Pondowner's Guide To The Use Of
Triploid Grass Carp in Pennsylvania

By Andrew L. Shiels and Mark A. Hartle, Pennsylvania Fish and Boat Commission

The grass carp or white amur (*Ctenopharyngodon idella*) is a large member of the minnow family native to the lower Amur River, which flows through Siberia and rivers in the Republic of China. Worldwide, they have been introduced into more than 20 countries. The U. S. Fish and Wildlife Service first imported grass carp into the U.S. in 1963 for study. Since then grass carp have been intentionally released into the waterways of at least 35 states as a means of biological aquatic vegetation control. On January 1, 1994, it became lawful to import, transport, possess, and introduce triploid grass carp into Pennsylvania waters under very specific regulations and permit procedures. It is unlawful to propagate grass carp, diploid or triploid in this Commonwealth.

Triploidy

In 1981, researchers developed a method to create sterile, non-reproducing grass carp by exposing the fertilized eggs to heat shock. This process results in fish of both sexes having three sets of chromosomes (triploid) rather than the normal two sets of chromosomes (diploid). Thus, sterile grass carp produced by this process are referred to as triploid grass carp. The U.S. Fish and Wildlife Service has established a testing and inspection program to ensure the integrity of triploid grass carp that are destined for importation into states like Pennsylvania that prohibit the introduction of diploid grass carp. Diploid and triploid grass carp cannot be identified by their external appearance. Determination of the fertility or sterility of grass carp occurs by analyzing a drop of blood taken from the fish. U.S. Fish and Wildlife Service inspectors conduct routine testing at the fish farmers' production site locations and furnish written certification of triploid condition to the transporter and appropriate officials in each state.

Biology

Triploid grass carp resemble a large creek chub in appearance and do not exhibit the spiny dorsal and anal fin rays or "chin" barbells that are found on common carp.

Triploid grass carp possess specially developed pharyngeal bones that perform like teeth and enable them to tear free and grind aquatic plants. Triploid grass carp can tolerate a wide variety of environmental conditions; however, they thrive in warm water. Generally, triploid grass carp will begin to consume aquatic vegetation whenever water temperatures exceed 52°F. Maximum aquatic vegetation consumption and triploid grass carp growth in Pennsylvania will occur during late spring through summer at water temperatures ranging from 68° to 90°F. Maximum growth is determined by latitude, water temperature, food availability, and age. Triploid grass carp are usually effective for 7 to 8 years and can reach weights of 25 pounds or more.

Vegetation Control

Triploid grass carp feed almost exclusively on aquatic vegetation after reaching two inches in length. Although they may consume many different kinds of aquatic plants, triploid grass carp prefer finer-leafed submerged aquatic vegetation and small floating plants like duckweed (*Lemna spp*.). Preferred food includes pondweeds (*Potamogeton spp.*), naiads (*Najas spp.*), common elodea (*Elodea canadensis*), coontail (*Ceratophyllum demersum*), and muskgrass (*Chara spp.*). Triploid grass carp do not prefer plants such as spatterdock (*Nuphar spp.*), cattail (*Typha spp.*), water lily (*Nymphaea*), or species of filamentous algae. They will eat algae in the absence of preferred food.

Triploid grass carp can be very effective at controlling unwanted aquatic plants. However, subsequent defecation of consumed plant material causes a recycling of nutrients to the water. Reduction in the submerged leafy plants coupled with changes in water chemistry and nutrient

availability can result in phytoplankton (algae) blooms that color water green or brown. Therefore, although the larger plants may have been controlled or removed, a decrease in water clarity may occur after triploid grass carp introduction.

Aquatic herbicides may be used in combination with triploid grass carp to provide an extra measure of control when plants are extremely prolific. This chemical and biological combination should not be used routinely and it should be noted that grass carp are sensitive to copper, the most common active ingredient in algae control products. A joint Department of Environmental Protection/Fish and Boat Commission *Permit for Use of an Algicide, Herbicide or Fish Control Chemical* is required for use of an algicide or herbicide.

Stocking

Ideally, triploid grass carp should be stocked at a rate, which will allow a gradual decrease in aquatic plant coverage to about 25% of the pond's surface area. To promote the prudent use of triploid grass carp and to prevent overstocking, permits to stock triploid grass carp in a specific pond or lake will not be issued unless at least two years have passed since the last stocking.

