



See You Out There

# NEBRASKA POND GUIDE



Private Waters Program



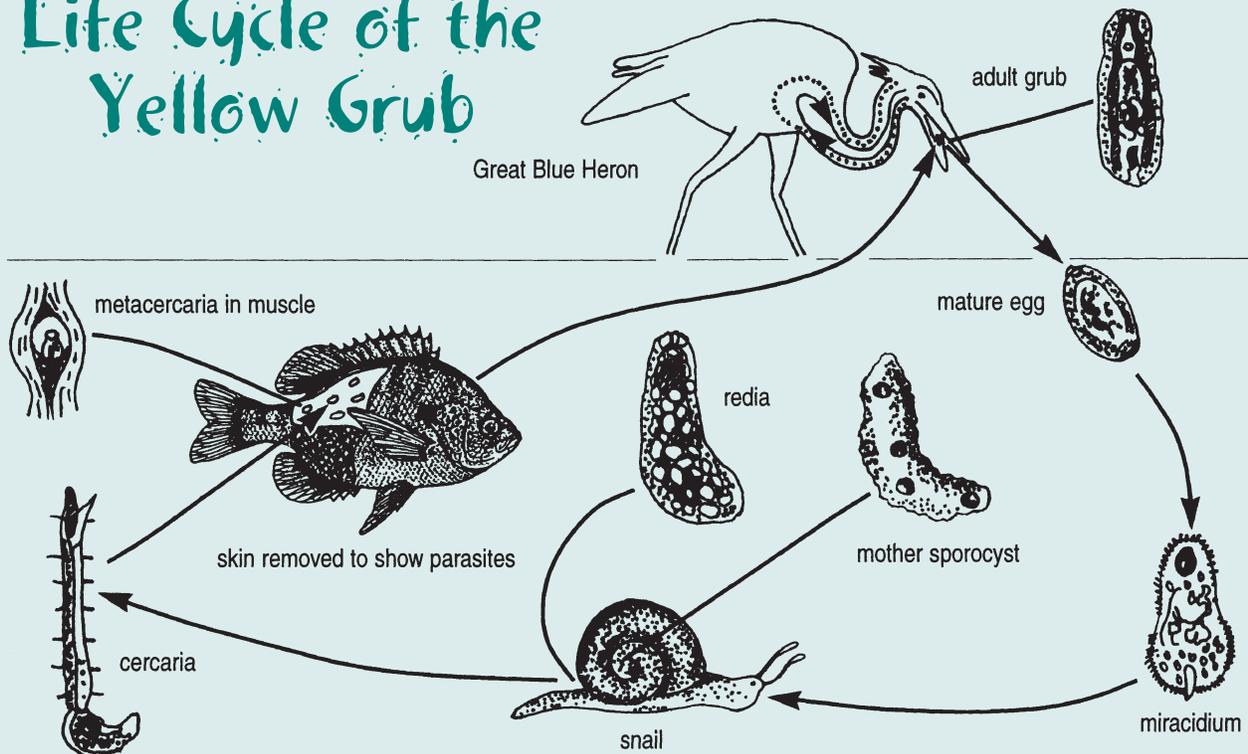
Management Assistance for Lakes, Ponds, Pits & Streams

## RESOLVING COMMON MAINTENANCE PROBLEMS FISH PARASITES AND DISEASES

**B**lack and yellow grubs are two common fish parasites found in farm pond fish. They are the larval stages of trematode worms (flukes) and are usually found in cysts in the flesh or associated with internal organs. They can also occur in the eye and other parts of a fish. Adult flukes can also be found in many fish organs but are seldom seen. Yellow grubs can be found in the flesh beneath the skin of largemouth bass, bluegills, and other fish. Commonly found in bluegills, black grubs are often imbedded in

the skin and flesh. Both of these parasites have no effects on humans, so infested fish are safe to eat. In addition, the parasites are killed when the fish are thoroughly cooked, hot-smoked, or frozen. If grub infestation is low, the parasites can be removed from the flesh if family members are squeamish about eating them. If the flesh is heavily infested, it might be impossible to remove all the parasites; getting the cook to prepare it and the family to eat it may also be difficult.

### Life Cycle of the Yellow Grub



Illustrations in Chapter 11 by Duane Westerholt.



See You Out There

# NEBRASKA POND GUIDE



Private Waters  
Program



The life cycles of black and yellow grubs involve different developmental stages that require host organisms such as fish, birds, and snails (see page 1 diagram). One technique that might reduce the abundance of these grubs is stocking snail-eating redear sunfish.

