and seal closed vial with electric tape to prevent leakage.
        Note: Trace amounts of chlorine from tap water, or "dechlorinated" tap water can completely destroy sample DNA. Do **not** use formaldehyde.
4. Write the date, boat registration number and authorized location directly on the sample tube with alcohol resistant permanent sharpie marker.
5. Place sample tubes in Ziploc bag and wrap in bubble wrap.
6. Place Ziploc bag and the completed form below in bubble mailer or padded box.
7. Overnight sample to CPW Aquatic Animal Health Lab, 122 E. Edison Street, Brush, CO 80723—ASAP (within 24 hours).
8. Email Elizabeth.Brown@state.co.us to notify CPW that the sample is being shipped
9. If you have questions, call (303) 291-7295.
10. Remember to disinfect all collection tools by soaking them with 140°F hot water or storing them in acidic acid or vinegar solution.

▼ *Remove bottom half of page and include in mailer with vials being shipped to CPW for analysis.*

SUSPECTED (ANS) COLLECTION FORM FOR WATERCRAFT INSPECTION STATIONS

Authorized Agent's Name: _____

Inspector ID Number: _____ Email: _____

WID Station Supervisor Name: _____

Phone Number: _____ Email: _____

WID Authorized Location Name: _____

Address: _____

Date and Time of Collection: _____ Watercraft Registration Number: _____

Trailer Plate Number: _____ Watercraft Green Seal Code: _____

REASON FOR COLLECTION (check all that apply)

❑ Visual ID of ANS ❑ Bumps on Boat/Trailer ❑ Zebra or Quagga Mussels Attached ❑ Plants on Boat/Trailer ❑ Unidentifiable Organic Material

LOCATION OF SUSPECTED ANS PRIOR TO COLLECTION

❑ Watercraft Hull ❑ Motor ❑ Live Well ❑ Anchor ❑ Bilge ❑ Watercraft Interior

❑ In Lake/Reservoir ❑ Other: _____

Date Mailed: _____

▼ *Do Not Write Below Line:* ***For Lab Use Only***

Date Received at AAHL: _____ AAHL ID #: _____

Specimen ID: _____ Date Identified: _____

Technician: _____ Further Analysis Needed: _____

Collector Contacted with Results: _____

DISTRIBUTION: White—Statewide Invasive Species Coordinator Colorado Parks & Wildlife Yellow—Inspection Location Pink—Owner/Operater 4/2014 14-EB2-2422/3079-14


State of Colorado
INSPECTION AND DECONTAMINATION SEAL RECEIPT
For use when applying green seals to boats at PREVENTION waters.
Provide original to watercraft owner (white) and keep carbon copy (yellow).
WID Location:
Date/Time:
Inspector's ID #:
Vessel Registration (CL #):
Trailer Plate #:
Seal Serial #:
PROCEDURES PERFORMED (Every line must be checked to be valid)
Exit (HEAD) Inspection: Performed or Not Performed
Exit High Risk Inspection: Performed or Not Performed
Full Decontamination: Performed or Not Performed
Standing Water Decontamination: Performed or Not Performed
Plant Decontamination: Performed or Not Performed
Bait Treatment or Decontamination: Performed or Not Performed
HOW TO TREAT A BOAT WITH A GREEN SEAL
Always ask about live aquatic bait and follow bait protocol. Cut off seal and let boat launch if one of the following are true:
1.) Boat is returning to the same location; or
2.) Boat has been out of the water for more than 30 days; or
3.) Boat has been decontaminated; or
4.) Boat is clean and fully drained.
If not, perform an inspection prior to launch.
NOTES:
CLEAN, DRAINED, AND DRY BOATS GET ON THE WATER FAST!
Distribution: White—Owner/Operator Yellow—Inspection Location
1 - 6/2013 - 140,000
13-EB2-12-4/3250FY3
State of Colorado
INSPECTION AND DECONTAMINATION SEAL RECEIPT BOOK
1 - 6/2013 - 140,000
13-EB2-12-4/3250FY3
State of Colorado
INSPECTION AND DECONTAMINATION SEAL RECEIPT
For use when applying green seals to boats at CONTAINMENT waters.
Provide original to watercraft owner (blue) and keep carbon copy (yellow).
This receipt only valid for State Parks preinspection if watercraft was decontaminated.
WID Location:
Date/Time:
Inspector's ID #:
Vessel Registration (CL #):
Trailer Plate #:
Seal Serial #:
RETURNING BOAT Yes No
PROCEDURES PERFORMED (Every line must be checked to be valid)
Exit (HEAD) Inspection: Performed or Not Performed
Exit High Risk Inspection: Performed or Not Performed
Full Decontamination: Performed or Not Performed
Standing Water Decontamination: Performed or Not Performed
Plant Decontamination: Performed or Not Performed
Bait Treatment or Decontamination: Performed or Not Performed
HOW TO TREAT A BOAT WITH A GREEN SEAL FROM A CONTAINMENT WATER
Always ask about live aquatic bait and follow bait protocol. Cut off seal and let boat launch if one of the following are true:
1.) Boat is returning to the same location; or
2.) Boat has been out of the water for more than 30 days; or
3.) Boat has been decontaminated.
If not, perform an inspection to check for standing water.
• If there is no standing water and the boat is clean and dried, allow launch.
• If any standing water is found, a standing water decontamination is required before allowing launch.
NOTES:
CLEAN, DRAINED, AND DRY BOATS GET ON THE WATER FAST!
Distribution: Blue—Owner/Operator Yellow—Inspection Location
2 - 6/2013 - 65,000
13-EB2-12-4/3250FY3
State of Colorado
INSPECTION AND DECONTAMINATION SEAL RECEIPT BOOK
2 - 6/2013 - 65,000
13-EB2-12-4/3250FY3

