DIAGNOSTIC TESTING, VETERINARY & FARM RECORD KEEPING

Walster C.I., Hammell K.L.*, McLoughlin M., Turnbull J., and Burr P.

International Aquaculture Biosecurity Conference. Trondheim, Norway – August 17-17, 2009.

Barriers to infectious disease control

- Attitude
- Knowledge
- Understanding
- Ownership

An Independent Evidence Baseline for Farm Hea
England (ADAS Dec 2007)
Source: http://www.defra.gov.uk/animalh/ahws/pdf/fmp.pdf
(August 2009)

Attitudes

- Farmers
  - **30% perceive improved net profit**
  - **30 – 50% perceived improved health**
  - (*ADAS DEC 2007*)
  - "We used to just call it cleansing and disinfecting''
  - (Donaldson, A. Biosecurity after the event: risk politics and animal disease. Environment and Planning A 2008, volume 40, 1552 -1567)
- Vets
  - **30% of cattle and 40% of sheep vets believed:**
  - Vets had no interest in biosecurity
  - Did not believe improved biosecurity resulted in net benefits to clients
  - Vets have insufficient know-how regarding on-farm biosecurity
  - *(G.J. Gunn et al. Prev Vet Med 84 (2008) 310–323)*

Considerations

- **Attitude** - The right approach
- **Knowledge** – Fully assess needs
- **Understanding** – What is achievable, what is the purpose
- **Ownership** – It must be worth something

Purpose of Records

- Knowing how site *will* use records in daily decisions, and what the site *may* want to use records for in the future, helps direct the level of detail
  - Daily management records
  - Regulatory required records

Regulatory Requirement for Records

- Certain information is required for authorities for
  - Action when exceeds acceptable threshold (e.g. sea lice)
  - Public accountability (e.g. that doing what is in policy)

Purpose of Records

- Audit trail
  - Able to find a piece of information if necessary
  - Many regulatory agencies depending on regular biosecurity audits
    - Demonstrating that actions done and also that there is a record of being done

Example: harvest boat audits

(Courtesy of New Brunswick Dept of Agriculture & Aquaculture)

NBDAFA HARVEST VESSEL BIOSECURITY AUDIT
WITH XACTICS (Updated June 2004)

A) GENERAL INFORMATION	
1. Date of Audit	
2. Vessel Name	
3. Company Name	
4. Port of Registry	
5. Registration No.	
6. Captain's Name	
7. Captain's Cell No	
8. Auditor	
9. Site and Cage No.	
B) VESSEL INFORMATION	
1. Vessel Type	
2. Hull Material	
3. Deck Material	
4. Wheelhouse Material	
5. General Condition	
6. Mooring/Berthage	
7. General Purpose	
8. Company Owned or Sub-Contracted	
C) EQUIPMENT INFORMATION	
1. How are fish removed from seine?	
2. How are fish stunned?	
3. How are fish bled?	
4. If there is stunwater, how is it contained?	
5. Was stunwater containment/storage inspected?	
6. If there is bloodwater, how is it contained?	
7. Was bloodwater containment/storage inspected?	

Purpose of Records

- Analysis
  - Trace-back of material (e.g. food safety issue)
  - Trace-back of cases for infectious disease investigation
    - Containment of spread when detected after biosecurity risk activity occurs

Units existing in records

- Often have collapsed data (combined for groups after data collected)
  - E.g. average sea lice counts by cage (not each fish count)
  - Groups of cages reflecting genetic stock
- Need access to smallest unit collected (and identifier that combines units later)

Policy vs Practice

- Documented policies are not documented practices
  - Difficult to compare practices across jurisdictions, or over time, unless purposefully collected information on practices
    - Through audits or surveys

Regular visits vs single samples

- Reliance on regular visits / inspections (with specified testing strategies) rather than single point sampling events
  - Improves probability of detection
    - Diseases occur at different times of year, different parts of the population, etc
  - Requires documentation that all mortality events were
    - 1) detected (so good mort recording)
    - 2) were investigated when greater than expected background levels

Example: record of veterinary health assessment

(Courtesy of New Brunswick Dept of Agriculture & Aquaculture)

Department of Agriculture & Aquaculture | Ministère de L'Agriculture, et de L'Aquaculture

New Nouveau Brunswick

Date: **MONTHLY FISH HEALTH ASSESSMENT**

GENERAL INFORMATION

Licence Holder: (Fill in only if change in contact information)	**Veterinarian: (Fill in only if change in contact information)**
Address:	Address:
Town / Province:	Town / Province:
Postal Code:	Postal Code:
Telephone:	Telephone:
Fax:	Fax:

FISH HEALTH INFORMATION

Site Name: Stocking Date(s):

Site No: Fish Source(s):

Month: Surveillance Frequency: Weekly / Biweekly / Monthly

Species on site:

		Y	N
1.	**a. Was the site inspected by a veterinarian during this month?**	☐	☐
	b. Was the site inspected by a designate under the direct supervision of the veterinarian, during this month?	☐	☐
	If not a or b please explain:		
2.	**Was the entire site dived during the veterinary visit?** If not, please explain:	☐	☐
3	**Were appropriate number of samples collected and submitted to NB DAA as outlined in the ISA Management & Control Program?** If not, please explain:	☐	☐
4.	**Were any unexplained mortality events investigated during this month?**	☐	☐
5.	**If so, were all samples appropriate for all diseases collected and submitted to NBDAA?** If not, please explain:	☐	☐
6.	**During this month, were the mortality records forwarded to the attending veterinarian each week?**	☐	☐
7.	**Were any other diseases diagnosed on the farm?**	☐	☐

If site treated sea lice with bath treatment please fill out attached form.

