Bio-Security at State Fish Hatcheries and Public Aquaria

Doug Sweet
Superintendent
London State Fish Hatchery
Ohio Division of Wildlife

“An ounce of prevention is worth a pound of cure.” Ben Franklin

- How do you facilitate this at an Aquaculture facility?
  - Obtain certified disease free (inspected) stock whenever possible and when required by law
  - Isolate new stock before introduction to your current inventory *(to the best of your ability)*
  - Disinfect and/or isolate equipment and staff (if necessary) between contacts with questionable sources

How do you facilitate this at an Aquaculture facility? (Con't)

- Disinfect eggs (gametes) before entry into your facility and even "in-house" gametes to prevent vertical transmission of select pathogens
- Design and implement a custom bio-security protocol for your facility
  - Identify significant pathogens you want to exclude
  - Design and adopt a protocol that addresses avoidance and/or treatment of select pathogens
  - ***Judiciously*** use approved/proven prophylactic treatments to exclude pathogens or treat ones present

How do you facilitate this at an Aquaculture facility? (Con't)

- Utilize professional diagnostic services when the problem or disease organism is beyond your capabilities
- When you have a "***Problem***"!
  - Cooperate with authorities to resolve situation and mitigate loses from all the parties involved

Obtain certified disease free (inspected) stock

- Has long been practiced with Salmonids. Most states have requirements that trout and salmon be imported/exported with disease free certification for the following diseases: Ceratomyxosis, IHN, IPN, ISA, PKD, VHS and whirling disease.
- With the introduction of Viral Hemorrhagic Septicemia Virus (VHSV), Spring Viremia of Carp Virus (SVCV), and Infectious Salmon Anemia Virus (ISAV) among other emerging fish diseases, additional fish species have, or can be expected to, come under regulatory authority (in OH an additional 30 species now must be tested for VHS and certified disease free before import.)
- Even if not a requirement for a specific species, it is wise to obtain stock from a certified source, or at least a very reputable source.

What have the State of Ohio hatcheries been doing for bio-security?

- Testing disease (virus) status of brood-stock lakes.
- Currently avoiding taking of eggs in disease positive (VHS) areas (Lake Erie is off limits as well as Clear Fork Reservoir)
- ***Talk*** of an isolation facility. However, logistics are problematic. We take too many cool-water fish eggs for practical purposes. A facility may be appropriate for exhibit fish but otherwise would not be practical. $$$$?
- Isolation of personnel and equipment during egg take.
- Two disinfections of eggs, both water hardening and external, before acceptance into the hatchery
- Disinfection of equipment between stocking events and fish transfers. Documented by a disinfection log for each major piece of equipment.
- Quarantine of entire facility if necessary when there is a problem or even suspect there could be a problem.

State of Ohio, Fish Egg Disinfection Protocol

- Used only hatchery origin or “fish free” well water for water hardening purposes

(no water used from brood-stock lake or river)

Disinfected eggs with iodophore ***during*** water hardening

- First eggs are quickly dipped in 50 ppm PVP (polyvinylpyrrolidone) iodine to rinse off any ovarian fluid, milt, and activation water.

Eggs transferred to 50 ppm PVP iodine bath for 30 minutes

- Screen bottomed and side basket facilitates this transfer.

The 30 minute bath must contain enough volume to prevent iodine depletion

- Note much larger container to assure iodine levels remain adequate in 30 minute bath.
- Solution must be changed for each batch of eggs or closely monitored for strength.

Eggs are rinsed in three consecutive rinse baths to remove iodine. All in hatchery origin or fish-free well water.

- Eggs were then packaged as normal for transport back to hatchery.
- Personnel handling disinfected eggs ONLY handled these i.e. they had no contact with brood fish or lake water.
- Personnel handling spawners (brood-fish) handled the fish and eggs before disinfection - ONLY.