State of Colorado

WATERCRAFT INSPECTION AND DECONTAMINATION ACTIVITY LOG

Location: _____

*See first line for example.

Date	Inspector's Number	Start Time	Initial Assessment: In or Out	Initial Assessment: Boat Type	Registrations: Boat Registration (CL Number)	Registrations: Trailer License Plate Number	Seals: Seal Removed or Applied (Seal Code)	Seals: Seal Color (if not Green)	Determine Risk Factors (2 or more = High Risk Inspection, √ = Yes): Been in Positive Waters in the Last 30 Days	Determine Risk Factors (2 or more = High Risk Inspection, √ = Yes): Out of State Within the Last 30 Days	Determine Risk Factors (2 or more = High Risk Inspection, √ = Yes): Dirty/Crusty/Slimy	Live Bait: Complex Boat	Ballast: Standing Water on Vessel	Ballast: Live Bait Present	Protocols (√ = Yes): Number of Ballast Tanks	Protocols (√ = Yes): Entrance Inspection	Procedures (√ = Yes): High Risk Inspection	Procedures (√ = Yes): Exit Inspection	Procedures (√ = Yes): Hull, Trailer, Exterior Feb. & Checked	Procedures (√ = Yes): Engine or Motor, Transom Checked w/Flashlight & Drained	Procedures (√ = Yes): Anchor & Equipment Checked	Procedures (√ = Yes): Drain & Check Interior Compartments	Results (√ = Yes): Standing Water Decontamination	Results (√ = Yes): Full Decontamination	Results (√ = Yes): Paint Decontamination	Results (√ = Yes): Bait Treatment or Decontamination
*6/24/13	3198	1:42 PM	I	P	CL 1108 SB	CO E929774					✓		✓	✓				✓		✓	✓	✓	✓	✓			
TOTALS:																											

Distribution: White—Statewide Invasive Species Coordinator Colorado Parks & Wildlife Yellow—Inspection Location

3/2013 – 8,000 13-EB2-12-222/3248FY3

Winterizing Procedures for Decontamination Units

Step-by-Step Instructions for Winterizing Trailered Hydro Tek Units

Objective

To winterize the units without the need to drain the water tank. This allows units to be kept at remote sites and "ready" with the necessary water to perform decontaminations when the water temperature is dropping below freezing during working hours or overnight.

Materials Needed

- Two gallons of RV/Marine antifreeze
- One 2–3 gallon plastic container/tank
- One three-way valve
- Adapters, barbed fittings, Teflon® tape, and clamps for attaching tank and valve to hoses
- Bulkhead for plastic container if needed

An example of container with bulkhead and 3-way valve.

The function of the three-way valve is to have the smaller antifreeze supply isolated from the water supply. The operator is able to "switch" back and forth between the water supply and antifreeze by turning the handle 90º as shown.

Valve position for antifreeze

Valve position for water

Install a 3-Way Valve if One is Not Already on Unit

1—Cut water supply line about 20 inches from the filter.