Triploid grass carp are generally available from the fish producers in sizes ranging from 8-11 inches. The price per fish usually increases with size. Pondowners are advised to purchase triploid grass carp of no less than 8 inches in length. Loss to predation (particularly from largemouth bass) can be reduced considerably by stocking triploid grass carp at least 12 inches long. Predation by birds can also be significant in small ponds. Pond outlets must be screened to prevent triploid grass carp escape. An effective screen can be constructed from round steel rods placed horizontally at one-inch intervals on vertical supports. This will prevent triploid grass carp of at least 8 inches in length from escaping. A photograph of the screen or grate must accompany your permit application.

To obtain the most effective plant control, triploid grass carp should be stocked during late spring when aquatic plants begin to flourish and when water temperatures are conducive to feeding. The stocking rate can range from 1 to 15 fish per acre depending on the type and density of aquatic plants. The Commission will not approve permits for stocking in excess of 15 triploid grass carp per surface acre of pond or lake.

Permits

Possession, importation and transportation of triploid grass carp in Pennsylvania are regulated by a permitting process to ensure the proper use of these sterile fish. The commission maintains a list of approved and permitted suppliers of certified triploid grass carp for import into Pennsylvania, which is available with the application packet.

Pondowners

Pondowners who wish to stock triploid grass carp in ponds of five (5.0) acres or less must complete and submit a Triploid Grass Carp Pondowner Stocking Permit Application along with the $20 permit fee. Ponds greater than five (5) acres in size and, in instances where there is an increased potential of adverse environmental impacts, require an Environmental Inspection Report to be completed and submitted with the Triploid Grass Carp Stocking Permit Application. The report must be completed by a qualified biologist, environmental scientist or environmental consulting firm. In cases where an Environmental Inspection Report must be completed, a notice of the Pondowner Stocking Permit Application will be published in the *Pennsylvania Bulletin* to invite public comment. The PA Fish and Boat Commission will not be conducting routine environmental inspections for the purpose of stocking triploid grass carp; however, a list of environmental inspectors who have presented their credentials to the Commission is available upon request. You should allow forty (40) days for processing of your triploid grass carp permit application and sixty (60) days for those permits requiring an Environmental Inspection Report and notice in the *Pennsylvania Bulletin*.

After receiving a stocking permit, a pondowner can then legally purchase and stock triploid grass carp into their pond. When fish are purchased, the appropriate permit copy must be completed with the number of fish purchased, date, and dealer information and returned to the Fish and Boat Commission within 10 days of stocking.

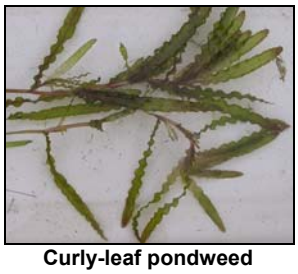
All applications and forms required for stocking triploid grass carp are available on the PA Fish and Boat Commission website www.fish.state.pa.us under "Forms" or by writing to:

Triploid Grass Carp Coordinator
PA Fish and Boat Commission
450 Robinson Lane
Bellefonte, PA 16823-9620

Plants preferred by Grass Carp

Pondweeds (*Potamogeton* spp.)
Common elodea (*Elodea canadensis*)
Coontail (*Ceratophyllum demersum*)
Naiad (*Najas* spp.)
Duckweed (*Lemna* spp.)
Watermeal (*Wolffia* spp.)
Chara or Muskgrass (*Chara* spp.)
Watermilfoil (*Myriophyllum* spp.)
Bladderwort (*Utricularia* spp.)
Water-stargrass (*Heteranthera dubia*)

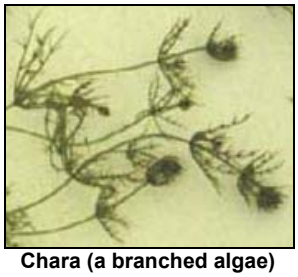

A thin-leafed pondweed

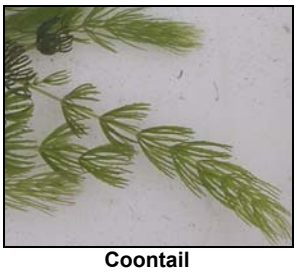

Curly-leaf pondweed


A floating-leafed pondweed

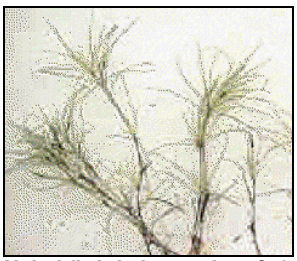

Watermeal (fine, granular)
Duckweed (leaves w/ rootlet)