Which Disease? **Date of Diagnosis:**

Actual Drug/Therapeutant Prescribed: **Amount of actual drug/therapeutant prescribed:**

Expected Treatment Start Date: **Expected End Date:**

SIGNATURES

We acknowledge that the above is true and correct.

Farm Manager/Licence Holder: _____ Date: _____

Attending Veterinarian: _____ Date: _____

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Purpose of Records

- Analysis
  - Epidemiologic investigation of risk factors
    - Retrospective, so cannot predict everything that may want to investigate
    - Example, assessing diver influence on spread between cages within site
      - May want to have usual dive order of cages to categorize early vs late quartiles of dive order
      - Not usually recorded

Consistency of Records

- Diagnostic criteria change / evolve over time
  - Diagnostic lab tests change (even if called same thing) so performance likely to change over time
  - Observational intensity / training changes over time
    - E.g. pathology scoring, lesion severity scoring

Purpose of Records

- Identify sub-populations for risk-based sampling
  - If disease is known to occur more frequently in small vs large fish (same age), then can sample small fish at site (evidence for detection, not prevalence, generated)
  - Sampling mortalities for diagnostic testing generates prevalence within morts of population but not prevalence within entire population
    - But sampling morts increases probability of detection with many / most infectious diseases
    - E.g. ISA cases

Purpose of Records

- Outcome data vs factor data
  - Most important to have reliable outcomes in record, such as
    - Mortality occurrence
    - Prevalence of positive tests (apparent prevalence)
  - Outcomes should include Population at Risk during time period
    - Too often total number of morts reported but not the denominator or the time period

Attitudes

- Some companies keep records of everything
  - But in formats that are not easily retrievable or understandable
- Often disconnect between farm staff doing recording and farm managers making decisions
  - Authenticity, error or gaps not seen as important by collectors of data
    - Just another bit of paper

Attitudes

- How important is to count mortalities when they are rotten?
  - Or sea lice when they exceed a threshold?

Attitudes

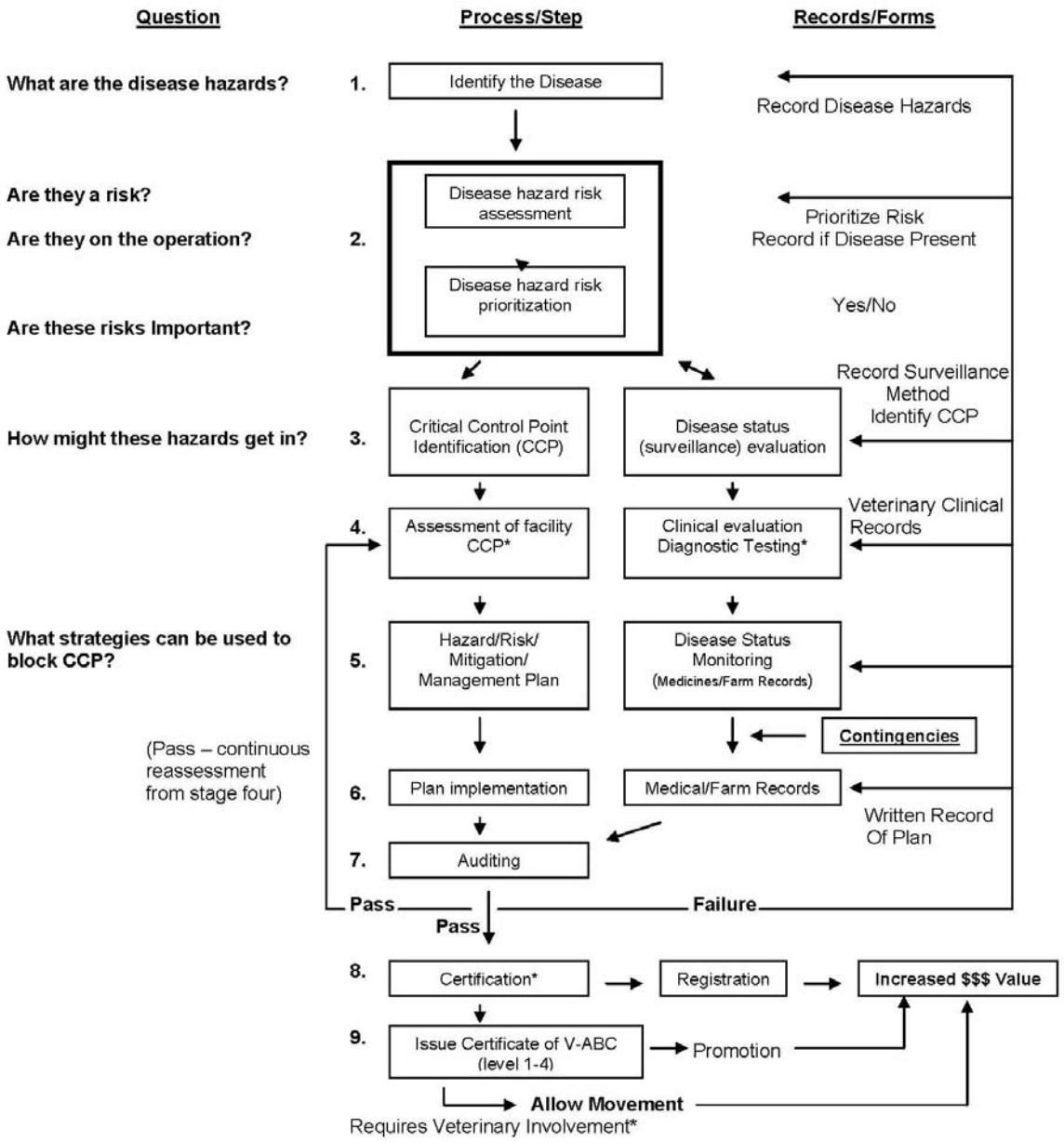
- "we hired an IT company to set up electronic records, so now tracking fish through our entire production to the consumer will take care of itself"