2—Attach water supply line to three-way valve.

3—Cut other side of supply line and attach to valve.


4—Cut about **five inches** of hose and attach the antifreeze container to the third port of the three-way valve.


Winterize the Decontamination Unit

1—Roll out **six feet** of pressure hose and secure the trigger in the **open** position.

2—Fill the container with two gallons of antifreeze.

3—Start up Hydro Tek unit and run the pump (no heat) until the colored antifreeze comes out of the gun. Shut down unit following the standard operating procedures.

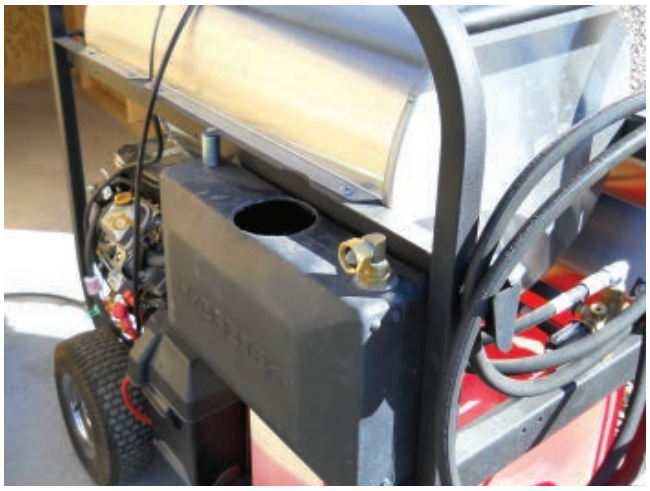

Note: *When switching the valve back to the water supply for decontamination, it is possible to recycle the two gallons of antifreeze which is in the machine and hose before the water begins to flow.*

Step-by-Step Instructions for Winterizing Trailered Hydro Tek Units (cont.)

4—Connect supply hose and store with trigger in elevated position for winter to avoid antifreeze siphoning out.

5—Be sure to drain the water tank at the end of the season before storing in a secure location.

Step-by-Step Instructions for Winterizing Non-Trailered Hydro Tek Units



Objective

To winterize the units and allow them to be kept ready for daily use for performing decontaminations when the water temperature is dropping below freezing during working hours or overnight.

Materials Needed

- Two gallons of RV/Marine antifreeze
- One zip-tie

Instructions

1—Pour a minimum of two gallons RV/Antifreeze into the holding reservoir.

2—Depress the trigger and secure it with a zip-tie.

3—Turn on the unit (**no heat**) and run it until antifreeze comes out through the trigger.

4—Store unit with the trigger elevated above the reservoir.

To Operate a Winterized Unit:

Begin by recycling the antifreeze into a clean container. When the water runs clear the unit is ready to use. It may be possible to re-use the antifreeze. A winterizing kit can also be used. This kit allows the decontamination unit to be winterized for protection. However, if it needs to be used for a decontamination, the operator just turns the yellow handle 90º, starts the unit (**no heat**) and recycles the antifreeze back into the red container. The unit is then ready to go. When finished with the decontamination, the operator turns the yellow handle back to the position shown in the photo and runs the unit (**no heat**) until the pink colored antifreeze comes out of the spray gun.

Burner on/off switch—This switch activates the burner to heat the water. Squeeze the trigger on the spray gun and the burner will begin heating the water. It will stop firing whenever the water spray is off or if the temperature setting is exceeded. After turning the switch off, be sure to run water through the system to cool the boiler.

Choke—When first starting the decontamination unit, pull the choke out and turn the key until the engine starts. Push the choke in immediately after the unit starts.

Diffuser—This attachment connects directly to the spray gun and is used to decontaminate discharge ports, soak carpeted areas on the boat and/or trailer and standing water flushes for any interior compartments. It provides low pressure and a rubber tip to prevent scratching any surface.

Dual lance wand—This attachment connects directly to the spray gun. The other end has a quick connect fitting so that a nozzle or connecting hose can be "quickly" attached by pressing down the outer ring and pressing the "other half" of the quick connect fitting into its center. The handle, when turned clockwise, directs the water through the lance with the quick connect fitting only. If a nozzle is attached the water exiting the wand will be at high pressure. The handle, when turned counter clockwise, directs the water through both lances and lowers the pressure of the water. A dual lance wand can be used for low pressure standing water flushes if there is no nozzle attached and the water is exiting both lances.