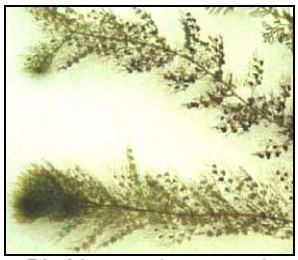

Common elodea


Chara (a branched algae)


Coontail


Eurasian watermilfoil

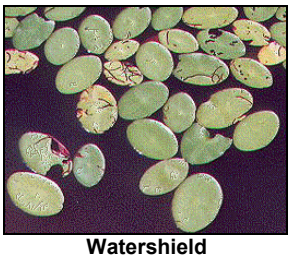

Naiad (brittle leaves in tufts)


Bladderwort (note sacs)

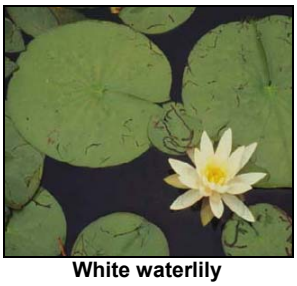
Plants NOT preferred by Grass Carp

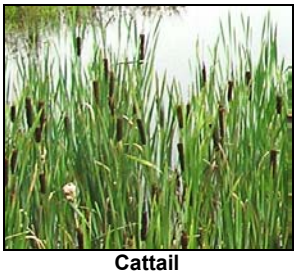
Filamentous algae (various species)
Large-leaf pondweed (*P. amplifolius)*
Cattail (*Typha* spp.)
Bulrush (*Scirpus americanus*)
Arrowhead (*Saggitaria* spp.)
Burreed (*Sparganium eurycarpum*)
Watershield (*Brasenia schreberi*)
White waterlily (*Nymphaea odorata*)
Spatterdock (*Nuphar* spp.)


Filamentous algae


Watershield


Large-leaf pondweed


White waterlily


Cattail


Spatterdock

pennsylvania
FISH AND BOAT COMMISSION

Division of Environmental Services
595 East Rolling Ridge Drive
Bellefonte PA 16823
fishandboat.com

PFBC-TGC-005
(7/24)

Triploid Grass Carp Stocking Permit Application

A permit from the Pennsylvania Fish and Boat Commission (PFBC) is required for each waterbody to be stocked with triploid grass carp (TGC) per 58 Pa. Code §71a.10.

Mail the required application package items listed to the address above.

- ☐ One completed permit application form for each waterbody in which you intend to stock TGC.
- ☐ An application fee of $85.00 payable to PFBC. If the permit is denied, the fee will be returned to you.
- ☐ A photograph of the waterbody showing containment device. Or if the waterbody does not overflow, photograph of waterbody looking toward the low point in the landscape.
- ☐ If containment device is installed on a regulated dam, DEP approval letter for installation.
- ☐ If latitude & longitude were not provided, map of and directions to waterbody.

All items must be received before applications are processed and a permit is issued.

A. APPLICANT INFORMATION		
Name:		
Mailing Address:		
City:	State:	Zip:
Email:	Phone:	
B. WATERBODY LOCATION AND DESCRIPTION		
Waterbody Name:	Waterbody Type (*check one*) ☐ Natural ☐ Man-made	
Address:		
City:	State:	Zip:
Municipality:	County:	
Waterbody Location Coordinates Latitude: _____	Longitude: _____	
Is the applicant the owner or lessee of all the land on which the waterbody is located? ☐ Yes ☐ No If "No", see Instructions Item 8.		
Surface area of waterbody (acres): If greater than 5 acres, is the Environmental Inspection Report complete? ☐ Yes ☐ No		
Maximum depth (feet):	Average depth (feet):	
Is the waterbody created by a dam regulated by the Department of Environmental Protection (DEP)? See Instructions Item 12. ☐ Yes ☐ No If yes, what is the DEP ID No. **D -**		
Water source (*check one*) ☐ Runoff ☐ Spring ☐ Well ☐ Stream (*specify*) ☐ Other (*specify*)		
Outlet Type (*check one*) ☐ None ☐ Spillway ☐ Standpipe		
Name of the nearest waterbody that would receive water flowing from your waterbody.		