Pond fish are sometimes affected by fungi (*Saprolegnia* spp.), thread-like plants that lack chlorophyll. The grayish, cotton-like growth is usually a secondary infection on fish that have experienced a disease or are stressed by some adverse environmental condition. Many times it is seen on external areas of fish that have been rubbed while spawning or on fish that have been mishandled. Some affected fish will die, but most will recover.

Small, single-celled organisms called protozoa may cause a variety of fish diseases. They can be found in cysts on the gills, embedded in the flesh, or free on the surface of the body. A protozoan (*Ichthyophthirius* spp.), often called "Ich", can be very harmful to fish. Many aquarium owners are familiar with this fish-killing parasite. The elimination of Ich from a pond is virtually impossible, so prevention is important. By maintaining good water quality in the pond and only stocking healthy fish, Ich should not be a problem.

Viruses and bacteria are microscopic organisms that cannot be seen with the naked eye. However, an angler can see their symptoms, which range from "pop-eye" to swollen, bloody fins. Their diseases are common in all fish and occur most often when environmental conditions, such as water quality, are poor. Inadequate oxygen levels in the pond can stress fish and also make them more susceptible. These infections are often associated with spring die-offs in ponds. As the water warms in the spring, fish weakened by the stress of winter can be affected by bacteria/virus and die. Spring spawning activity adds another stress to weakened fish that can increase the number of deaths. The loss of fish to these infections is fairly common in May and June. When a die-off does occur, it is often dominated

by one species. If there is a high density of one species, particularly crappies, a disease outbreak can result in a substantial die-off. There is no economical treatment available for large scale bacterial/viral problems; fortunately, most are rarely severe. Keep in mind that viruses need fish to survive – they enter a pond via infected fish. Whereas, bacteria are present in the pond environment and severely infect fish that are stressed or mishandled.

There are a variety of larval and adult cestodes (tapeworms) that infect fish. Larval tapeworms are found in cysts on or inside internal organs, or free in the body cavity. Adults are typically white and can be found in the intestines and seen if the intestine is pierced.

Anglers will seldom see an acanthocephalan (spiny-headed worm). Adults typically live in the intestine; one species may be found in the body cavity with its head buried in the intestinal wall. They can cause injury to the intestine if present in large numbers. Larvae occur as white cysts attached to internal organs.

Nematodes (roundworms) are one of the most common parasites and can occur in great numbers. Larvae can be encysted or coiled on or in the internal organs. Adults generally attach themselves in the intestine, or some can coil under the skin in the head area or on the fins.

Leeches are typically an external, blood-feeding parasites. They can adhere to almost any part of the body, but seem to prefer the fins. They can leave small circular wounds, which may become infected with bacteria or fungi.

Copepods (small crustaceans) are a highly diversified group of parasites that are often found embedded in the flesh, or attached to the gills or mouth, or even free-moving over the entire surface of the body. When they occur in large numbers, some species can kill young fish; others can open wounds in the body that can make the fish susceptible to bacterial or fungal infections.

Fish secrete a protective mucus coating which



See You Out There

# NEBRASKA POND GUIDE



helps prevent fungal, bacterial, and parasite infections. If this coating is damaged during the spawning process, or as a result of mishandling by an angler, the fish becomes more susceptible to infection. The mucus coating is less likely to be damaged if a hook is removed while the fish is still in the water, or if the angler wets their hands before handling the fish and gently releases the fish, instead of tossing it into the water.

A healthy fish can tolerate some parasites with little ill effects. It is not practical to remove parasites from a pond. Pond owners must simply learn to live with them. Of the more than 1,000 species of North American freshwater fish parasites, only a few (such as tape worms) can infect man (none found in Nebraska).

Extensive disease outbreaks of columnaris bacteria or parasite problems are rare, usually occurring when a particular fish species approaches or surpasses its carrying capacity. Follow recommended stocking rates and strategies and you shouldn't have any problems. In catfish- or wiper-only ponds and some backyard ponds, where fish are kept and fed at a high density, diseases are much more common. In these situations, special medicated feeds may prevent serious problems.

**Contacts:** Jeff Blaser, Private Waters Specialist  
 Nebraska Game and Parks Commission  
 2200 North 33<sup>rd</sup> Street, Lincoln, NE 68503  
 402-471-5435  
 or area Commission fisheries biologist.