Fake-a-lake—This attachment is used for decontaminating inboard engines and ballast tanks. It has a telescoping leg and the hose attachment threads into the connection on the "plunger," joining the fake-a-lake to the hose to the wand.

Hose for connecting attachments—This six foot hose has a quick connect fitting that connects to the end of the wand. The other end threads into the fake-a-lake or muff attachments needed for a decontamination.

Hydro Tek trailered decontamination unit—Hydro Tek units have both a key and pull start option. It has a thermostat for adjusting water temperature. It does not have a water shut off value between the tank and the pump. Therefore, the tank must be empty to remove the water filter for maintenance.

Hydro Tek non-trailered decontamination unit—These units are identical to the trailered units listed above but they do not have a water tank attached and are not loaded on a trailer.

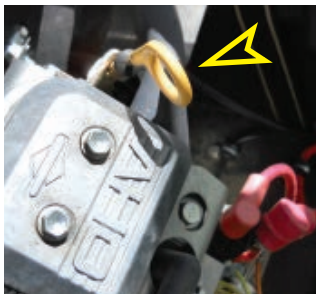
Thermometer—Thermometers are invaluable to the decontamination process. It is used to initially test the temperature of the water prior to the decontamination. It is also used to check the exiting water temperature when performing a standing water decontamination for interior compartments and engine flushes.

Muffs—Muffs are used to decontaminate the lower unit of an outboard motor or inboard/outboard engine. The muffs pictured at the top of the photo are used for all new models of the outboard motor and inboard/outboard Mercury engines that have intake ports that are open. The lower muffs are used on all other outboard motors and inboard/outboard manufacturer's engines.

Nozzle and nozzle storage—The Nozzle Storage area shows the degree of the nozzle written below the nozzle and its spray pattern is shown above the nozzle. The preferred spray pattern is 40º. Nozzle color and degrees can vary by manufacturer. A nozzle is attached to the end of the wand with the help of the quick connect fitting. Be sure the quick connect "clicks" into place when attaching the nozzle. Point the wand and nozzle towards the ground when you first engage the trigger to start the water. This is a safety issue and will ensure that no one or nothing will be hurt or damaged if the nozzle blows off the wand.

Note: *All red colored nozzles (0º) have been removed and should never be used for boat decontaminations. The 15º nozzles are also not recommended.*

Oil dip-stick for the decontamination unit's engine—This should be checked prior to every use. Use 30-weight detergent oil to keep the oil reservoir topped off.



Oil dip-stick for the decontamination unit's pump—This should be checked prior to every use. Pump oil is used to keep the oil reservoir topped off.

Quick connect fitting—This fitting comes in two parts. The part that is attached to the end of the wand has to have the external circle pressed down before the "male" portion of the fitting can be inserted. The external circle then must "click" in place to make a proper connection.

Spray gun with trigger—This photo of the gun has the trigger "wired" open due to unit having been winterized. The wand or the diffuser attachment thread directly onto the gun.

CAUTION: The spray gun kicks back when the trigger is engaged—hold with both hands.

Thermostat—The thermostat allows the water temperature to be adjusted so that different decontamination temperature protocols can be adhered to by the inspector. Every machine's temperature is different depending on the altitude of its location and the temperature of the water in the tank. Be sure to test the temperature of the water with a digital thermometer prior to beginning and during all decontaminations.

Winterizing kit for trailered Hydro Tek units—This kit allows the decontamination unit to be winterized for protection. However, if it needs to be used for a decontamination, the operator just turns the yellow handle 90º, starts the unit (**no heat**) and recycles the antifreeze back into the red container. The unit is then ready for decontamination. When finished with the decontamination, the operator turns the yellow handle back to the position shown in the photo and runs the unit (**no heat**) until the pink colored antifreeze comes out of the spray gun.

Acknowledgements

The Colorado Parks & Wildlife would like to thank the following people and companies for their assistance with this decontamination manual. With their help we were able to provide current and accurate information.

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Lund Boat Co. & Crestliner Boat Co.

Jamie Marentette
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Ross Robinson
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Pat and Shelly Ryan
Best Marine Service
Wheat Ridge, CO

Tony Sherlock
Bass Pro Shops/Tracker
Denver, CO

Hydro Engineering 5/3000GSOV Skid S.O.P.