Principal waterbody uses (*Check all that apply.*)

☐ Fishing ☐ Swimming ☐ Boating ☐ Aquaculture ☐ Water Source ☐ Irrigation

☐ Other (*specify*)

Have grass carp been stocked in this waterbody in the past? ☐ Yes ☐ No

If yes, provide the following: Permit #: Year: Number of carp remaining:

Describe the containment measures or devices that will be used to prevent the escape of TGC and **include a photo** with your completed application. If the waterbody is created by a regulated dam, approval of the device by DEP is required **before** dam installation. See Instructions 18.

☐ Screened or fenced spillway ☐ Screen or grate on standpipe ☐ Screen or grate on horizontal outlet pipe.

☐ Other (*specify*)

C. AQUATIC VEGETATION INFORMATION

Choose type(s) of problematic vegetation.

☐ Rooted and growing above the water ☐ Rooted and growing under the water

☐ Moss or pond scum (filamentous algae) ☐ Floating

☐ Other (*specify*)

Total surface area covered with problematic vegetation (check one): ☐ 10-25% ☐ 25-60% ☐ ≥ 61%

Indicate dominant plant species and density of each.

Name	High	Medium	Low
_____	☐	☐	☐
_____	☐	☐	☐
_____	☐	☐	☐
_____	☐	☐	☐

Describe other methods of aquatic plant or algae control employed in the past.

CERTIFICATION and SIGNATURE

☐ **I certify that the information contained in the application is true and correct to the best of my knowledge, information, and belief.** This certification is made subject to the penalty of Section 4904 of Crimes Code (18 Pa. C.S.A. § 4904) (relating to Unsworn Falsification to Authorities) and Section 908 of the Fish and Boat Code (30 Pa. C.S. § 908) (relating to False Identification or False or Fraudulent Statements on Reports).

☐ I understand that the PFBC makes no representation as to the effectiveness or suitability of use of TGC to control aquatic vegetation in any particular situation and that the applicant is responsible for consequences of such use.

☐ I own, lease, or have legal authorization from the owner(s) to request a permit.

☐ I understand that if a permit is issued, the permittee must obtain triploid (sterile) grass carp from a PFBC approved TGC Dealer.

☐ I consent to a site visit by the PFBC to the waterbody described in this permit application.

☐ I consent to receive electronic correspondence from PFBC regarding this permit application and related regulation.

Date: _____ **Signature of Applicant or Form Preparer:** _____

Form PFBC-TGC-005, Triploid Grass Carp Permit Application Instructions

1. Indicate the name of the person or group responsible for the waterbody where stocking of TGC is proposed. You must own, lease, or have legal authorization from the owner(s) to request a permit.
2. Provide the legal address where you may be contacted.
3. Provide an email address and a daytime telephone number where a responsible person may be contacted.
4. Provide the waterbody name. If unnamed, simply indicate "Your last name Pond". Check the box for *Natural* or *Man-made* (i.e., a dam).
5. Provide the address of the waterbody if it is not located at the applicant address.
6. Provide the county and municipality (e.g., township or borough) where the waterbody is located.
7. Provide the waterbody's coordinates. A latitude & longitude of your waterbody can be found on an internet site such as http://itouchmap.com/latlong.html or https://www.google.com/maps. Alternatively, submit detailed directions and a map with application.
8. Check yes or no to indicate if the waterbody is entirely within the applicant's property boundaries. If "No", then all other landowners must complete an application with their name, address, signature. These copies must accompany the permit application. No additional fee required.
9. Provide the total surface area, in acres. This is an important measurement that directly affects the number of TGC that may be stocked. Do not provide a range or indicate an approximate measurement.