A second, egg surface disinfection was conducted again once the eggs arrived at the hatchery

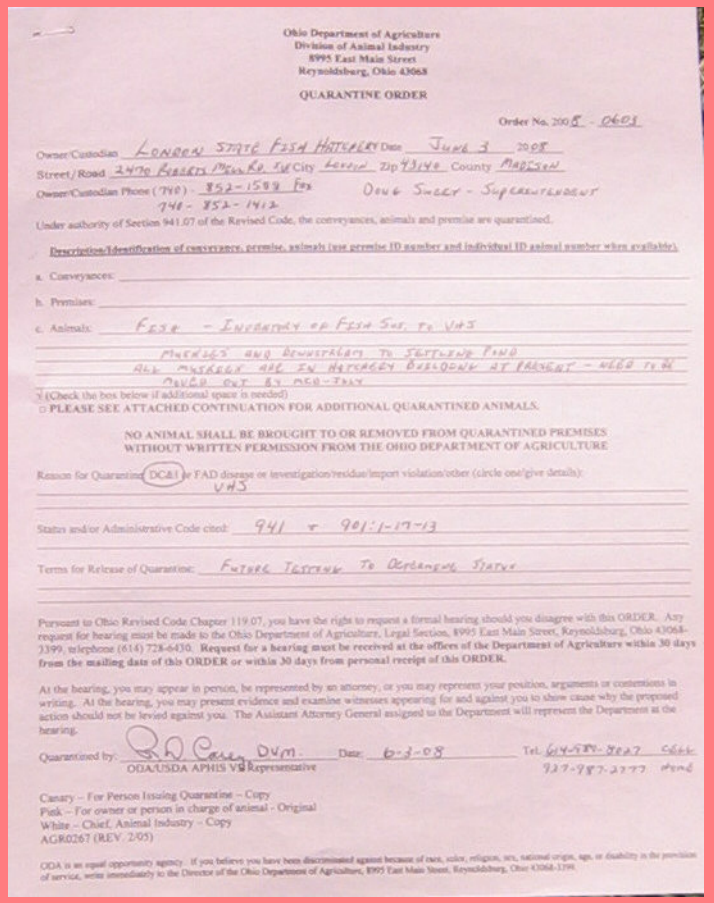
- This was another bath of PVP iodine at 100 ppm for 10 minutes.
- Eggs were rinsed again and incubated as normal.

Equipment and nets are disinfected between stocking trips and after any suspect activities

- Contact spray of chlorine bleach (1200 ppm) is used to instantly disinfect boots or other items coming in direct contact with suspect fish before returning to hatchery.
- Transport trucks are filled with 200 ppm chlorine bleach for one hour. Dumped, refilled and rinsed several times before use.
- Raingear or other miscellaneous items, that would be destroyed by bleach are sprayed and wiped down with isopropyl rubbing alcohol for immediate disinfection
- Log is kept for disinfection of major pieces of equipment (fish transport truck)

Good thing these activities were initiated for egg take 2008!

- Muskies utilized for egg take in spring 2008 from Clear Fork Reservoir tested positive for VHSV. This was the first case of VHSV recorded outside of the Great Lakes drainage basin.
- London State Fish Hatchery, the recipient of these eggs, was immediately quarantined by Ohio Department of Agriculture and USDA-APHIS via Quarantine order 2008-0603.
- Steps were taken to isolate muskies from the rest of the hatchery stock.
- Currently tests are ongoing to clear the hatchery and fish from quarantine. So far, all tests have been negative.



Ohio Department of Agriculture
Division of Animal Industry
8995 East Main Street
Reynoldsburg, Ohio 43068

QUARANTINE ORDER

Order No. 2008 - 0603

Owner/Custodian LONDON STATE FISH HATCHERY Date JUNE 3 2008
Street/Road 2470 BEERS MOUND RD City LONDON Zip 43140 County MADISON
Owner/Custodian Phone (740) 852-1588 Fax 740-852-1412 DOUG SWEET - SUPERINTENDENT

Under authority of Section 941.07 of the Revised Code, the conveyances, animals and premise are quarantined.

