

Pennsylvania's Guide to

Identifying Baitfish



Acknowledgements

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Pennsylvania Sea Grant is one of 34 Sea Grant programs supported by the National Sea Grant College Program and the National Oceanic and Atmospheric Administration. Pennsylvania Sea Grant's mission is to enhance the use and conservation of Pennsylvania's coastal, marine, and Great Lakes resources to create a healthy environment, resilient and inclusive communities, and a strong and sustainable economy. Learn more online at <https://seagrants.psu.edu>.



Funding and support for this project was provided by the Great Lakes Restoration Initiative, U.S Environmental Protection Agency, National Oceanic and Atmospheric Administration, United States Fish and Wildlife Service, and the Pennsylvania Fish and Boat Commission.



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Using This Guide

This guide was developed to help bait shop owners, dealers, growers, harvesters, anglers, and others quickly identify invasive baitfish species.

These species can be mistakenly included in baitfish shipments, whether the bait is grown or collected. Knowing how to quickly identify and dispose of aquatic invasive species are vital skills in the effort to protect the Commonwealth's waters from their spread.

Invasive and native species can have very similar physical characteristics, making it difficult to recognize one versus the other. This guide provides quick ID details to help anyone identify invasive baitfish. Native baitfish are also featured in the guide.

Many invasive baitfish species originate from Asia or Europe. However, a species may be native to North America but not to Pennsylvania. Similarly, a species may be native to western Pennsylvania, but considered invasive in eastern Pennsylvania, and vice versa, so it's important to know which baitfish species are native, locally.

This guide also serves to help increase awareness about aquatic invasive species and the threats they pose to native species and Pennsylvania's waters.

Invasive Fishbait

Fishbait such as crayfish, crabs, and the nymphs, larvae, and pupae of all insects (those spending any part of their life cycle in the water), can also be considered invasive.

Anglers Support PA's Economy

\$627.2 million in economic output
7,110 jobs supported
(American Sportfishing Association)

Aquatic Invasive Species Overview

Aquatic invasive species (AIS) are aquatic animals and plants that have been introduced into water bodies where they do not live naturally. Here, they can cause detrimental ecological and economic impacts and/or harm to human health.

Global and domestic trade, recreational activities, and a changing climate are helping AIS spread at accelerated rates. As a result, AIS are changing the health and natural diversity of watersheds across the Commonwealth.

Preventing the introduction and spread of AIS, including baitfish, is critically important to protecting Pennsylvania's natural resources, and averting long-term ecosystem damage. Once AIS become widely established, controlling their spread is technically difficult, expensive, and eradication can be nearly impossible.

Pennsylvania's Waters

84K miles of waterways

77 miles of Lake Erie shoreline

112 miles of Delaware Estuary coastline

5 major watersheds

\$40 Million

**Economic Input to Lake Erie Community
from Fishing Related Activities**

(Dr. Alan Graefe, 2016)

Why It's Important to Stop the Spread of AIS

Baitfish dealers and anglers play a significant role in protecting the Commonwealth's waters and native species from the potential harm of AIS. Everyone's participation is needed to help stop their spread.

Aquatic invasive species can have detrimental impacts to ecosystems and native aquatic species. The *Baitfish Primer*, developed by Becky Cudmore and Nicholas Mandrak, describes several ways that AIS can impact native species, including:

- 1) Aquatic invasive species can out-compete native species for food and may prey on them and their eggs. This reduces the abundance of native species and alters the natural food web of that ecosystem.
- 2) Aquatic invasive species can cause habitat changes through behaviors like bottom-feeding and spawning which can destroy aquatic vegetation, increase turbidity, and negatively impact native species.
- 3) Diseases and parasites can be transferred from aquatic invasive species to native species. Exposure to these diseases or parasites may lead to decreased abundance of native species.
- 4) Native species are well adapted to their environment. Aquatic invasive species, not adapted to their new environment, may spawn with native species. Their offspring may look the same, but they are less adapted to their environment. Aquatic invasive individuals may also spawn with native individuals of closely related species. Their offspring (hybrids) may be less adapted to their environment or may be unable to reproduce. In most cases, spawning between introduced and native species will lead to a decreased abundance of native species. These impacts are not limited to aquatic invasive baitfishes.

How are AIS introduced?

There are many ways AIS can be unintentionally spread.

BOATING AND FISHING ACTIVITIES

As Hitchhikers: AIS can spread by attaching themselves to boats, trailers, equipment, fishing tackle, motors, clothing, diving gear, and boots.

As Stowaways: Microscopic AIS such as the Spiny Waterflea, Fishhook Waterflea, and Zebra Mussel larvae can be present in water in bait buckets, live wells, or bilges.

As Discarded Bait: AIS can be spread by discarding unused bait into a non-native waterbody. Additionally, baitfish shipments can accidentally contain non-native or invasive fish that can then be released into a new ecosystem.

INTERNATIONAL SHIPPING

Species are transported in the ballast tanks of cargo ships and often released into non-native waters.

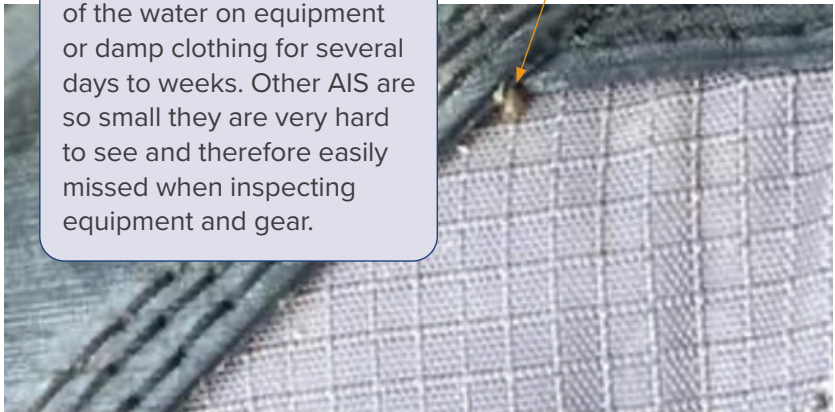
AQUARIUM OWNERS

Without realizing the consequences, well-meaning individuals may release their aquarium pet into a waterbody when they are no longer able to care for it.

CHECK YOUR GEAR!

Some AIS can survive out of the water on equipment or damp clothing for several days to weeks. Other AIS are so small they are very hard to see and therefore easily missed when inspecting equipment and gear.

New Zealand Mudsail on a boot



Prevention Tips - Clean, Drain, Dry

Preventing the introduction of aquatic invasive species to Pennsylvania's waters is the first and most vital step in stopping their spread. Anglers and recreational water users play a significant role in prevention efforts.