   Helpful hints: 43,560 square feet = 1 acre. Area of circle = 3.14 (radius)^2, Area of rectangle = Length X Width, Area of triangle = 0.5 X base X height (base is usually the distance across the dam, height is the waterbody length).
10. **Applications for waterbodies over 5 surface acres require an Environmental Inspection Report completed by a qualified individual.** These applications are published in the Pennsylvania Bulletin for public comment which significantly increases review time. The List of Environmental Inspectors is posted on the PFBC Conservation > Landowner section: https://www.fishandboat.com/Conservation/Landowners/Pages/default.aspx.
11. Enter the maximum depth and the average depth of your waterbody in feet.
12. Is your waterbody regulated by the DEP under the Dam Safety and Encroachments Act? Obstructing the outlet could jeopardize the integrity of regulated dams. Consultation with DEP's Dam Safety Division is necessary. Contact them at (717) 787-8568 or visit www.dep.state.pa.us keyword: Dam Safety, before ANY device is installed on a dam or its outlet.
13. What is the source of water for your waterbody? Choose as many as applicable from the selections named. If you select "stream", enter its name. If you select "other", describe the water source in the space provided.
14. Indicate the type of outlet(s) where water leaves the waterbody, even if only during very wet conditions.
15. Name the stream that will directly or eventually receive water from your waterbody, even if it is only during the most severe storm. If the stream is unnamed, indicate, "Unnamed tributary to next named creek downstream Creek". Our intent first is to determine where grass carp would go if they escaped, second, to help locate your waterbody, and third, to examine characteristics of downstream waters. Even if the water soaks into the ground, name the watershed in which your waterbody is located.
16. Choose the primary use of your waterbody from the options. If you select "other", describe the primary use in the space provided.
17. Indicate (Yes or No) if TGC have been stocked previously. If "Yes", write in the permit number, if known, the year TGC were stocked. Indicate how many of the carp that were stocked remain, to the best of your knowledge.

18. What measures or devices will be used to prevent the escape of TGC? **Containment of TGC is our primary concern.** It is the policy of the PFBC that waters leaving the waterbody must be screened to effectively prevent escape of TGC. The screen is to be constructed of bars or grating with one inch vertical spacing. A schematic of a proposed containment device may be submitted in advance to PFBC for pre-approval before it is installed. Any device installed on a regulated dam, or its outlet structure must be approved by DEP BEFORE installation. Attach a copy of DEP's approval letter with this application, if applicable. Provide a detailed description of the device that will contain fish during high flows and include a picture of the device installed. The photo is very helpful to us and is required even if you have obtained a permit before. If your waterbody never overflows, you must provide information that supports this claim and a photo of the waterbody looking toward the low point in the landscape.
19. Describe what type of vegetation is causing you problems by choosing all that apply.
20. Choose the most appropriate percentage that best describes the total waterbody surface area that is covered with problematic vegetation.
21. List the dominant plant species in the waterbody and the density of each. Common or scientific names are acceptable. Correct identification of plants is important for us to determine if plants will be eaten by TGC.

    We want to be sure the use of grass carp is appropriate. The Penn State Extension website, http://extension.psu.edu/water/ponds, is helpful for plant identification.
22. Describe methods of control employed to date. Physical or mechanical control methods should be identified if used. If grass carp were stocked previously and this application is for restocking your waterbody, please indicate past failure or success.

    NOTE: Use of algicides, herbicides or fish control chemicals requires a separate PFBC/DEP permit. See http://www.depgreenport.state.pa.us/elibrary/GetFolder?FolderID=3677 for more information.
23. Read and check the box next to each statement to complete certification. Date and sign the application.

Additional Information

- Permits are valid for the number of TGC and time period specified. We determine the appropriate number of TGC using the information you provide. We do not guarantee positive results or survival of TGC.
- Future stocking requests must be made with a new application. Our policy is that permit holders must wait two years before submitting an additional TGC Stocking Permit Application. The waiting period provides an opportunity for TGC to achieve control and allows identification of any problems unique to your waterbody.
- Any party, including the applicant, who is aggrieved by a decision of the Executive Director to grant or deny a permit under Section 2906 of the Code, may appeal the decision to the full PFBC. Appeals must conform to 1 Pa. Code § 35.20. The Executive Director may stay a permit upon filing of an appeal. Appeals shall be disposed of in accordance with the General Rules of Administrative Practice and Procedure, as amended or supplemented by Commission rules.
- Contact the PFBC TGC Permit Coordinator at ra-fbtriploidcarp@pa.gov or 814-470-5274 with questions.