BEFORE START UP

 **SAFETY!** ***Locate the unit on a level surface in upright position for stable operation.***

1. **CHECK PUMP OIL:** Check pump oil by locating the oil dip stick or oil view window on the pump housing. Fill to midway notch on the oil dip stick or to the red dot on the oil view window (General Pump non-detergent SAE 30w). Check oil level in gear reduction box located between the engine and pump (90w gear lube).
2. **CHECK FLUID LEVELS:** Check engine oil (10w 30), gasoline (87 octane or higher) and burner fuel (diesel or kerosene).
3. **CONNECT DISCHARGE HOSE & TRIGGER GUN ASSEMBLY**
4. **CONNECT WATER SUPPLY:** Connect 5/8" to 3/4" ID garden hose with pressure between 25 and 60 psi to inlet. Maintain an adequate supply of water. Check inline water filters, clean as needed. Do not run pump dry.

OPERATION

 **WEAR PPE!** ***Burner power switch should be off before starting.***

1. **START ENGINE:** Squeeze trigger gun, adjust choke, turn key to start position until engine starts. De-Winterize unit with five (5) gallon bucket, reuse or dispose of anti-freeze according to site regulations.
2. **PURGE AIR FROM SYSTEM:** Squeeze the trigger gun until a constant stream of water comes out. (Purging works best with nozzle removed from wand and in low pressure mode.)
3. **CONNECT SPRAY ACCESSORY OR NOZZLE:** Connect nozzle securely. Ensure the quick coupler collar snaps into the locked position to prevent blow apart.
4. ***4.*** **BYPASS MODE:** When machine is left running and trigger gun is closed the system will re-circulate pump inlet water through the unloader and across the pump head.

    ***Do not leave in bypass for longer than two (2) minutes to prevent pump overheating. Shut off unit when not spraying water.***
5. **START BURNER:** With trigger gun depressed and water flowing, turn the burner switch to the "on" position and set the thermostat (if equipped) to the required temperature. Burner should shut down when the temperature setting is exceeded or the water flow stops. Cycle the trigger gun on/off, ensure the burner shuts down when trigger is released.

    ***Cool down burner before shutting down. Water exiting the trigger gun should be below 100F.***

SHUTDOWN

1. Squeeze trigger gun keep water flowing. Turn burner switch to the off position.
2. Wait for water exiting trigger gun to drop below 100F, turn engine switch off.
3. Turn water supply off.
4. Squeeze trigger gun to release pressure from discharge hose.
5. Disconnect & store attachments.

Hydro Engineering 5/3000GSOV Skid S.O.P.

ATTACHMENTS

QUICK COUPLER: When connecting a hose, nozzle, or accessory with a quick coupler ensure the collar snaps into the locked position to prevent blow apart. If the quick coupler begins to leak, replace the o-ring (Viton or EDPM material) located in the socket coupler.

TRIGGER GUN: The trigger gun is a valve that turns water flow on and off. If it begins to leak or fail to shut off, replace or repair the valve assembly.

SPRAY WAND: The operator can easily adjust the output pressure by using a dual lance wand. Pressure will increase or decrease by turning the knob on the valve to divert part of the water through the low-pressure nozzle.

SPRAY NOZZLE: The spray nozzle is connected to the end of the spray wand with a quick coupler. Be sure the collar on the quick coupler snaps into the locked position, or the nozzle could become a dangerous projectile.

DIFFUSER: A low pressure attachment connected to the trigger gun for soaking carpets, bunks, compartments, hull fittings, etc.

FAKE-O-LAKE: A low pressure attachment connected to the end of the spray wand with a hose. Adjust the spray wand to low pressure before operation. Used to flush inboard engines through the intake fitting on the underside of the hull.

ENGINE MUFFS: A low pressure attachment connected to the end of the spray wand with a hose. Used to flush I/O or outboard engines.

WINTERIZATION

STORE IN HEATED LOCATION OR COVER WITH TARP

1. Fill bucket using 2-3 gallons of RV anti-freeze. Connect short hose to supply inlet place other end in bucket. Run unit with burner off. Re-circulate 2 minutes, bypass system on/off. Fill all lines until discharge water pink.

   Extreme cold storage locations: Blow water system dry with an air compressor. Drain inlet lines & water filter housing.