CLEAN

Clean off visible aquatic plants, animals, and mud from watercraft, motor, trailer, waders, footwear, ropes, anchors, bait traps, dip nets, fishing lines, field gear, and any other equipment before leaving water access.

Scrub off any visible material on hull and footwear using a stiff brush. Rinse watercraft, trailer, and equipment with high pressure hot water when possible. Flush motor according to owner's manual.

It is unlawful in Pennsylvania to transport plants, mud, or debris on boats and trailers.

Boaters must also drain all water from their boat and remove drain/bilge plugs before leaving (Pennsylvania Regulations (58 Pa. Code Chapter 71a).

CHECK THESE AREAS:

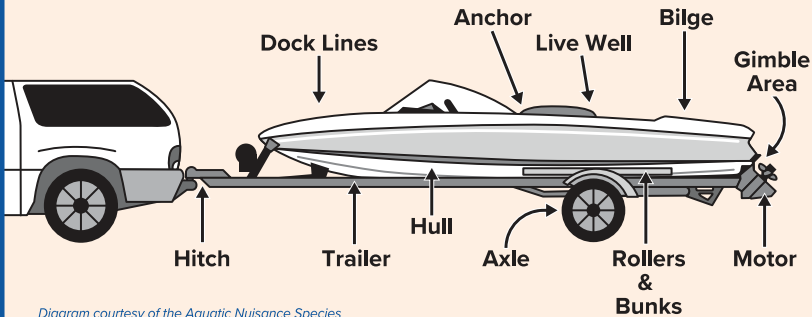


Diagram courtesy of the Aquatic Nuisance Species Taskforce's Recreational User Guidelines.

DRAIN

Drain water from all equipment including watercraft, motor, bilge, bladder tanks, livewell, and portable bait containers before leaving water access.

DRY

Dry everything for five days or more, unless otherwise required by local or state laws, when moving between waterbodies. Drying can kill small species not easily seen. If drying for 5 days isn't possible, wipe with a towel before reuse.

DISPOSE

Drain water from all equipment. Dispose of unwanted bait, fish parts, and packing materials in the trash; do not dump them in the water or on land.

Dumping any live bait into the water after fishing is illegal in Pennsylvania (58 Pa. Code Chapter 71a).

Other Key Actions

- Use non-felt soled boots to further reduce the risk of spreading aquatic invasive species.
- Fish caught for eating or taxidermy should be cleaned at designated fish cleaning stations or placed on ice.

Never move live fish or other organisms from one water body into another.

CHECK THESE AREAS:



Permitted Activities and Restrictions

The following is a summary of guidance issued by the Pennsylvania Fish and Boat Commission related to baitfish. For a full listing of permitted activities and restrictions, see the Pennsylvania Fish and Boat Commission Fishing Summary Handbook published each year.

A person shall not

- Release or dispose of live baitfish into any water of this Commonwealth, except live baitfish baited on a hook for angling purposes.
- Use or possess Goldfish, Comets, Koi, and Common Carp as baitfish while fishing.
- Transfer a collected baitfish species from waters in this Commonwealth into another drainage of this Commonwealth where the species does not already exist.

A person may

- A person may collect live baitfish for angling.
- Use legally taken gamefish as bait.
- Use crayfish as bait if used in the water from which it was taken. Otherwise, the head must be immediately removed behind the eyes upon capture.

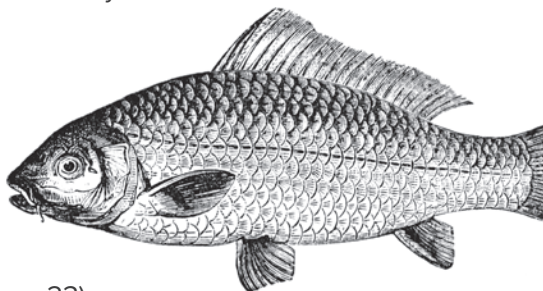
Collecting, Purchasing, and Keeping Bait

- There is no closed season for collecting baitfish.
- There is no minimum size.
- The daily and possession limits are 50 combined species. Purchased fishbait or baitfish do not have a possession limit and do not count toward your daily limit of fishbait and baitfish taken from Commonwealth waterways. If fishing in a group, and possession limit exceeds 50, separate containers must be provided for the fishbait and baitfish.
- Retain sales receipt for purchased baitfish or fishbait. It serves as authorization for the possession for a period of 15 days.
- Stocked trout waters are closed for taking fishbait and baitfish from February 19 to the opening day of trout season. Most specially regulated trout waters are closed to taking fishbait and baitfish at all times.
- Collection of bait is permitted using rod and reel or handline, dip net, minnow seine, or minnow trap.
- Unattended minnow traps or baitfish containers must include the owner/user's name, address, and telephone number.

Banned Species

It is illegal to possess, transport, sell, or introduce the following baitfish species, living or dead, in Pennsylvania.

- Bighead Carp (page 12)
- Black Carp (page 13)
- European Rudd (page 17)
- Round Goby (page 28)
- Eurasian Ruffe (page 37)
- Silver Carp (page 26)
- Snakehead (all species) (page 23)
- Tubenose Goby (page 29)



DISPOSAL AND REPORTING

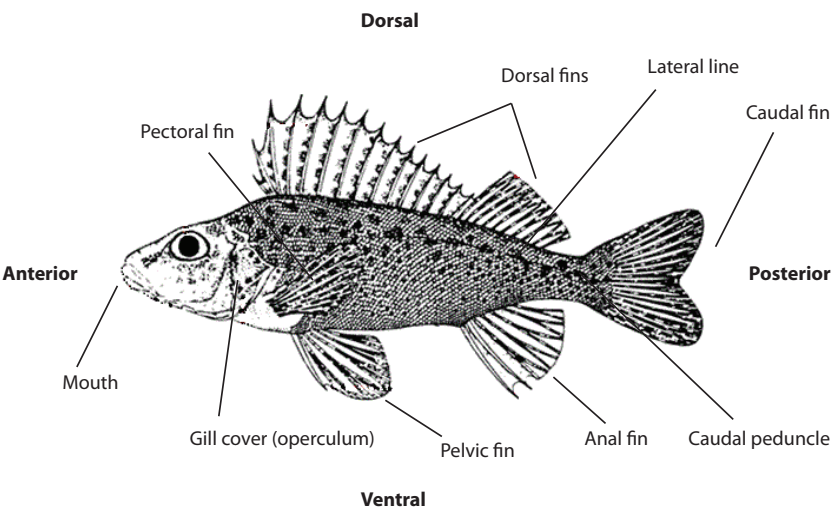
If you've found a suspected aquatic invasive species,