Description/Identification of conveyance, premise, animals (use premise ID number and individual ID animal number when available).

a. Conveyances:
b. Premises:
c. Animals: FISH - INVENTORY OF FISH SUS. TO VHS
MUSKIES AND BOWSTRINGS TO SETTLING POND
ALL MUSKIES ARE IN HATCHERY BUILDING AT PRESENT - NEED TO BE MOVED OUT BY DOG-TRAY

(Check the box below if additional space is needed)
☐ PLEASE SEE ATTACHED CONTINUATION FOR ADDITIONAL QUARANTINED ANIMALS.

NO ANIMAL SHALL BE BROUGHT TO OR REMOVED FROM QUARANTINED PREMISES WITHOUT WRITTEN PERMISSION FROM THE OHIO DEPARTMENT OF AGRICULTURE

Reason for Quarantine: (DC&I or FAD disease or investigation/residue/import violation/other (circle one/give details): VHS

Status and/or Administrative Code cited: 941 + 901:1-17-13

Terms for Release of Quarantine: FUTURE TESTING TO DETERMINE STATUS

Pursuant to Ohio Revised Code Chapter 119.07, you have the right to request a formal hearing should you disagree with this ORDER. Any request for hearing must be made to the Ohio Department of Agriculture, Legal Section, 8995 East Main Street, Reynoldsburg, Ohio 43068-3399, telephone (614) 728-6430. **Request for a hearing must be received at the offices of the Department of Agriculture within 30 days from the mailing date of this ORDER or within 30 days from personal receipt of this ORDER.**

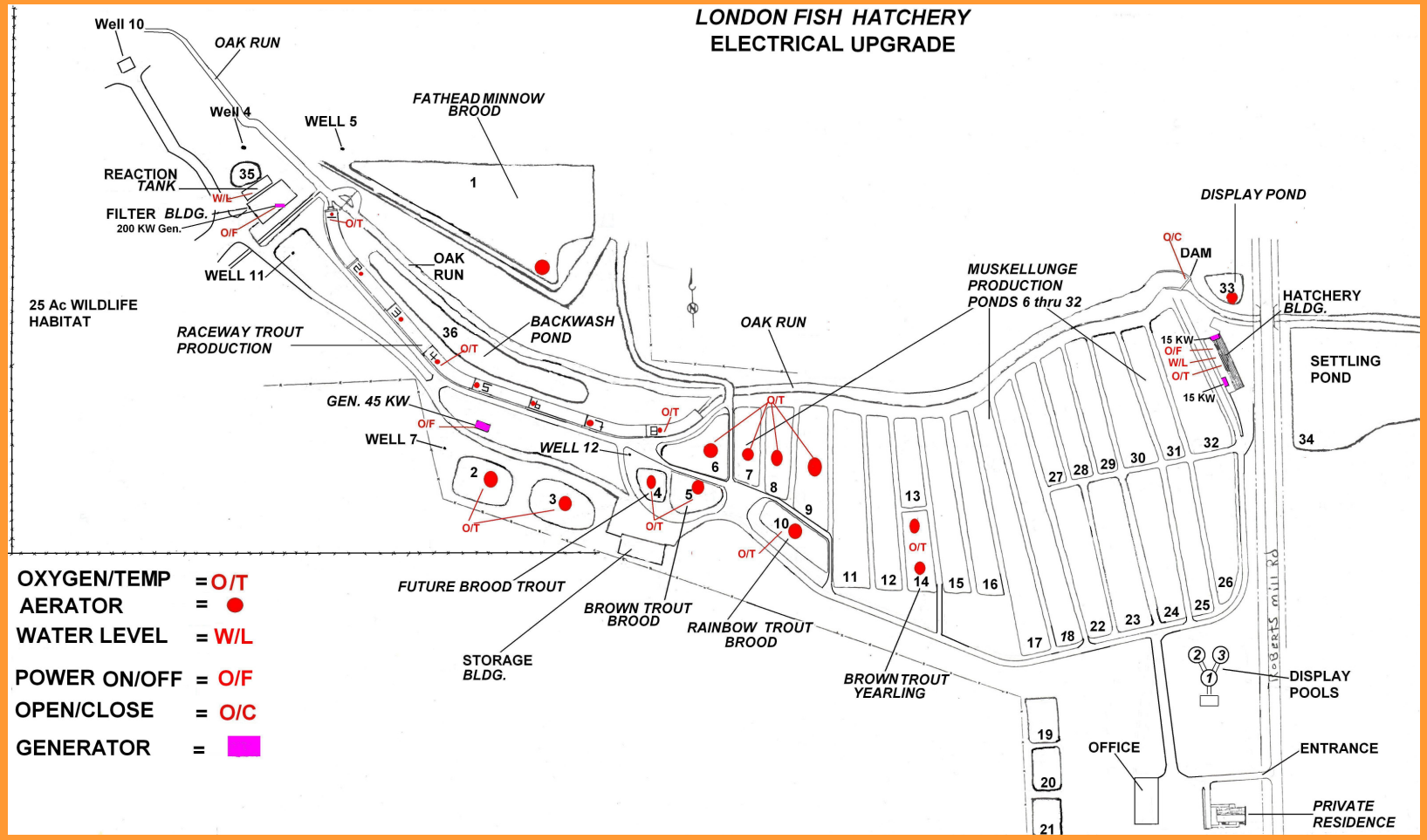
At the hearing, you may appear in person, be represented by an attorney, or you may represent your position, arguments or contentions in writing. At the hearing, you may present evidence and examine witnesses appearing for and against you to show cause why the proposed action should not be levied against you. The Assistant Attorney General assigned to the Department will represent the Department at the hearing.