## FISH PARASITE AND DISEASE IDENTIFICATION

### Found Externally

#### Visual Sign

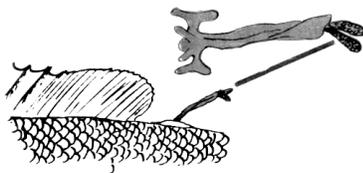
#### Cause/Recommendation (sp. = species)

1. Fish popeyed; scales puffed with fluid (dropsy). Bloody wounds; bloody under scales.



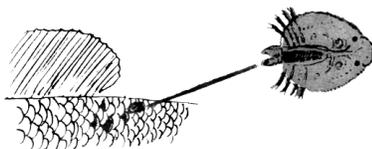
**Various Bacteria** (such as *Aeromonas* sp.). Commonly found in water, *Aeromonas* normally does not infect fish, unless they have undergone some stress. Fish with severe popeye or dropsy probably will not bite, but can be seen dead or in distress along the shore. In some cases, open bloody wounds can result from the bacterial infection. **Edible, if wound is superficial, remove infected tissues and cook well. If popeye is indicated, destroy fish.**

2. Red pustule on or near base fins; thread-like body may protrude from the wound.



**Anchor Worm** (*Lernaea* sp.). This copepod buries only its anchor-shaped head into a fish's flesh. The remaining portion will hang free from the wound, where a red inflamed pustule may form. This parasite may drop off, leaving only the inflamed area. **Edible. Remove inflamed area; clean and prepare as usual.**

3. Bloody area on body under the scales



**Fish Louse** (*Argulus* sp.). This rarely seen copepod leaves a fish soon after it's removed from the water. It feeds on the blood by piercing the skin, destroying the protective mucous coat in the process. Thus, secondary infection from bacteria or fungus can result. **Edible. Clean and prepare as usual.**

4. Tiny mobile white spots on the skin.



**Ich** (*Ichthyophthirius* sp.). The most common protozoan encountered by fishermen, Ich appears as mobile white spots or clusters on the skin or gills. It burrows under the skin and may cause surface lesions. Individuals can be seen with a magnifying glass. **Edible. Clean and prepare as usual.**

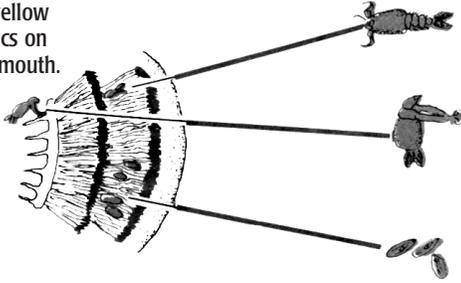
## FISH PARASITE AND DISEASE IDENTIFICATION

### Found Externally (continued)

**Visual Sign**

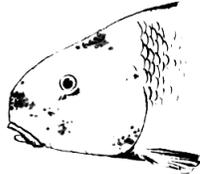
**Cause/Recommendation** (sp. = species)

5. White or yellow cysts or sacs on gills or in mouth.



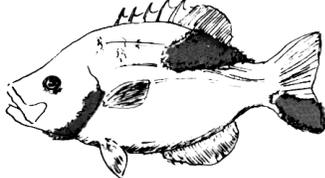
- a. (*Ergasilus* sp.). When numerous, these copepods can kill young fish. Their presence is indicated by V-shaped white egg sacs on the inner edges of the gills. **Edible. Clean and prepare as usual.**
- b. (*Achtheres* sp.). Larger than *Ergasilus*, this copepod attaches itself in the mouth or to the inner surface of the gills. *Achtheres* has a short plump body with arm-like appendages that cling to the fish. **Edible. Clean and prepare as usual.**
- c. **Yellow Grub** (*Clinostomum* sp.). This larval fluke forms cream-colored cysts on the gills and under the skin in the mouth. It can easily be seen with a magnifying glass if cyst is broken. **Edible. Clean and prepare as usual.**

6. White pustules under skin or scales.



**(Myxosporidia).** The white cysts created by Myxosporidia hold thousands of the microscopic protozoans. While certain species cause some important diseases in fish, none have been found in Nebraska. **Edible. Clean and prepare.**

7. Patches of fuzzy gray-white mat on body and gills.



**Water Fungus** (*Saprolegnia* sp.). Usually found on fish injured by improper handling or other cause. When established, water fungus can kill a fish by completely covering it. **Edible. Skin fish; remove infected area and adjacent flesh; prepare as usual.**

8. Grey-white slime on the skin.



**Columnaris Disease** (*Condrococcus columnaris* sp.). This bacterial infection may be found on catfish, trout, and possibly other species. Frayed fins and bloody wounds are other indicators. **Edible. Clean and prepare as usual.**

9. Black spots under the skin or in the flesh.



**Black Spot** (*Neascus* sp.). The easiest disease to recognize, Black Spot is caused by larval flukes burrowing under the skin. Appearing as small round black spots, the cysts may also be found in the flesh. **Edible. Skin and prepare as usual.**