1. Use the "PA AIS" app to confirm.
2. Dispose of the species by freezing it.
3. Report it! Options to report include,
 - a. Call 1-833-Invasiv
 - b. Use the "PA AIS" app
 - c. Submit an online form to the Pennsylvania Fish & Boat Commission

Scan Now! To access AIS reporting methods and resources. Or visit us online at <https://seagrant.psu.edu/aquatic-invasive-species/>

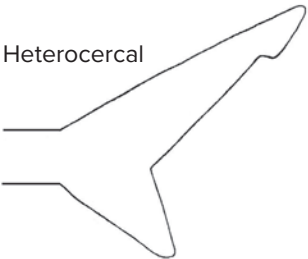


Fish Anatomy

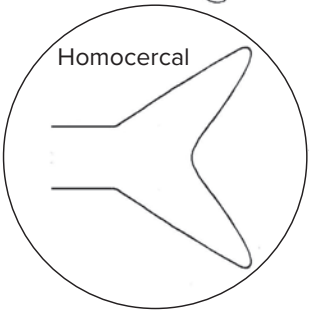


Types of Caudal Fin

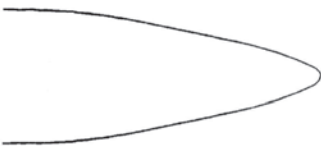
Heterocercal



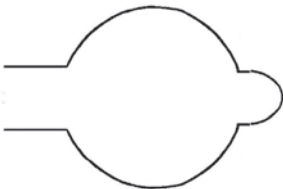
Homocercal



Protocercal

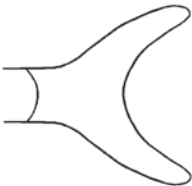


Diphycercal

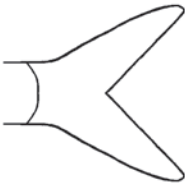


Shapes of Homocercal Caudal Fins

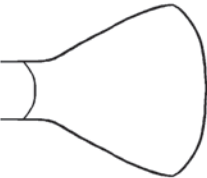
Lunate



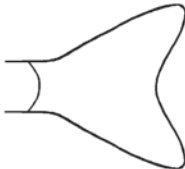
Forked



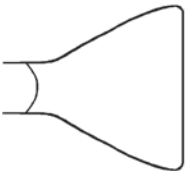
Rounded



Emarginate (Concave)



Truncated (Straight)



Bighead Carp

(*Hypophthalmichthys nobilis*)



**BANNED FOR SALE, BARTER, POSSESSION, OR
TRANSPORTATION IN PENNSYLVANIA**

The Bighead Carp is native to eastern Asia. **It is considered invasive in Pennsylvania.** There is concern it could “stow away” in bait and be moved unintentionally. The Bighead Carp looks similar in appearance to the Silver Carp and Common Shiner.

Quick ID:

Distinctive Markings: irregular gray-black blotches on sides

Body: broad, fusiform, laterally compressed

Adult Length: 39-58 in

General Color: dark gray top blending to white belly

Eyes: low set eyes, positioned downward

Other Features:

Head: large

Mouth: large, terminal, protruding lower jaw

Teeth or Barbels: none

Caudal Fin Shape: forked

Other Fin Notes: gray to dark gray in color, dorsal fin lacks spines

Scales: none on head, very small on body

Black Carp

(*Mylopharyngodon piceus*)



**BANNED FOR SALE, BARTER, POSSESSION, OR
TRANSPORTATION IN PENNSYLVANIA**

The Black Carp is native to eastern Asia from southern Russia to northern China. **It is considered invasive in Pennsylvania.** There are currently no reports of Black Carp in Pennsylvania. The Black Carp looks similar in appearance to the Grass Carp and the Common Carp.

Quick ID:

Distinctive Markings: none

Body: elongate, fusiform, slightly compressed

Adult Length: 39-58 in

General Color: dark brown to black on the back and sides, with some white on the underside

Other Features:

Head: pointed

Mouth: small, terminal, lacks barbels

Teeth or Barbels: none

Caudal Fin Shape: large, forked

Other Fin Notes: fins are dark and lack spines

Scales: very large

Common Carp

(*Cyprinus carpio*)



The Common Carp is native to Europe and Asia. **It is considered invasive in Pennsylvania.** It is illegal to use Common Carp as bait in Pennsylvania. The Common Carp looks similar in appearance to the Grass Carp.

Quick ID:

Distinctive Markings: large scales outlined in black, two pairs of barbels on each side of the upper jaw

Body: heavy, stout

Adult Length: 16-31 in

General Color: olive brown to reddish brown, with yellow or yellow-white belly

Other Features:

Head: short, rounded snout

Mouth: suckerlike, with two barbels on each side

Teeth or Barbels: barbels

Caudal Fin Shape: large, forked

Other Fin Notes: long dorsal fin, 17-23 soft rays

Scales: large, with dark edges and black spot at the base

Creek Chub

(*Semotilus atromaculatus*)



The Creek Chub is native to most of the eastern United States.

It is considered native in parts of Pennsylvania and is commonly used as live bait. The Creek Chub looks similar in appearance to the Fallfish.

Quick ID:

Distinctive Markings: none

Body: stout, robust, slightly compressed

Adult Length: 11 in

General Color: black or bluish with silvery belly

Other Features:

Head: broad, blunt

Mouth: large, moderately oblique

Teeth or Barbels: small, single barbel in the corner of each jaw

Caudal Fin Shape: forked

Other Fin Notes: variable, brown to gray color, prominent dark spot on the base of the dorsal fin

Scales: small, appear cross-hatched

Emerald Shiner

(*Notropis atherinoides*)



The Emerald Shiner is widely distributed across the United States, specifically in the Mississippi River Basin. **It is considered invasive in parts of Pennsylvania** and is commonly used as bait. The Emerald Shiner looks similar in appearance to other shiners.

Quick ID:

Distinctive Markings: none

Body: elongated, slender

Adult Length: 2-3 in

General Color: light olive to bluish green, sides are silvery, with a horizontal iridescent green or bluish green band the length of the body

Eyes: large

Other Features:

Head: blunt snout

Mouth: moderately large, slightly upturned

Teeth or Barbels: none

Caudal Fin Shape: forked

Other Fin Notes: dorsal fin behind pelvic fins, fins are clear

European Rudd

(*Scardinius erythrophthalmus*)



**BANNED FOR SALE, BARTER, POSSESSION, OR
TRANSPORTATION IN PENNSYLVANIA**

The European Rudd is native to Europe and western Asia. **It is considered invasive in Pennsylvania.** There is concern it could be a bait stowaway. The European Rudd looks similar in appearance to the Common Shiner.