Required Documentation

- Identified/prioritised targeted diseases
- Risk Assessments
- Evaluation/identified control points
- Mitigation steps
- Contingency plans
- Veterinary records of clinical assessments and treatments
- Diagnostic testing records

Outline Process for Developing, Implementing, Auditing and Certifying Aquaculture Biosecurity Plans and Programs

The following process can be applied to any epidemiological unit (EU – a defined area in which infectious and contagious diseases can be freely transmitted through the occupying population)—from a tank, to a farm, to a zone or country.



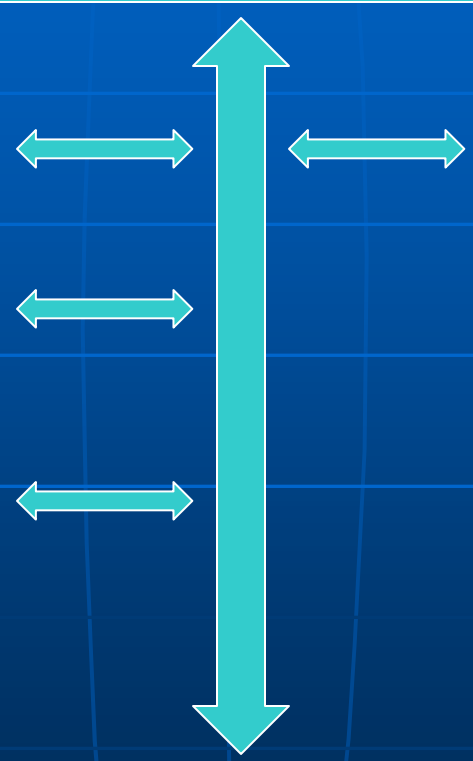
Deciding Appropriate Records

Written Biosecurity Plan & Key Husbandry Procedures

Program Intent

Practical Implementation

Required Testing



Further considerations

- System design
- Movements
- Water Quality
- Other environmental
- Mortalities
- Vaccines
- Therapeutic Agents
- Other considerations