10. Eye deformed; fish apparently blind.



**Eye Fluke** (*Diplostomulum* sp.). These tiny larval flukes will not be seen. They live in the fluid of the eye and eventually cause blindness. Eye may be opaque or shrunken. **Edible. Clean and prepare as usual.**

## FISH PARASITE AND DISEASE IDENTIFICATION

### Found Externally (continued)

**Visual Sign**

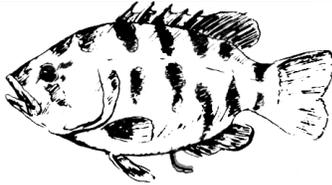
**Cause/Recommendation** (sp. = species)

11. Undulating worms attached to body, fins, gills, and mouth.



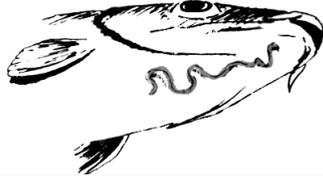
**Leeches.** Conspicuous, blood-feeding, external parasites, leeches produce a small circular wound that remains even though the leech moves or drops off. **Edible. Clean and prepare as usual.**

12. Red, thread-like worms extending from the anus.



**Round Worms** (*Camallanus* sp.). Various roundworms are found throughout the intestine. The species that lives in the lower large intestine will occasionally extend from the anus. **Edible. Clean and prepare as usual.**

13. White to pink thread-like swelling on head or fins.



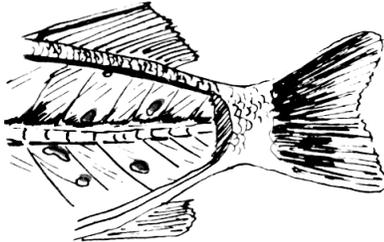
**Round Worms** (*Philometra* sp.). Normally found on carp, buffalo and suckers. This adult roundworm lives just under the skin. **Edible. Clean and prepare as usual.**

### Found in the Flesh

**Visual Sign**

**Cause/Recommendation** (sp. = species)

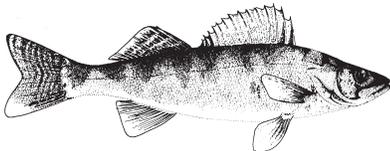
14. White or yellow cysts imbedded in the muscle.



**Yellow Grub** (*Clinostomum* sp.). Cream-colored cysts found in many parts of the body contain larval flukes that become adults in birds. Numerous at times, the Yellow Grub will emerge if cyst is broken in water. **If practical, remove cysts from flesh; clean and prepare as usual. Otherwise, discard entire fish.**

**White Grub** (*Histeromorpha* sp.). Smaller and lighter colored than the Yellow Grub. These larval flukes are most often found in catfish. **Use same as above.**

15. Sandy flesh in walleye.



**Unknown.** An unusual problem apparently found only in walleye. Fish show no external symptoms or abnormal behavior. The rough, sandy flesh is found in varying intensity when fish is filleted but the flesh is always somewhat discolored. **DO NOT EAT. Wrap fish in plastic or foil (do not freeze) and notify nearest Game and parks Commission office.**

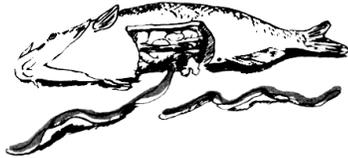
## FISH PARASITE AND DISEASE IDENTIFICATION

### Found Internally

#### Visual Sign

#### Cause/Recommendation (sp. = species)

16. Large white flat worm in the body cavity.



**Tapeworm** (*Ligula* sp.). This larval tapeworm is found free in the body cavity of minnows, carp, suckers, and some other fish. It is uncommonly large and may create an abdominal bulge. **Edible. Clean and prepare as usual.**

17. Coiled (like a watch spring) worm encysted on the internal organs.



(*Contracaecum* sp.). Found on the internal organs or the wall of the body cavity, these larval roundworms are immobile. They become adult in fish-eating birds. **Edible. Clean and prepare as usual.**

18. Round transparent cysts on the internal organs. (Heart shown)



**White Grub** (*Neascus* sp.). These larval flukes occasionally occur in quite large numbers. **Edible. Clean and prepare.**

19. Irregular white cysts in or on the internal organs. (Heart shown)

**Larval Spiny-Headed Worm or Larval Tapeworm.** These cysts are larger, whiter, and not as round as those described in No. 18. **Edible. Clean and prepare as usual.**