Quick ID:

Distinctive Markings: beginning of dorsal fin set well behind the front of the pelvic fin

Body: stocky, robust, elliptical

Adult Length: 19 in

General Color: brownish green on top, brassy yellow to rosey on sides, fading to silver underneath.

Eyes: iris is orange to yellow

Other Features:

Head: small

Mouth: terminal, lower lip is sharply angled with protruding lower jaw

Teeth or Barbels: none

Caudal Fin Shape: forked

Other Fin Notes: pectoral, pelvic, and anal fins are a distinct red orange color

Scales: large

Fallfish

(*Semotilus corporalis*)



The Fallfish is native to the northeast United States. **It is native in parts of Pennsylvania and invasive in others.** Its spread in Pennsylvania has been attributed to bait release. The Fallfish looks similar in appearance to the Creek Chub.

Quick ID:

Distinctive Markings: none

Body: moderately compressed

Adult Length: 20 in

General Color: olive to golden brown

Other Features:

Head: rounded snout

Mouth: large, overhanging

Teeth or Barbels: none

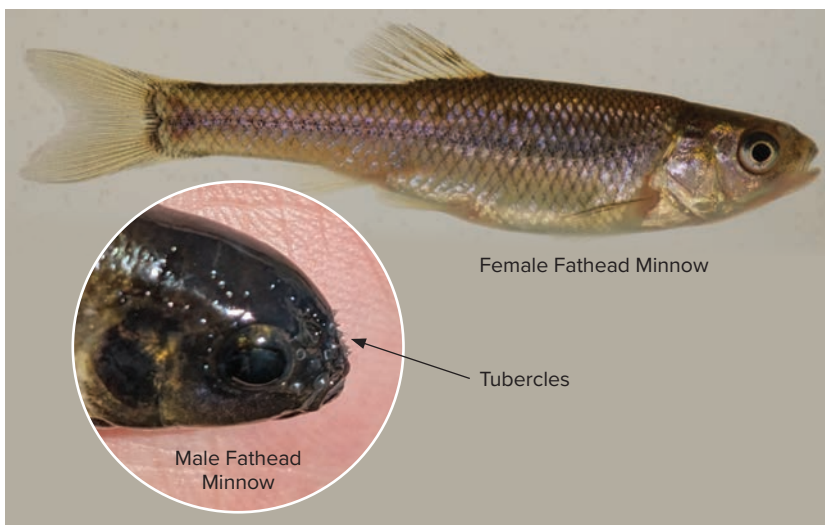
Caudal Fin Shape: forked

Other Fin Notes: fins are gray to brown

Scales: dorsal scales are darkly outlined

Fathead Minnow

(*Pimephales promelas*)



The Fathead Minnow is **native to much of the central United States and northwestern Pennsylvania; however, it is considered invasive in other parts of Pennsylvania.** It is commonly used as live bait.

- Breeding males acquire a large, gray fleshy growth on the nape, and approximately 16 white breeding tubercles on the snout.

Quick ID:

Distinctive Markings: spot at base of tail fin

Body: chubby, moderately compressed

Adult Length: 3 in

General Color: dark olive or brown, sides are dusky, fading to pale belly

Other Features:

Head: blunt and round snout

Mouth: slightly subterminal

Teeth or Barbels: none

Caudal Fin Shape: forked

Other Fin Notes: short, rounded fins that are clear to gray or brown

Scales: scales ahead of dorsal fin are small and crowded

Golden Shiner

(*Notemigonus crysoleucas*)



The Golden Shiner is native to the entire eastern half of the United States. **It is not considered invasive in Pennsylvania.** It is commonly used as live bait. The Golden Shiner looks similar in appearance to other shiners.

Quick ID:

Distinctive Markings: none

Body: extremely compressed

Adult Length: average 2-4 in, large 8-10 in

General Color: dark olive green, sides may be golden, brassy, or silvery

Other Features:

Head: pointed snout

Mouth: small, upturned

Teeth or Barbels: none

Caudal Fin Shape: forked

Other Fin Notes: anal fin is gray with long base

Scales: large

Grass Carp

(*Ctenopharyngodon idella*)



The Grass Carp is native to eastern Asia including China and Russia. **It is considered invasive in Pennsylvania.** In Pennsylvania, a permit is required to stock triploid Grass Carp, a sterile form that is unable to reproduce. Stocking is only permitted in ponds to prevent the spread through waterways and river systems. The Grass Carp looks similar in appearance to the Common Carp.

Quick ID:

Distinctive Markings: none

Body: oblong, slender

Adult Length: 24-49 in

General Color: olive to silvery white, fins are clear to gray brown

Other Features:

Head: slightly flattened

Mouth: small, terminal

Teeth or Barbels: none

Caudal Fin Shape: large, forked

Other Fin Notes: dorsal fin has three simple rays and seven branched rays

Scales: large, dark edges and black spot at the base

Mimic Shiner

(*Notropis volucellus*)



The Mimic Shiner is native from Vermont south to Texas and the Gulf of Mexico, and north to the Great Lakes. **It is considered invasive in Pennsylvania.** Its introduction in Pennsylvania has been attributed to bait release. The Mimic Shiner looks similar in appearance to darters and gobies.

Quick ID:

Distinctive Markings: dark pigmentation around anus, base of anal fin

Body: laterally compressed

Adult Length: 2-3 in

General Color: yellowish olive, silvery sides, white belly

Eyes: large

Other Features:

Head: broad, round snout

Mouth: slightly upturned

Teeth or Barbels: none

Caudal Fin Shape: forked

Other Fin Notes: clear fins

Scales: increase in size from front to back, upper sides are dark edged

Northern Snakehead

(*Channa argus*)



**BANNED FOR SALE, BARTER, POSSESSION, OR
TRANSPORTATION IN PENNSYLVANIA**

The Northern Snakehead is native to China, Russia, and Korea. **It is considered invasive in Pennsylvania.** Its introduction in Pennsylvania has been attributed to pet release by aquarists and as bait by anglers. It looks similar in appearance to the native Bowfin and the native and endangered Burbot.

Quick ID:

Distinctive Markings: snake-shaped head, truncated caudal fin, long anal fin

Body: cylindrical, long, thin

Adult Length: 33 in

General Color: tan with dark brown mottling

Other Features:

Head: snake-shaped, flattened

Mouth: large

Teeth or Barbels: canine-like, sharp, many

Caudal Fin Shape: truncated

Other Fin Notes: long dorsal and anal fins

Scales: present on top of head

Redside Dace

(*Clinostomus elongatus*)



The Redside Dace is native to the Upper Susquehanna River Basin, and the Great Lakes. **It is not considered invasive in Pennsylvania.** The Redside Dace looks similar in appearance to the Rosyside Dace.