Farm & Veterinary Records

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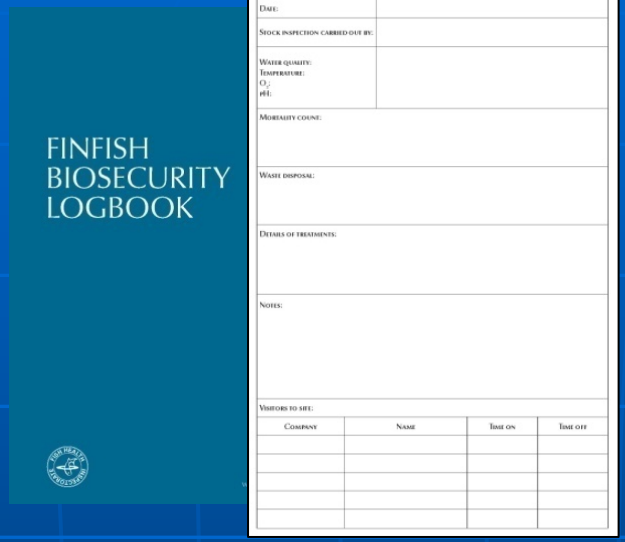
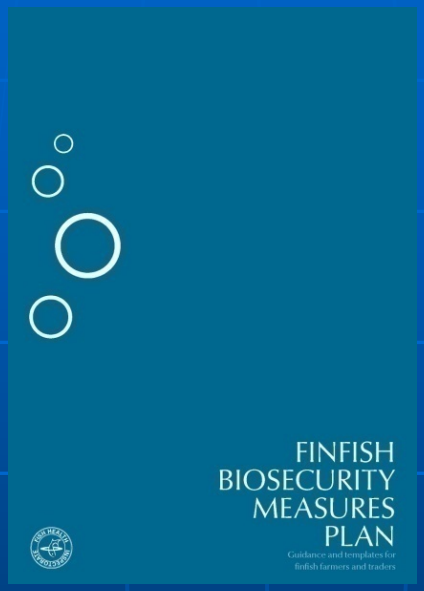
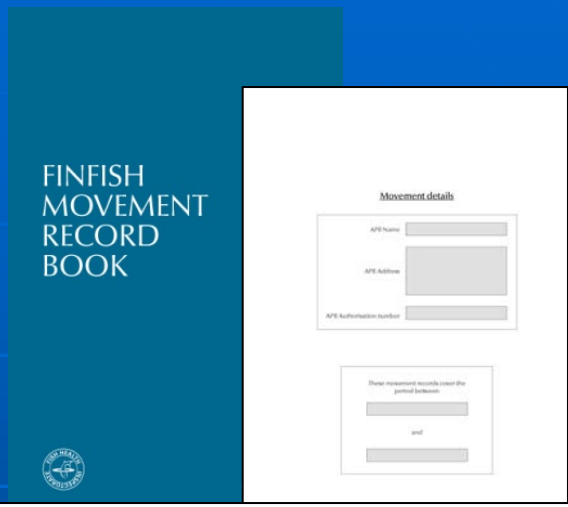
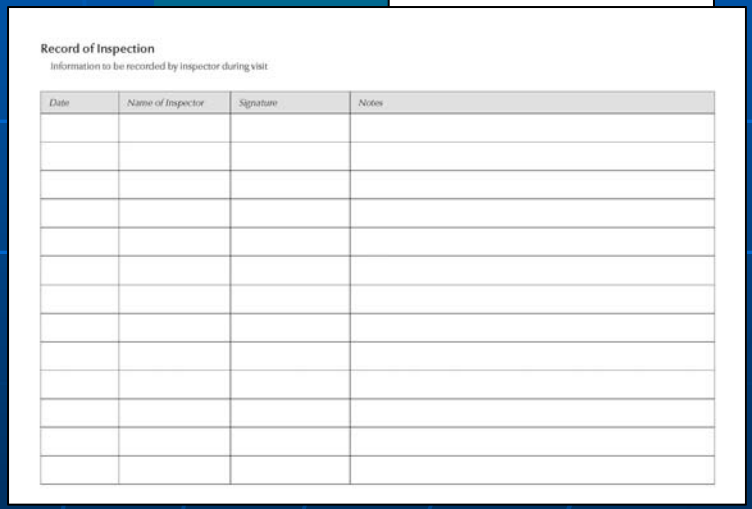
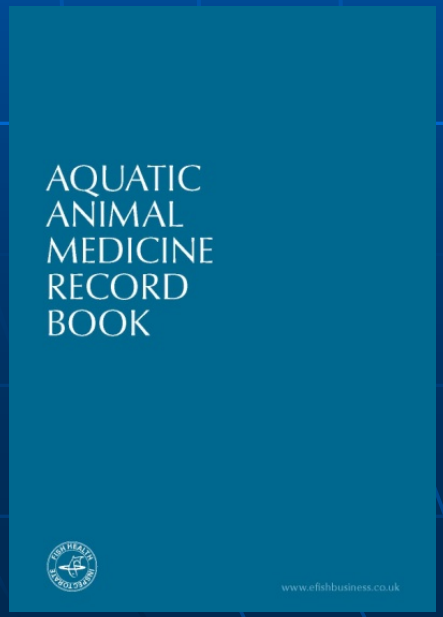
Records