2. Fill gasoline tank and add fuel stabilizer.

   Units returning to ANS Program Office should be drained of all gasoline.

3. Fill burner fuel tank and add fuel stabilizer.
4. Change engine oil & filter.
5. Inspect/Change fuel filters.
6. Disconnect battery.

Hydro Engineering 5/3000GHO Trailer S.O.P.

BEFORE START UP

 **SAFETY!** ***Level the trailer with jack and chock wheels for stable operation.***

1. **CHECK PUMP OIL:** Check pump oil by locating the oil dip stick or oil view window on the pump housing. Fill to midway notch on the oil dip stick or to the red dot on the oil view window (General Pump non-detergent SAE 30w).

2. **CHECK FLUID LEVELS:** Check engine oil (10w 30), gasoline (87 octane or higher) and burner fuel (diesel or kerosene).

3. **CONNECT DISCHARGE HOSE & TRIGGER GUN ASSEMBLY**

4. **FILL WATER SUPPLY TANK:** Maintain an adequate supply of water. Check inline water filters, clean as needed. Be sure there is water in the supply tank and the valve is open for the supply tank feed to the pump. Do not run pump dry.

OPERATION

 **WEAR PPE!** ***Burner power switch should be off before starting.***

1. **START ENGINE:** Squeeze trigger gun, adjust choke, turn key to start position until engine starts. De-Winterize unit with five (5) gallon bucket, reuse or dispose of anti-freeze according to site regulations.

2. **PURGE AIR FROM SYSTEM:** Squeeze the trigger gun until a constant stream of water comes out. (Purging works best with nozzle removed from wand and in low pressure mode.)

3. **CONNECT SPRAY ACCESSORY OR NOZZLE:** Connect nozzle securely. Ensure the quick coupler collar snaps into the locked position to prevent blow apart.

4. **BYPASS MODE:** When machine is left running and trigger gun is closed the system will re-circulate pump inlet water through the unloader and across the pump head. Inlet water can be bypassed back into the bulk supply tank thus reducing heat on pump seals.

    ***Do not leave in bypass for longer than five (5) minutes to prevent pump overheating. Shut off unit when not spraying water.***

5. **START BURNER:** With trigger gun depressed and water flowing, turn the burner switch to the "on" position and set the thermostat (if equipped) to the required temperature. Burner should shut down when the temperature setting is exceeded or the water flow stops. Cycle the trigger gun on/off, ensure the burner shuts down when trigger is released.

    ***Cool down burner before shutting down. Water exiting the trigger gun should be below 100F.***

SHUTDOWN

1. Squeeze trigger gun keep water flowing. Turn burner switch to the off position.
2. Wait for water exiting trigger gun to drop below 100F, turn engine switch off.
3. Squeeze trigger gun to release pressure from discharge hose.
4. Disconnect & store attachments.

Hydro Engineering 5/3000GHO Trailer S.O.P.

ATTACHMENTS

QUICK COUPLER: When connecting a hose, nozzle, or accessory with a quick coupler ensure the collar snaps into the locked position to prevent blow apart. If the quick coupler begins to leak, replace the o-ring (Viton or EDPM material) located in the socket coupler.

TRIGGER GUN: The trigger gun is a valve that turns water flow on and off. If it begins to leak or fail to shut off, replace or repair the valve assembly.

SPRAY WAND: The operator can easily adjust the output pressure by using a dual lance wand. Pressure will increase or decrease by turning the knob on the valve to divert part of the water through the low-pressure nozzle.

SPRAY NOZZLE: The spray nozzle is connected to the end of the spray wand with a quick coupler. Be sure the collar on the quick coupler snaps into the locked position, or the nozzle could become a dangerous projectile.

DIFFUSER: A low pressure attachment connected to the trigger gun for soaking carpets, bunks, compartments, hull fittings, etc.

FAKE-O-LAKE: A low pressure attachment connected to the end of the spray wand with a hose. Adjust the spray wand to low pressure before operation. Used to flush inboard engines through the intake fitting on the underside of the hull.

ENGINE MUFFS: A low pressure attachment connected to the end of the spray wand with a hose. Used to flush I/O or outboard engines.

WINTERIZATION

STORE IN HEATED LOCATION OR COVER WITH TARP

1. Fill float tank/reservoir (located above fuel tanks) using 2-3 gallons of RV anti-freeze. Open valve from float tank/reservoir to pump. Run unit with burner off. Re-circulate 2 minutes, bypass system on/off. Fill all lines until discharge water pink.