Quarantined by: R. Casey DVM Date: 6-3-08 Tel. 614-589-3627 Office
ODA/USDA APHIS VS Representative 727-587-2777 Home

Canary – For Person Issuing Quarantine – Copy
Pink – For owner or person in charge of animal - Original
White – Chief, Animal Industry – Copy
AGR0267 (REV. 2/05)

ODA is an equal opportunity agency. If you believe you have been discriminated against because of race, color, religion, sex, national origin, age, or disability in the provision of service, write immediately to the Director of the Ohio Department of Agriculture, 8995 East Main Street, Reynoldsburg, Ohio 43068-3399.

Isolation of muskies suspected of VHS at London State Fish Hatchery



Separate equipment and gear used in hatchery building for work around quarantined muskies

Muskies produced during 2008 season will be stocked in Clear Fork Reservoir and Alum Creek Reservoir ONLY. Just for safety reasons and only after all testing comes back negative. Taking minimal chances with false negatives.

Importance of having an isolation/quarantine protocol in place

- Write your own “isolation, holding, quarantine facility procedures
  - Develop or identify and use a place where new fish can be held in isolation for observation, testing, and treatment of pathogens.
  - Identify the most significant pathogens you wish to avoid. Compose a program to limit this pathogen(s) influence on your facility

A five page quarantine, holding and isolation facility procedure for the Belle Isle Aquarium (Detroit Zoological Institute) can be summarized into the following:

- **Quarantine Procedure Summary**

1. First week – acclimatization and stabilization
2. End of first week – 15-25 ppm Formalin treatment for external protozoans.
3. End of second week – praziquantel (3.5 ppm) plus metronidazole (6.5 ppm) used to eliminate monogenean trematodes (external flukes), digenean trematodes (internal flukes), tapeworms, and internal protozoan parasites.
4. End of third week – Quarantine completed if no signs of disease

A simplistic quarantine procedure like this can eliminate the vast majority of acute and chronic disease problems that may occur when bringing in new stock.