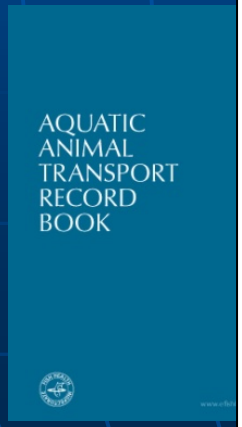


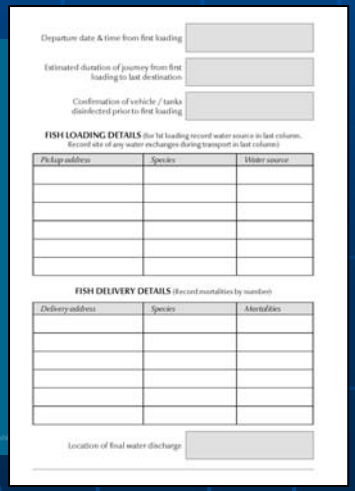












Cefas
Efishbusiness website

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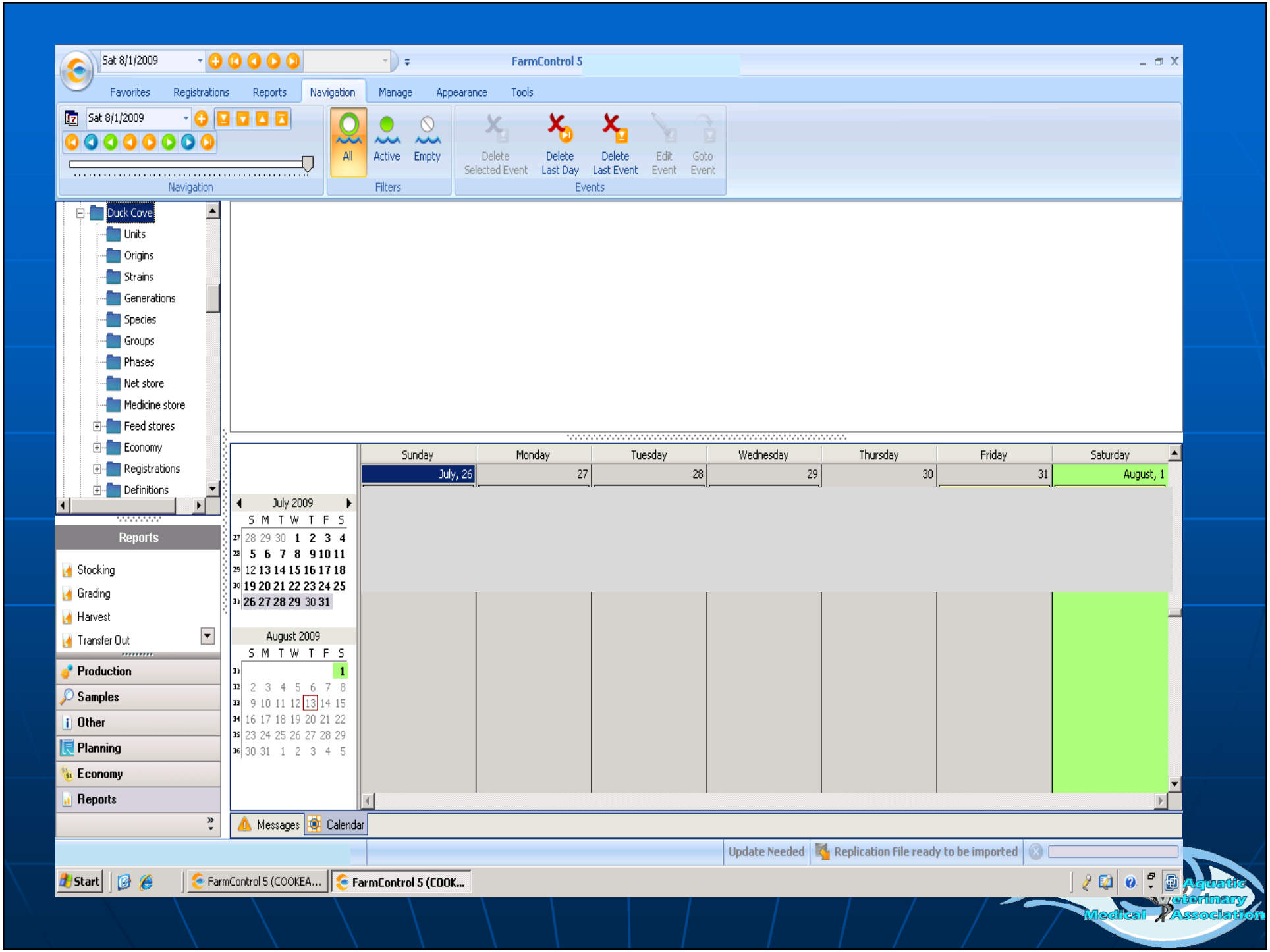

Certificates of Veterinary Inspection

CERTIFICATE OF VETERINARY INSPECTION
FOR LIVE FINFISH or their LIVE PRODUCTS

Page 1 of 2

ISSUING VETERINARIAN/ AUTHORITY (Name/Address) Phone / Fax / e-Mail

Certificate Number

This Certificate of Veterinary Inspection is only valid if the information in all fields below are completed (none must be left blank; add N/A if not applicable), and contains the original signatures of the licensed veterinarian issuing the certificate and the Consignor. Please note – Endorsement by the competent veterinary authority overseeing the source may be required.

Source and Destination

CONSIGNOR (Source/Owner)	Phone / Fax / e-Mail	SOURCE Premises ID or GPS Coordinates (if required)	SOURCE Population Use Dropdown - select one
CONSIGNEE (Destination)	Phone / Fax / e-Mail	DESTINATION Premises ID or GPS Coordinates (if required)	DESTINATION Use Dropdown - select one

Transportation

TRANSPORTER (Name/Address)	Phone / Fax / e-Mail	CARRIER TYPE Dropdown - select one	CONTAINER TYPE Dropdown - select one	TOTAL No. FISH ____
VEHICLE License/ Flight /Train No.	TOTAL No. CONTAINERS in Shipment	CONTAINER ID(s)	PERMIT No. (if req'd)	

Animal Information (Source)

SPECIES COMMON NAME	*Genus & species*	ANIMAL / PRODUCT TYPE Dropdown - select one
SEX: Select one	SIZE/ WEIGHT RANGE: ____ Select measurement	AGE RANGE: ____ Select measurement
No. Populations (tanks/ponds/etc) sampled ____	Population(s) ID (specific tanks/ponds/etc)	Total Population Size (No. Fish) ____	Total No. Fish Sampled/ Tested ____
ADDITIONAL STATEMENTS concerning the source population health/disease:	Water Source: Dropdown - select one Water Treatment: None ☐; Sand/bag filters ☐; Ozone ☐; Ultraviolet ☐; Chlorination/de-chlorination ☐; Other (specify) ____		