20. White, thread-like worms lying on or moving through the internal organs. (Liver shown)



**Larval Tapeworm.** Some tapeworms are not found in cysts. Numerous worms may infect the ovaries of bass. **Edible. Clean and prepare as usual; or can be cleaned by removing worms with tweezers before preparing.**

21. Tiny gold-brown cysts on the internal organs. (Liver shown)

**Larval Roundworm.** Often found in great numbers, these cysts will give a sandy appearance to a fish's innards. **Edible. Clean and prepare as usual.**

22. White or orange worm in body cavity, attached to the intestine.



**Spiny-Headed Worm** (*Pomphorhynchus* sp.). Since most adult acanthocephalans live inside the intestine, they are not seen by fishermen. However, this species can be found lying in the body cavity with its head buried in the intestine. **Edible. Clean and prepare as usual.**

23. White, undulating worms emerging from ruptured intestine.

**Intestinal Worms (Adult Helminths).** Adult flukes, tapeworms, roundworms, and spiny-headed worms will not normally be seen by fishermen unless the intestine is accidentally cut in cleaning. **Edible. Clean and prepare.**



See You Out There

# NEBRASKA POND GUIDE



Private Waters  
Program



Management Assistance for  
Lakes, Ponds, Pits & Streams

## TECHNICAL ASSISTANCE CONTACTS

### Nebraska Game and Parks Commission (Commission)

2200 N 33rd Street PO Box 30370

Lincoln, NE 68503

Private Waters Specialist 402-471-5435

Natural Heritage Program 402-471-5419

#### Northwest (NW) District - Alliance

Game and Parks Commission  
299 Husker Road PO Box 725  
Alliance, NE 69301  
308-763-2940  
Fisheries Division or  
Wildlife Habitat Partners Section

#### Northwest (NW) Field Office - Valentine

Valentine State Fish Hatchery  
90164 Hatchery Road  
Valentine, NE 69201  
402-376-8080 or 402-376-2244

#### Southeast (SE) District - Lincoln

Game and Parks Commission  
2200 N 33rd Street PO Box 30370  
Lincoln, NE 68503  
402-471-7651 or 402-471-5561  
Fisheries Division or  
Wildlife Habitat Partners Section

#### Northeast (NE) District - Norfolk

Game and Parks Commission  
2201 N 13th Street  
Norfolk, NE 68701  
402-370-3374  
Fisheries Division or  
Wildlife Habitat Partners Section

#### Northeast (NE) Field Office - Bassett

Game and Parks Commission  
524 Panzer Street PO Box 508  
Bassett, NE 68714  
402-684-2921  
Fisheries Division or  
Wildlife Habitat Partners Section

#### Southwest (SW) District - Kearney

Game and Parks Commission  
1617 First Avenue  
Kearney, NE 68847  
308-865-5310  
Fisheries Division or  
Wildlife Habitat Partners Section

#### Southwest (SW) Field Office - North Platte

Game and Parks Commission  
301 East State Farm Road  
North Platte, NE 69101  
308-535-8025  
Fisheries Division or  
Wildlife Habitat Partners Section



See You Out There

# NEBRASKA POND GUIDE



Private Waters  
Program



Management Assistance for  
Lakes, Ponds, Pits & Streams

## United States Department of Agriculture - Natural Resources Conservation Service (NRCS)

Federal Building, Room 152  
100 Centennial Mall North  
Lincoln, NE 68508  
Statewide Wildlife Biologist  
402-437-4100  
or contact Local County Office

## University of Nebraska - Lincoln, Cooperative Extension

211 Agricultural Hall - UNL East Campus  
Lincoln, NE 68583  
Main Office 402-472-2966  
or contact Local County Office;  
Water Quality Questions 402-643-2981, ext. 115

## Nebraska Department of Natural Resources (DNR)

301 Centennial Mall South, PO Box 94676  
Lincoln, NE 68509  
Water Storage Permits 402-471-2363 or  
Dam Safety Guidelines 402-471-1222

## U.S. Army Corps of Engineers (ACOE)

8901 S. 154th Street, Suite 1  
Omaha, NE 68138 402-896-0723  
or contact the Kearney office at:  
1430 Central Avenue  
Kearney, NE 68847  
308-234-1403

## Nebraska Department of Environmental Quality (NDEQ)

1200 N Street, PO Box 98922  
The Atrium, Suite 400  
Lincoln, NE 68509  
402-471-0096

## Nebraska Association of Resources Districts (NARD)

601 S. 12th Street, Suite 201  
Lincoln, NE 68508  
402-471-7670  
or contact your local Natural Resources District (NRD)  
listed in White Pages of the phone book