Quick ID:

Distinctive Markings: none

Body: laterally compressed

Adult Length: 4 in

General Color: dark back with red band on lower side

Other Features:

Head: pointed snout

Mouth: large, oblique

Teeth or Barbels: none

Caudal Fin Shape: forked

Other Fin Notes: fins are light brown to clear

Scales: small

Rosyside Dace

(*Clinostomus funduloides*)



The Rosyside Dace is native to the Atlantic Slope from the Lower Delaware River in Pennsylvania south to Georgia and west to southern Ohio, Tennessee, and Kentucky. **It is not considered invasive in Pennsylvania.** The Rosyside Dace looks similar in appearance to the Redside Dace.

Quick ID:

Distinctive Markings: none

Body: laterally compressed

Adult Length: 4 in

General Color: olive fading to white

Other Features:

Head: pointed snout

Mouth: large, oblique

Teeth or Barbels: none

Caudal Fin Shape: forked

Other Fin Notes: fins are olive to brown

Scales: small

Silver Carp

(*Hypophthalmichthys molitrix*)



**BANNED FOR SALE, BARTER, POSSESSION, OR
TRANSPORTATION IN PENNSYLVANIA**

The Silver Carp is native to eastern Asia. **It is considered invasive in Pennsylvania.** Resource managers are concerned that it may spread as a bait stowaway. The Silver Carp looks similar in appearance to the Bighead Carp and the Common Shiner.

Quick ID:

Distinctive Markings: none

Body: laterally compressed

Adult Length: 16-28 in

General Color: olive to grayish black, silvery sides blending to white belly

Eyes: large, low on head, more forward-facing

Other Features:

Head: large

Mouth: large and terminal, lower jaw slightly protruding

Teeth or Barbels: none

Caudal Fin Shape: forked

Other Fin Notes: short dorsal fin, lacks spines, fins are gray to dark

Scales: very small

Black Bullhead

(*Ameiurus melas*)



The Black Bullhead is native to the Great Lakes and Mississippi River basins. **It is native in parts of Pennsylvania and considered invasive in other parts of Pennsylvania.** There is concern it could stow away in bait and be unintentionally moved. The Black Bullhead looks similar in appearance to the Brown Bullhead and the Yellow Bullhead.

Quick ID:

Distinctive Markings: has adipose fin

Body: stout

Adult Length: 24 in

General Color: dark brown to gray

Other Features:

Head: variable

Mouth: terminal mouth, upper lip extends past bottom

Teeth or Barbels: present, dark, whisker-like

Adipose Fin: Yes

Caudal Fin Shape: rounded, slightly notched

Other Fin Notes: fin coloration is similar to body

Scales: none

Round Goby

(*Neogobius melanostomus*)



**BANNED FOR SALE, BARTER, POSSESSION, OR
TRANSPORTATION IN PENNSYLVANIA**

The Round Goby is native to Eurasia. **It is considered invasive in Pennsylvania.** It was introduced in the United States through ballast water and has spread through bait release or by stowing away in bait buckets. The Round Goby looks similar in appearance to the Tubenose Goby, darters, and sculpins.

Quick ID:

Distinctive Markings: none

Body: cylindrical, somewhat flat underside

Adult Length: 3-10 in

General Color: solid slate gray, can be mottled with olive green, black, gray, and brown spots. Males can be nearly solid black.

Eyes: frog-like

Other Features:

Head: large, round

Mouth: wide, large lips

Teeth or Barbels: none

Caudal Fin Shape: rounded

Other Fin Notes: black spot on the dorsal fin, light brown to clear fins

Scales: all over

Tubenose Goby

(*Proterorhinus semilunaris*)



**BANNED FOR SALE, BARTER, POSSESSION, OR
TRANSPORTATION IN PENNSYLVANIA**

The Tubenose Goby is native to the Black and Caspian seas in Europe. **It is considered invasive in Pennsylvania.** It was introduced in the United States through ballast water and can be spread through bait release or by stowing away in bait buckets. The Tubenose Goby looks similar in appearance to the Round Goby and sculpins.

Quick ID:

Distinctive Markings: has fused pelvic fins

Body: cylindrical body, somewhat flat underside

Adult Length: 2-4 in

General Color: light brown with dark brown blotches that may form vertical bars.

Other Features:

Head: blunt or rounded snout

Mouth: wide, large lips

Teeth or Barbels: none

Caudal Fin Shape: rounded

Other Fin Notes: triangular black spot is present at base of caudal fin followed by two white spots

Scales: small

Alewife

(*Alosa pseudoharengus*)



The Alewife is native to the Atlantic Coast of the United States.

It is invasive in parts of Pennsylvania and native in other parts of Pennsylvania. It is commonly used as live bait. The Alewife looks similar in appearance to the Gizzard Shad.

Quick ID:

Distinctive Markings: black spot on each side just behind head

Body: small, slender, laterally compressed

Adult Length: 10-15 in

General Color: silver (bluish to green), often has coppery sheen, with horizontal darker stripes

Eyes: relatively large, obvious eyelid

Other Features:

Head: broad and triangular

Mouth: superior

Teeth or Barbels: none

Caudal Fin Shape: forked

Other Fin Notes: fins are brownish gray

Scales: row of scales form sharp edge along midline of the belly

Gizzard Shad

(*Dorosoma cepedianum*)



The Gizzard Shad is native to the southern Great Lakes region, and from Pennsylvania to Florida and Texas. **It is considered native in parts of Pennsylvania and invasive in other parts of Pennsylvania.** It is commonly used as live bait. The Gizzard Shad looks similar in appearance to the Alewife.

Quick ID:

Distinctive Markings: closely packed gill rakers

Body: short, moderately to strongly compressed

Adult Length: 20 in

General Color: dark on top fading to silvery white belly

Eyes: has eyelids

Other Features:

Head: blunt snout

Mouth: small, subterminal to inferior

Teeth or Barbels: none

Caudal Fin Shape: forked

Other Fin Notes: long trailing last dorsal ray, brown to gray fins

Scales: none on head, scales on body are thin

Eastern Mosquitofish

(*Gambusia holbrooki*)



The Eastern Mosquitofish is native to the Atlantic and Gulf Slope drainages. **It is considered invasive in Pennsylvania.** It has been observed as a stowaway in bait shipments. The Eastern Mosquitofish looks similar in appearance to the Western Mosquitofish.

- Females usually have a black stripe near the eye area but are more easily recognized by a black spot on their belly called the gravid spot which darkens during pregnancy.