Diagnostic Laboratory Tests and Clinical Evaluation

As required by the Consignee or the Veterinary/Competent Authority overseeing the movement or importation of finfish, the source population of animals noted above have been clinically evaluated and tested using specific diagnostic laboratory tests detailed on the accompanying page of this certificate for the following diseases (see Instructions for abbreviations):

1. Select one 2. Select one 3. Select one 4. Select one 5. Select one Other (Specify) ____

Declarations

Issuing Veterinarian's Declaration: This is to certify that the animals identified above were inspected by me. Based on my clinical evaluation of the animals, source populations, lots and premises, and assessment of laboratory diagnostic test results summarized in the attached report, the animals for which this certificate is issued are free from the diseases or pathogens noted above and, in-so-far as can be determined, exposure thereto. The premises of origin are not under Veterinary Authority quarantine and the owner/consignor has been instructed to not commingle the animals with non-inspected animals, or utilize other water sources not described above.

Consignee (Source) Owner/ Agent Declaration: This is to certify that the animals identified above have not been moved to non-inspected premises or co-mingled with non-inspected animals, or exposed to other water sources after the date of inspection.

VETERINARIAN NAME	DATE ISSUED	CONSIGNMENT OWNER / AGENT NAME
VETERINARIAN SIGNATURE	VETERINARIAN LICENSE, REGISTRATION or ACCREDITATION No.	CONSIGNMENT OWNER / AGENT SIGNATURE

This Certificate is valid for 30 days after date issued.
A fully executed Certificate (with original signatures) must accompany animals moved or sold

File: Model-Finfish-CVI(V15a)w-Instructions(2))

CERTIFICATE OF VETERINARY INSPECTION
FOR LIVE FINFISH or their LIVE PRODUCTS
Clinical Evaluation and Diagnostic Test Results

Page 2 of 2

Diagnostic Laboratory Tests and Clinical Evaluation Performed — Certificate Number ____

1. DIAGNOSTIC LABORATORY (Name/Address)	Phone / Fax / e-Mail		LAB ACCESSION #	DATE RECEIVED
DISEASE/PATHOGEN	TEST TYPE	PROTOCOL USED	SAMPLE TYPE Dropdown - select one	# SAMPLES TESTED ____
DX TEST RESULT DATE	DX TEST RESULTS	DX TEST COMMENTS		
CLINICAL EVALUATION DATE	CLINICAL EVALUATION of Source Population revealed Dropdown - select one of disease/infection.	ADDITIONAL CLINICAL COMMENTS		

2. DIAGNOSTIC LABORATORY (Name/Address)	Phone / Fax / e-Mail		LAB ACCESSION #	DATE RECEIVED
DISEASE/PATHOGEN	TEST TYPE	PROTOCOL USED	SAMPLE TYPE Dropdown - select one	# SAMPLES TESTED ____
DX TEST RESULT DATE	DX TEST RESULTS	DX TEST COMMENTS		
CLINICAL EVALUATION DATE	CLINICAL EVALUATION of Source Population revealed Dropdown - select one of disease/infection.	ADDITIONAL CLINICAL COMMENTS		

3. DIAGNOSTIC LABORATORY (Name/Address)	Phone / Fax / e-Mail		LAB ACCESSION #	DATE RECEIVED
DISEASE/PATHOGEN	TEST TYPE	PROTOCOL USED	SAMPLE TYPE Dropdown - select one	# SAMPLES TESTED ____
DX TEST RESULT DATE	DX TEST RESULTS	DX TEST COMMENTS		
CLINICAL EVALUATION DATE	CLINICAL EVALUATION of Source Population revealed Dropdown - select one of disease/infection.	ADDITIONAL CLINICAL COMMENTS		

4. DIAGNOSTIC LABORATORY (Name/Address)	Phone / Fax / e-Mail		LAB ACCESSION #	DATE RECEIVED
DISEASE/PATHOGEN	TEST TYPE	PROTOCOL USED	SAMPLE TYPE Dropdown - select one	# SAMPLES TESTED ____
DX TEST RESULT DATE	DX TEST RESULTS	DX TEST COMMENTS		
CLINICAL EVALUATION DATE	CLINICAL EVALUATION of Source Population revealed Dropdown - select one of disease/infection.	ADDITIONAL CLINICAL COMMENTS		

5. DIAGNOSTIC LABORATORY (Name/Address)	Phone / Fax / e-Mail		LAB ACCESSION #	DATE RECEIVED
DISEASE/PATHOGEN	TEST TYPE	PROTOCOL USED	SAMPLE TYPE Dropdown - select one	# SAMPLES TESTED ____
DX TEST RESULT DATE	DX TEST RESULTS	DX TEST COMMENTS		
CLINICAL EVALUATION DATE	CLINICAL EVALUATION of Source Population revealed Dropdown - select one of disease/infection.	ADDITIONAL CLINICAL COMMENTS		

Official Veterinary/ Competent Authority Endorsement *(if required)*

Endorsement Declaration: As the Official Veterinary/Competent Authority for verifying the disease status of live aquatic animals within ____ (jurisdiction), I certify the health, disease diagnostic test results and veterinary declarations noted in this document have been verified to be true and correct, and meet the requirements of the destination entity's Official Veterinary/Competent Authority