   Extreme cold storage locations: Blow water system dry with an air compressor. Drain water supply tank, open lid, drain inlet lines & water filter housing.

2. Fill gasoline tank and add fuel stabilizer.

   Units returning to ANS Program Office should be drained of all gasoline.

3. Fill burner fuel tank and add fuel stabilizer.
4. Change engine oil & filter.
5. Inspect/Change fuel filters.
6. Disconnect battery.

Chapter 5 Decontamination Procedures Review Questions

1. The goal of decontamination is to _____ and _____ ANS from a vessel/or trailer.

2. Although it is rare, we sometimes use chemicals to kill ANS during decontamination. True or False

3. What are the four types of decontamination and what are they used for?

   1. _____
   2. _____
   3. _____
   4. _____

4. Why is the location important when we perform decontaminations?

   _____

5. Put the following in the correct order when performing a full decontamination.

   1. _____
   2. _____
   3. _____
   4. _____

   a. Document
   b. Decontaminate
   c. Collect
   d. Report

6. According to the State of Colorado ANS protocols, which boat requires a mandatory decontamination?

   a. A boat from a positive/suspect water from last weekend that is completely dry everywhere.
   b. A boat from a positive/suspect water from 90 days ago with 2 gallons of water in an oily bilge.
   c. A boat from a positive/suspect water from 21 days ago with standing water.
   d. A boat from out of state that has no standing water.

7. When performing a flush of an I/O or outboard motor, always be clear of the prop and ask the boater to start the boat in: (circle one) a. drive b. neutral c. reverse.

8. What are the temperature requirements for decontamination?

   a. Interior Compartments = 100ºF; Exterior = 160ºF
   b. Interior Compartments = 120ºF; Exterior = 140ºF
   c. Interior Compartments = 140ºF; Exterior = 180ºF
   d. Interior Compartments = 180ºF; Exterior = 200ºF

9. What order is recommended for a **full decontamination** of a boat?

   a. Hull, trailer, engine, back of boat, interior compartments, anchor

   b. Through hull discharge ports, interior compartments, motor/engine, rinse exterior and trailer, then high pressure hull and trailer.

   c. Engine, trailer, interior compartments, hull, back of boat, anchor

   d. Anchor, back of boat, trailer, hull, engine, interior compartments

10. How long do you back-flush discharge ports with low pressure, 120ºF water?

    _____

11. How long do you decontaminate plants with low pressure, 140ºF water?

    _____

12. How long do you flush the gimbal area with low pressure, 140ºF water?

    _____

13. How often do you need to start up and use your decontamination unit if not performing regular decontaminations?

    _____

14. Which one of these boats does **NOT** get a mandatory standing water decontamination if they have no seal and receipt? (circle one)

    a. Ski boat with an inboard/outboard engine

    b. Wakeboard boat with a ballast tank

    c. Fishing boat with an outboard motor and a live well

    d. Ski boat with an inboard engine

Full Decontamination

Temperature and Pressure Table

Area	Temp	Pressure	Time	Exit Temp
Hull- through hole ports	120◦F	Low	1 min	
Interior Compartments, carpeted areas, equipment	120◦F	Low		
Motor	140◦F	Low		Reaches 140◦F
Gimbal	140◦F	Low	2 min	
Hull, Trailer – to kill	140◦F	Low		
Hull, Trailer – to remove	140◦F	High, 45◦ angle		
Inboard – Prop Shaft support / Rudder	140◦F	Low		
Inboard Engine Compartment	120◦F	Low		Plug, Fill with 4-5 gal of 120◦F water, drain and flush till 120◦F on exit

Standing Water, Plant, Bait Decontamination Table

Treatment	Location	Temp	Pressure	Time	Exit Temp
Standing water	Interior Compartments	120◦F	Low		
Standing Water	Ballast Tank	120◦F	Low		120◦F
Standing Water	Engine	140◦F	Low		140◦F
Standing Water	Gimbal	140◦F	Low	2 min.	
Plant	Carpeted bunks, transducer	140◦F	Low	15 sec	
Plant	Frame, Rollers, Prop	140◦F	High	15 sec	
Bait -Entrance	Interior Compartments or Live wells	120◦F	Low		
Bait – Exit	No Decon – Boater must bring distilled water				