Quick ID:

Distinctive Markings: dark teardrop shape below eyes

Body: compressed, females have rounded belly

Adult Length: 2 in

General Color: olive gray to yellowish

Other Features:

Head: flattened

Mouth: small, upturned

Teeth or Barbels: none

Caudal Fin Shape: rounded

Other Fin Notes: dusky to black spots on dorsal and caudal fins, small dorsal fin starting behind anal fin, clear fins

Scales: darkly outlined

Western Mosquitofish

(*Gambusia affinis*)



Female Western Mosquitofish

Male Western Mosquitofish

The Western Mosquitofish is native to the Atlantic and Gulf Slope drainages from New Jersey to New Mexico and Illinois to Texas. **It is considered invasive in Pennsylvania.** Its introduction in Pennsylvania has been attributed to bait release. The Western Mosquitofish looks similar in appearance to the Eastern Mosquitofish.

- Females are generally larger than males. During pregnancy, females tend to have a distended abdomen with a black spot called a gravid spot which darkens during pregnancy.

Quick ID:

Distinctive Markings: small teardrop streaks below eyes

Body: short

Adult Length: 2-3 in

General Color: dull gray or brown

Other Features:

Head: flattened

Mouth: pointed upwards

Teeth or Barbels: none

Caudal Fin Shape: rounded

Other Fin Notes: fins are clear, small light speckling on caudal and dorsal fins

Scales: lightly outlined in black on back and sides

Eastern Banded Killifish

(*Fundulus diaphanus*)



The Eastern Banded Killifish is native in the Atlantic Slope drainages of the northeast United States to South Carolina and west to the Dakotas. **It is native in some parts of Pennsylvania and considered invasive in other parts of Pennsylvania.** Its introduction in Pennsylvania has been attributed to bait release. The Eastern Banded Killifish looks similar in appearance to darters and gobies.

- Females have fewer than 9 thin, distinctly black bands that often do not span the full width of the body. Males have more than 9 silvery bands which are less distinct and closer together.

Quick ID:

Distinctive Markings: none

Body: Laterally compressed

Adult Length: 2-4 in

General Color: dark gray on the back fading around sides to white or yellow belly. Spawning males have yellow fins.

Other Features:

Head: flattened, bluntly pointed snout

Mouth: small, slightly upturned

Teeth or Barbels: small teeth on both jaws

Caudal Fin Shape: rounded to truncated

Other Fin Notes: clear to gray fins

Scales: small, all over

Mummichog

(*Fundulus heteroclitus*)



The Mummichog is native to marine, brackish, and occasionally freshwater areas along the Atlantic Coast from Maine to northeastern Florida. **It is native in parts of Pennsylvania and considered invasive in other parts of Pennsylvania.** Its spread in Pennsylvania has been attributed to bait release. The Mummichog looks similar in appearance to shiners.

- Males typically present with bright yellow fins, and females are larger in body size.

Quick ID:

Distinctive Markings: none

Body: stout

Adult Length: 1-3 in

General Color: brownish green to green or olive

Other Features:

Head: flat, short blunt snout

Mouth: lower lip juts out

Teeth or Barbels: teeth

Caudal Fin Shape: rounded or squared off

Other Fin Notes: females have green tinted dorsal and anal fins, males have yellow pectoral and anal fins

Scales: all over

Banded Darter

(*Etheostoma zonale*)



The Banded Darter is native to Lake Michigan and the Mississippi River basins from New York to Minnesota, and south to northern Georgia, northern Alabama, and southern Arkansas. **It is native in parts of Pennsylvania and considered invasive in other parts of Pennsylvania.** Its spread in Pennsylvania has been attributed to bait release. The Banded Darter looks similar in appearance to other darters and gobies.

- Males possess more striking colors during spawning while females maintain neutral earth tones.

Quick ID:

Distinctive Markings: dark green vertical bands along the body, and 3 to 4 dark spots on the base of the tail fin

Body: short and stubby

Adult Length: 3 inches

General Color: green and brown, belly is yellow to white

Other Features:

Head: rounded snout

Mouth: subterminal, upper lip is connected to snout by a narrow ridge of skin

Teeth or Barbels: none

Caudal Fin Shape: rounded

Other Fin Notes: all fins have narrow dark lines, the dorsal fins have a red to rust colored band at the base

Scales: all over

Eurasian Ruffe

(*Gymnocephalus cernua*)



**BANNED FOR SALE, BARTER, POSSESSION, OR
TRANSPORTATION IN PENNSYLVANIA**

The Eurasian Ruffe is native to Eurasia. **It is considered invasive in Pennsylvania.** Its introduction in Pennsylvania has been attributed to bait release. The Eurasian Ruffe looks similar in appearance to the Yellow Perch and the White Perch.

Quick ID:

Distinctive Markings: rows of dark spots between spines on dorsal fin, very slimy when handled, sharp spines on gill covers

Body: slender, slightly compressed

Adult Length: 4-6 in

General Color: greenish to brown on top with dark patches on lighter brown sides, yellow belly has dark spots

Eyes: glassy

Other Features:

Head: large

Mouth: small, downturned

Teeth or Barbels: none

Caudal Fin Shape: forked

Other Fin Notes: dorsal fin behind pelvic fins, fins are clear to yellow

Scales: on body, none on head

Greenside Darter

(*Etheostoma blennioides*)



The Greenside Darter is native to the Great Lakes and Mississippi River basins, and from New York to Maryland to Kansas and Oklahoma. **It is native in parts of Pennsylvania and considered invasive in other parts of Pennsylvania.** Its spread in Pennsylvania has been attributed to bait release. The Greenside Darter looks similar in appearance to other darters.

- During spawning season, males display striking colors while females maintain neutral earth tones.

Quick ID:

Distinctive Markings: none

Body: cylindrical

Adult Length: 2-3 in

General Color: brownish to green, dark or reddish spots present on the top of back, green bands along sides

Eyes: large

Other Features:

Head: rounded snout

Mouth Shape: small, terminal

Teeth or Barbels: none

Caudal Fin Shape: slightly notched

Other Fin Notes: large well-developed pectoral fins, and green dorsal fins with reddish bands at the base

Scales: all over

Iowa Darter

(*Etheostoma exile*)



REGULATED AS ENDANGERED IN PENNSYLVANIA

The Iowa Darter is native to the northern central United States. **It is native to parts of Pennsylvania and is not considered invasive in Pennsylvania.** It has been observed as a stowaway in bait shipments. The Iowa Darter looks similar in appearance to other darters.

- During spawning, males display striking colors while females maintain neutral earth tones.