Authority / Agency	Official Agent's Name	Official Agent's Signature	Date Endorsed

Authority/ Agency Seal(s) (if required)

Diagnostic Testing

Surveillance

Presence		Absence
OIE or National Listed	⟷ Competent Authority ⟷	OIE or National Listed
Important to Farm/EU		Important to Farm/EU
Laboratory Selection		Laboratory Selection
Test Selection		Test Selection
Results Interpretation		Results Interpretation

Record Results

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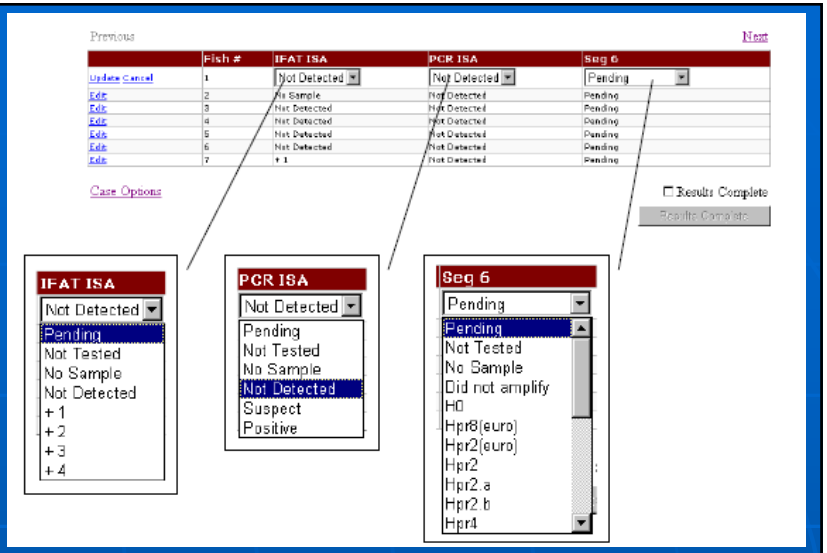
Diagnostic test use



- Electronic retrieval assists in ability to detect deviance from thresholds
  - e.g. ISA surveillance program in Canada requires detection in 2 fish by 2 tests
    - Requires that be able to identify which cage had a previous positive test
    - How many fish have been tested from that cage
    - How many cages have no tests done

Records

Diagnostic submissions and test results must be linked in records.

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Submission Information

Vet Case #:	171108JB
Date Collected:	11/17/2008
Veterinarian:	NB DAA Veterinarian
Species of Fish:	Atlantic salmon
Collected By:	john
Delivered By:	john
Necrospied By:	john
Submitted By:	lynn
Type of Test:	ISA Surveillance
Samples Entered:	7
Class:	2007 Fall

Lab Case

Lab Case #: 2008-0556

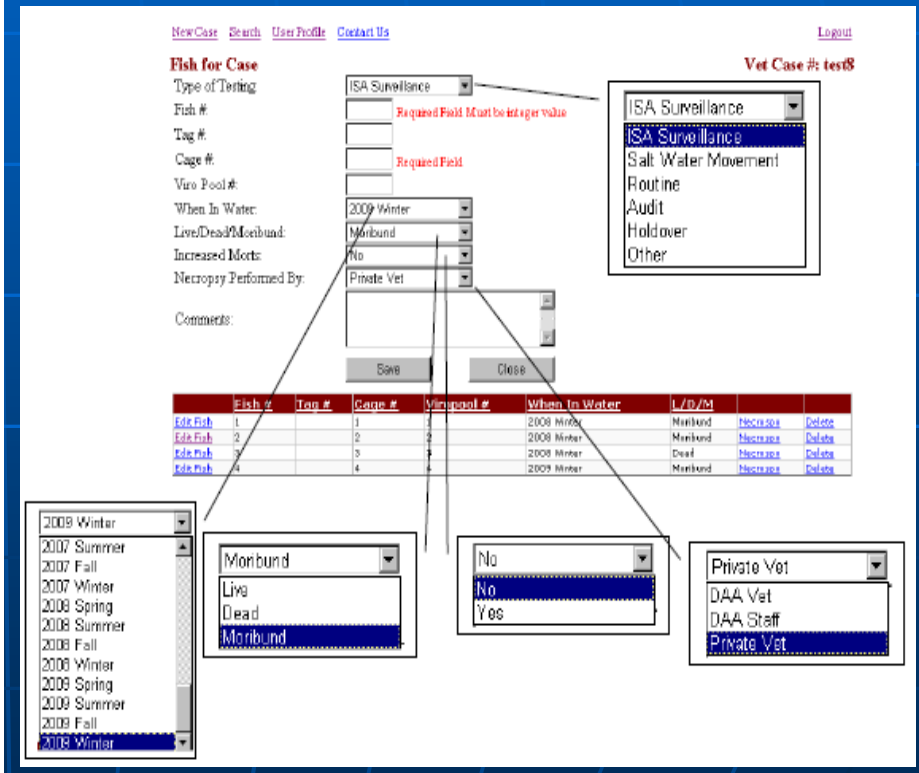
Date Delivered: 11/18/2008 (MM/DD/YYYY)