Quick ID:

Distinctive Markings: teardrop mark under eyes, 9 to 12 dark blotches on sides

Body: slender

Adult Length: 2-3 in

General Color: greenish or brownish

Eyes: large

Other Features:

Head: rounded snout

Mouth: terminal

Teeth or Barbels: none

Caudal Fin Shape: rounded

Other Fin Notes: front dorsal fin is green with red stripe

Scales: all over

White Perch

(*Morone americana*)



The White Perch is native to the Atlantic Coast of the United States. **It is native in parts of Pennsylvania and considered invasive in other parts of Pennsylvania.** Its spread in Pennsylvania has been attributed to bait release. The White Perch looks similar in appearance to the White Bass and the Yellow Perch.

Quick ID:

Distinctive Markings: none

Body: laterally compressed

Adult Length: 5-7 in

General Color: silvery gray to greenish brown fading to silvery white

Other Features:

Head: steep slope from nose to dorsal fin

Mouth: large, subterminal, extends just below the eye

Teeth or Barbels: none

Caudal Fin Shape: forked

Other Fin Notes: dorsal fin has spiny and soft portions separated by a deep notch, fins are gray to brown

Scales: all over

White Sucker

(*Catostomus commersonii*)



The White Sucker is native to the Atlantic Coast, Arctic, Great Lakes, and the Mississippi River basin. **It is not considered invasive in Pennsylvania.** The White Sucker looks similar in appearance to the Common Carp.

Quick ID:

Distinctive Markings: none

Body: round

Adult Length: 25 in

General Color: olive brown to black fading to white on belly

Other Features:

Head: rounded snout

Mouth: inferior, faces downward

Teeth or Barbels: none

Caudal Fin Shape: forked

Other Fin Notes: none

Scales: increase in size from front to back

Sculpin

(*Cottus spp.*)



The Sculpin is native to parts of the eastern and western United States. **It is not considered invasive in Pennsylvania.** The Sculpin looks similar in appearance to the Round Goby and the Tubenose Goby.

Quick ID:

Distinctive Markings: none

Body: cylindrical, somewhat flat underside

Adult Length: 6 in

General Color: brown, may have dark blotches that appear as vertical bands

Eyes: large

Other Features:

Head: large, rounded

Mouth: large and wide with large lips

Teeth or Barbels: none

Caudal Fin Shape: rounded

Other Fin Notes: large, pointy fins that are brown to clear

Scales: none

Brook Stickleback

(*Culaea inconstans*)



The Brook Stickleback is native to the Great Lakes and Mississippi River basins from Vermont to Montana, and south to Ohio and Illinois. **It is native in parts of Pennsylvania and considered invasive in other parts of Pennsylvania.** It has been observed as a stowaway in bait shipments and may have been introduced via bait bucket releases. The Brook Stickleback looks similar in appearance to the Fourspine Stickleback.

Quick ID:

Distinctive Markings: 4 to 6 dorsal spines on back

Body: deep, compressed

Adult Length: 3 in

General Color: olive, belly tends to be silver white or light green, may have pale vertical lines

Other Features:

Head: conical

Mouth: lower jaw extends past upper

Teeth or Barbels: sharp teeth on both jaws

Caudal Fin Shape: rounded

Other Fin Notes: fins are clear to olive

Scales: none, has small bony plates along sides

Fourspine Stickleback

(*Apeltes quadracus*)



The Fourspine Stickleback is native to Europe and the North American Atlantic Coast from New Brunswick to North Carolina. **It is native in parts of Pennsylvania and considered invasive in other parts of Pennsylvania.** Its spread in Pennsylvania has been attributed to bait release. The Fourspine Stickleback looks similar in appearance to the Brook Stickleback.

Quick ID:

Distinctive Markings: 2 to 4 free dorsal spines close to each other, has a bony ridge on each side of abdomen

Body: triangular, flat belly, sharp back

Adult Length: 2 in

General Color: brown on back and sides with white belly, body covered in dark mottling

Other Features:

Head: tapers to pointed nose

Mouth: terminal, slightly upturned

Teeth or Barbels: none

Caudal Fin Shape: rounded

Other Fin Notes: dorsal and anal fins are rounded, brownish white, slim base at tail, clear pelvic fins are sometimes reddish

Scales: on sides

Bluegill

(*Lepomis macrochirus*)



The Bluegill is native to the St. Lawrence, Great Lakes, and Mississippi River Basins from New York to Minnesota and south to the Gulf of Mexico. **It is native in parts of Pennsylvania and considered invasive in other parts of Pennsylvania.** Its introduction in Pennsylvania has been attributed to bait release. Juvenile Bluegill are similar in appearance to darters and gobies.

Quick ID:

Distinctive Markings: flexible black ear flap

Body: compressed

Adult Length: 9 in

General Color: blue green back blends to white belly, with 5 to 9 dark vertical bands on sides which lighten

Eyes: large, dark

Other Features:

Head: bluntly pointed

Mouth: terminal, small

Teeth or Barbels: none

Caudal Fin Shape: shallow fork with rounded tips

Other Fin Notes: two spiny-ray dorsal fins are continuous, dusky rounded spot on rear dorsal fin

Scales: all over

Glossary

Anal Fin: a median unpaired fin on the lower posterior part of the body behind the vent and sometimes confluent with the caudal fin

Anterior: situated before or toward the front

Aquatic Invasive Species: freshwater or marine organism that has spread or been introduced beyond its native range and is either causing harm or has the potential to cause harm

Baitfish: small marine or freshwater fish that are used as bait to attract larger predatory fish

Barbel: whisker like sensory organ near the mouth

Bilge: outer surface of a ship's hull where the bottom curves to meet the vertical sides

Caudal: directed towards the hind part of the body

Caudal Fin: the tail fin, located at the end of the caudal peduncle; used for propulsion

Caudal Peduncle: tapered region behind the dorsal and anal fins where the caudal fin attaches to the body

Compressed: having a narrow shape as if flattened

- **Laterally Compressed:** flattened from side to side

Conical: resembling a cone especially in shape

Cylindrical: relating to or having the form or properties of a cylinder

Depressed: flattened from top to bottom

Diphyceral: caudal tail shape; vertebrae extend to the tip of the tail and the tail is symmetrical and expanded

Dorsal: located on the top of a fish, used for stabilizing in the water and directing through turns and stops

Dorsal Fin: fish may have three, located on the back, serves as protection against rolling and assists in sudden turns and stops

Elliptical: of, relating to, or shaped like an ellipse

Elongate: to extend the length of

Emarginate: having the margin notched

Fishbait: all insects spending any part of their life cycle in the water

Forked: resembling a fork especially in having one end divided into two or more branches or points

Fusiform: tapering toward each end

Gill Raker: any of the bony processes on a gill arch that divert solid substances away from the gills

Heterocercal: of a fish tail fin: having the upper lobe larger than the lower with the vertebral column extending into the upper lobe

Homocercal: of a fish tail fin: having the upper and lower lobes approximately symmetrical and the vertebral column ending at or near the middle of the base