Tests	Comments
☑ IFAT Test	☑ ISA ☐ BKD ☐ Other
☑ PCR	☑ ISA ☐ IPN ☐ MSX ☐ Other
☑ Strain Typing	☑ Seg 6 ☐ Seg 8 ☐ Other
☑ Necropsy Notes	
☑ Virology	
☑ Bacteriology	
☑ Parasitology	
☑ Antibiotic Disc Assay	
☐ Other	

Save Close

Department of Agriculture and Aquaculture
Fish Health Surveillance Sytem Version 2.0

Example: Courtesy of New Brunswick Dept of Agriculture & Aquaculture



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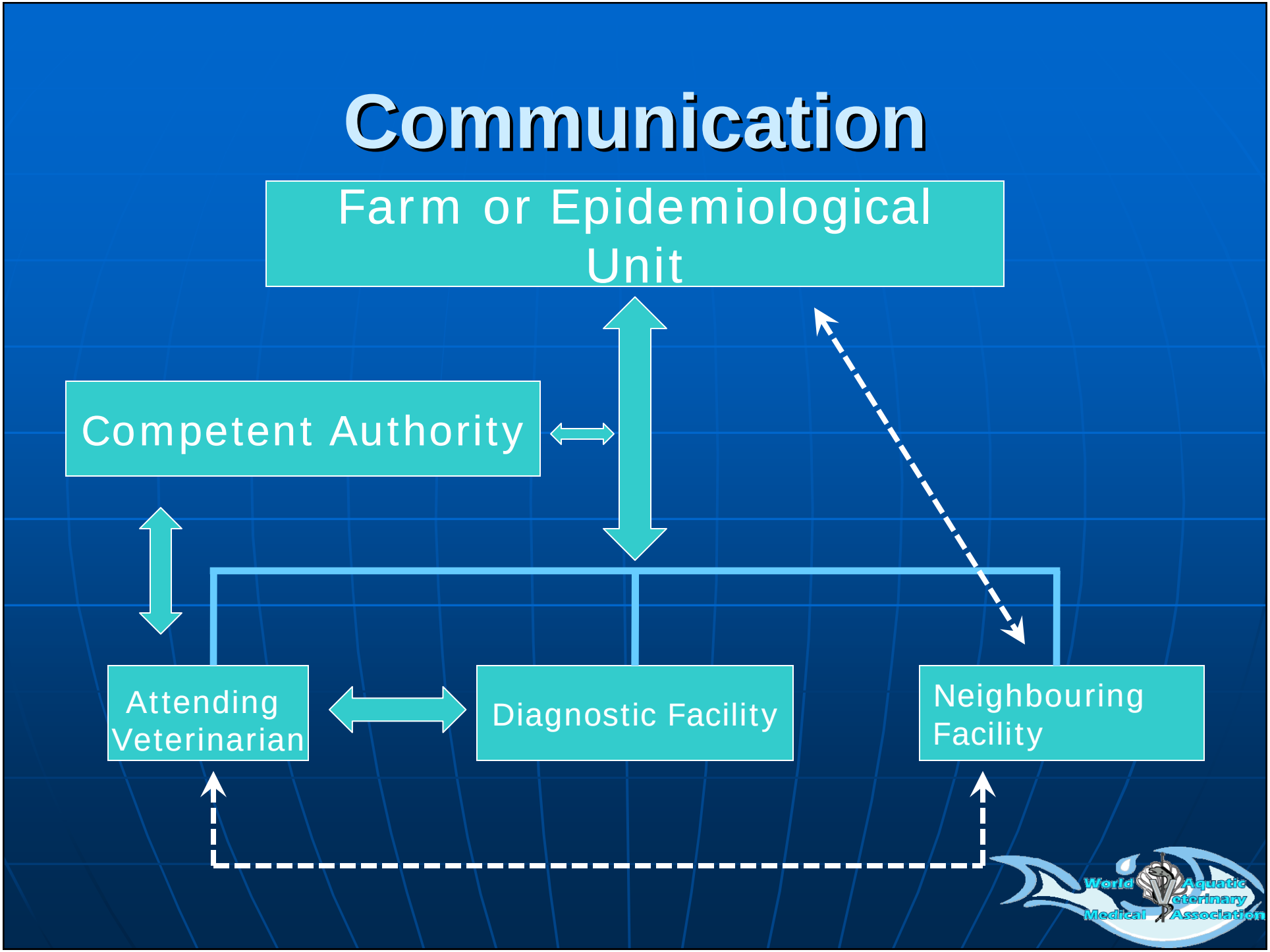

Summary

Sufficient documentation of practical biosecurity procedures will:

1. Improves implementation
2. Improves farm compliance

BUT

1. Stakeholders must understand the reasoning behind procedures
2. Stakeholders must recognise a real benefit/return
3. Certifying aquatic livestock operations free of specific diseases will likely raise the value of products and expedite trade

Summary

Successful documentation requires:

1. Attitude
2. Dissemination of knowledge
3. Greater stakeholder understanding
4. Clear benefit of ownership

Conclusion

- Records document regulatory concerns to authorities
- Most importantly, they are the measurement guides for improving disease control and biosecurity at farm sites