Inferior: situated in a relatively low posterior or ventral position in a quadrupedal body

Lateral Line: a canal along the side of a fish containing pores that open into tubes supplied with sense organs sensitive to low vibrations

Livewell: a well for keeping fish alive in a fishing boat by allowing water to circulate through it

Lunate: shaped like a crescent

Oblique: neither perpendicular nor parallel

Glossary

Operculum: the covering of the gills of a fish

Pectoral Fin: either of the fins of a fish that correspond to the forelimbs of a quadruped

Pelvic Fin: one of the paired fins of a fish that are homologous with the hind limbs of a quadruped

Peduncle: a stalk-like part by which an organ is attached to an animal's body, or by which a barnacle or other sedentary animal is attached to a substrate

Posterior: situated behind

Ray: compound, segmented, and branched bony structures which support a fin

Rounded: made round: flowing rather than jagged or angular

Superior: situated higher up

Terminal: of or relating to an end, extremity, boundary, or terminus, a terminal pillar, growing at the end of a branch or stem

- **Subterminal:** situated or occurring near but not precisely at an end

Truncate: Appearing to end abruptly, shortened, cut off at the end

Tubercles: a small knobby prominence or excrescence especially on a plant or animal

Ventral: being or located near or on the anterior or lower surface of an animal opposite the back

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Additional Resources

Fact Sheets

Pennsylvania Sea Grant has developed numerous fact sheets designed for anyone interested in learning more about aquatic invasive species (AIS) and the threats they pose. We've also developed tip sheets, specific to activities known to increase the spread of AIS, with recommendations to help stop the spread of aquatic invaders.

Guides, Trainings, and Videos

STOP Aquatic Invasive Species With the “PA AIS” App

Aquatic invasive species (AIS) and the “PA AIS” app are featured in this webinar, designed to help users download and navigate through the app to identify and report, in real time, sightings of AIS in Pennsylvania.

Pennsylvania Field Guide to Aquatic Invasive Species

An in-depth guide to aquatic invasive species found in Pennsylvania. The guide includes tips to identify, report, and preventing the spread of aquatic invasive species.

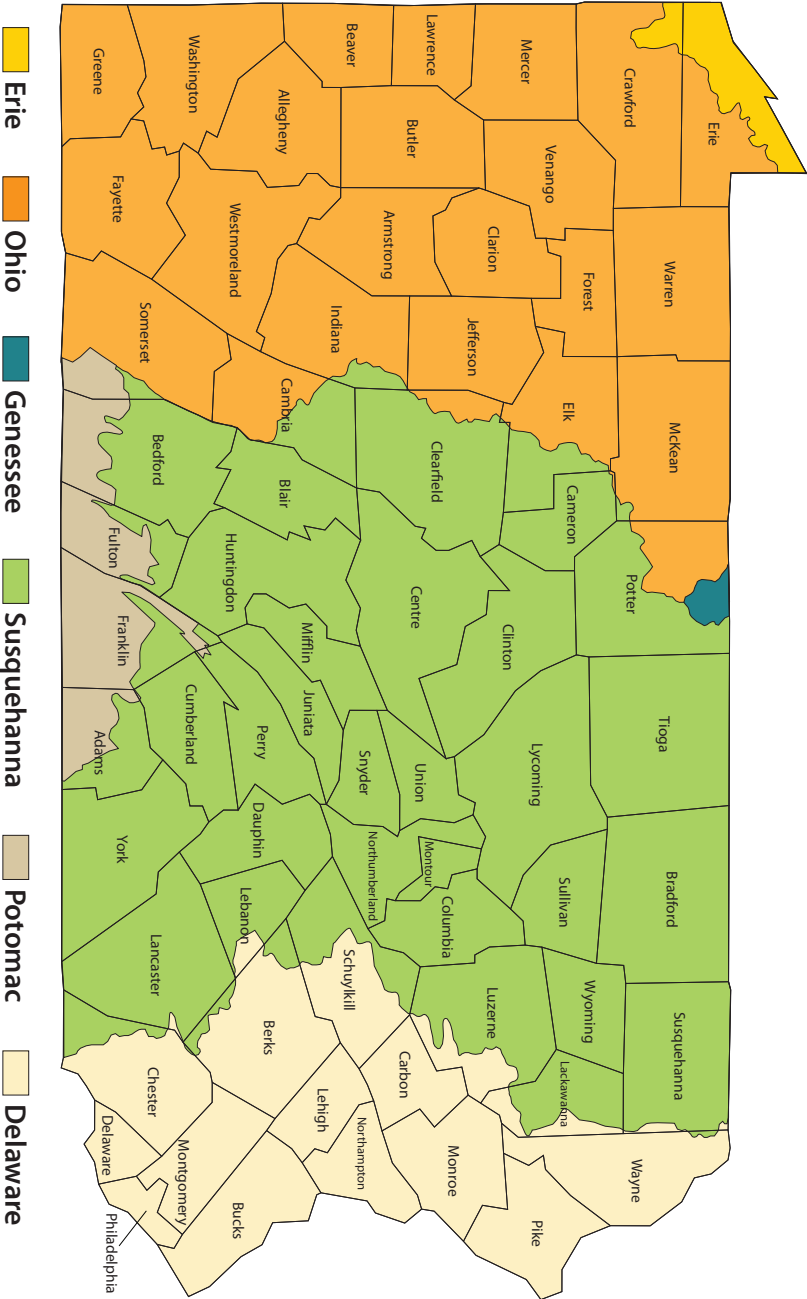
Aquatic Invasive Species Video Series

These videos begin with Aquatic Invasive Species (AIS) “101” and move the audience through the steps to identify, report, and to prevent the spread of AIS.

Scan Now! To access AIS resources. Or visit us online at <https://seagrants.psu.edu/aquatic-invasive-species/>



Six Major Watershed Basins



Measurement Conversion

1 centimeter = 0.39 inches

2.5 centimeters = 1 inch

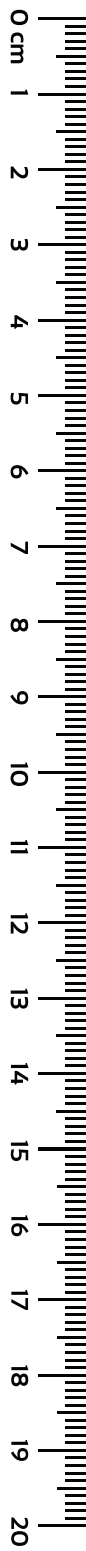
25.4 millimeters = 1 inch

30.5 centimeters = 1 foot

1 meter = 3.28 feet

0.914 meters = 1 yard

Centimeter Specimen Ruler





PennState