



AUSTRALIAN AND NEW ZEALAND COLLEGE OF VETERINARY SCIENTISTS

FELLOWSHIP GUIDELINES

Veterinary Aquatic Animal Health

ELIGIBILITY

The candidate must meet the eligibility prerequisites for Fellowship outlined in the *Fellowship Candidate Handbook*.

Membership of the College must be achieved prior to the Fellowship examination.

Membership must be in Aquatic Animal Health or its precursor Medicine and Management of Aquaculture Species.

OBJECTIVES

To demonstrate that the candidate has sufficient knowledge, training, experience and accomplishment in **Veterinary Aquatic Animal Health** to meet the criteria for registration as a specialist in this field.

LEARNING OUTCOMES

Aquatic Animal Health is defined as pathobiology and disease control (including medicine, management and epidemiology) of all aquatic animals (apart from reptiles, amphibians, birds and mammals), with particular emphasis on those species which are kept for aquaculture or ornamental purposes (fish, crustacean, mollusc).

Candidates must demonstrate a **sound**¹ knowledge of the discipline for the major commercial aquatic animal species groups across all electives as defined below and in the Training Program section, as well as a **detailed** knowledge in one nominated elective, which shall comprise up to **25%** of the candidate's training program. Candidates must indicate their elective sub-specialty when submitting their training program for approval.

¹ Knowledge Levels:

Detailed knowledge - candidates must be able to demonstrate an in-depth knowledge of the topic including differing points of view and published literature. The highest level of knowledge.

Sound knowledge – candidate must know all of the principles of the topic including some of the finer detail, and be able to identify areas where opinions may diverge. A middle level of knowledge.

Basic knowledge – candidate must know the main points of the topic and the core literature.

Electives have been structured to reflect current practice patterns, with some professionals covering all aquatic animal species on a discipline basis (pathobiology and diagnosis; disease control and regulation – generally at a state or country level); and others directly service industry at a farm or owner level, principally directed to one major industry sector. As there is considerable overlap and movement between these major activities, knowledge of the core learning outcomes is required of all candidates.

Candidates will choose one of the following seven electives, defined as:

Services covering all aquatic animal industries: either

Elective A) Pathobiology of aquatic animals: pertaining to the diagnosis and disease investigation aspects of aquatic animal disease, mainly (but not entirely) at a laboratory level.

Elective B) Aquatic animal disease control and regulation: pertaining to the overall control of disease in aquatic animal populations. This may include field aspects of investigation.

Or veterinary service for industry sectors; pertaining to the provision of comprehensive veterinary services to either farm populations or individual aquatic animal within an industry sector. To include diagnosis and interpretation of laboratory results, medicine and management, surgical techniques (as appropriate), and disease control and regulatory aspects relevant to one of the following industry groups:

Elective C) Production fin-fish

Elective D) Ornamental aquatic animals

Elective E) Temperate production aquatic animals

Elective F) Tropical production aquatic animals

Elective G) Aquaculture invertebrates

Learning outcomes relating to biology of animals and their diseases:

1. The candidate will have **detailed knowledge** of the following, for their elective sub-specialty, and **sound knowledge** for other species:
 - 1.1. Aquatic animal comparative anatomy, physiology and immunology.
 - 1.2. The husbandry and management of aquatic animals including nutrition, reproductive and genetic management, hygiene, handling, water quality and technology of containment facilities, behaviour and record keeping under varying Australian and New Zealand aquaculture and holding conditions.
 - 1.3. The aetiology, pathogenesis, epidemiology, diagnosis, treatment and control of diseases endemic to Australia and New Zealand and internationally reportable diseases of aquatic animals including infectious diseases (microbial and parasitic) and non-infectious conditions such as those due to nutritional deficiencies, toxicants, iatrogenic actions, neoplasia, genetic abnormalities, physical damage and stress.

Learning outcomes relating to disease diagnosis:

2. The following learning outcomes require **detailed knowledge** for candidates with the Pathobiology of Aquatic Animals elective, and **sound knowledge** for those with other electives:
 - 2.1. The concepts of host-pathogen-environment interactions to produce disease.
 - 2.2. Principles of disease related to pathological processes (mechanisms of cell injury, inflammation and repair, vascular disturbances, disorders of growth, and pigmentations and deposits) in each major phyla of aquatic animals of commercial significance (fish, crustacean, and molluscs) and their causes (physical, chemical, infectious, genetic and immune-mediated).
3. For the following, candidates with Pathobiology of Aquatic Animals elective require **detailed knowledge** for major commercial species of all industry sectors. Candidates with industry sector electives (C; D; E, F; or G) require **detailed knowledge** for species within their elective. **Sound knowledge** in this area is required for other species and by candidates with disease control and regulation elective.
 - 3.1. Pathobiology of organ systems, including recognition and interpretation the structural and functional changes at the sub-cellular, cellular, tissue and organ levels of each of the major phyla of aquatic animals of commercial significance.
 - 3.2. The pathological features (gross and histological) of diseases of companion and commercially farmed fish, crustacea (shrimp, yabby, lobster, Moreton Bay bug group), bivalve molluscs and abalone, in Australia or New Zealand.
 - 3.3. The pathological features of major infectious aquatic animal diseases exotic to Australia and New Zealand.
 - 3.4. Diagnostic (technical and interpretive) aspects including routine laboratory procedures including microbiology, parasitology, and toxicology.
4. For all electives:
 - 4.1. The candidate will have a **sound knowledge** of the principles, limitations and interpretation of PCR, and immunohistochemistry, and a **basic knowledge** of interpretation of electron microscopy.
5. All candidates will be able to, with **sound² expertise**:
 - 5.1. Perform a detailed necropsy on commercial, companion, laboratory, and selected wild aquatic animal species.

² **Skill levels:**

Detailed expertise – the candidate must be able to perform the technique with a high degree of skill, and have extensive experience in its application. The highest level of proficiency.

Sound expertise – the candidate must be able to perform the technique with a moderate degree of skill, and have moderate experience in its application. A middle level of proficiency.

Basic expertise – the candidate must be able to perform the technique competently in uncomplicated circumstances.

- 5.2. Conduct on-site investigations, applying sound epidemiological knowledge to collect a full suite of diagnostic samples.
 - 5.3. Utilise diagnostic methodologies including gross and clinical pathology, microscopy of cytological smears and identify common pathogenic parasites.
 - 5.4. Interpret laboratory results including bacteriology, virology, mycology, parasitology, toxicology, histology, serology, molecular biology and nutritional analyses in order to determine a diagnosis.
 - 5.5. Conduct in-depth and complex disease investigations eg. of newly emerging pathogens or fish diseases, using multiple disciplines including gross and clinical pathology, toxicology, bacteriology, virology, mycology, parasitology, molecular and immunological techniques as appropriate.
6. Candidates with Pathobiology of Aquatic Animals elective will also be able to perform the following for all species with **detailed expertise**, and candidates with industry sector electives with **sound expertise** for species within their elective. **Basic expertise** is required for species outside an industry sector elective and for all species for elective B (control and regulation).
- 6.1. Detect, describe and interpret macroscopic and microscopic (histopathological and ultrastructural) changes in necropsy specimens from these animal species. Collect, process and examine cytological smears (surface, solid tissue, body fluid), and haematological smears (peripheral blood), and **detect, describe and interpret** morphological changes and identify parasites within these.
 - 6.2. Provide to veterinarians and non-veterinarians, information and advice on the pathological features of diseases in animals, using **concise, clear** verbal and written communication.

Learning outcomes relating to clinical practice and treatment:

7. **Detailed knowledge** of the following is required for all major species for those candidates with industry group electives (C, D, E, F, G). Candidates with other electives (A, B) will be able to demonstrate with **sound knowledge** of the following for all major species.
- 7.1. Practical skills associated with catching and handling aquatic animals for clinical examination, anaesthesia, occupational health and safety precautions; history taking, diagnostic sampling (for bacteriology, virology, mycology, molecular biology and parasitology) and necropsy techniques, as specified above.
 - 7.2. Clinical medicine including modification of husbandry and administration of therapeutics. Therapeutant knowledge includes pharmacokinetics; tissue residues; and food safety issues; assessment of treatment efficacy; welfare aspects; cost-benefit analysis; food safety.
 - 7.3. Surgical techniques (e.g. laparotomy, wound debridement and suture, removal of tumors, insertion of tracking devices, reproductive manipulation).
 - 7.4. National and State Legislative responsibilities with respect to the provision of veterinary services and administration of therapeutic chemicals.

- 7.5. Aquatic animal welfare issues as applicable to: wild harvest; recreational fishing; aquarium hobbyists; and aquaculture industries including the practical application of principles of fish welfare: industry codes of practice; national and State legislation relevant to fish welfare.
- 7.6. The relevant current environmental issues including: the environmental impacts of aquaculture; the potential for conflict between aquaculture pursuits and other aquatic activities such as, wild harvest fisheries, recreational fishing and marine conservation issues; the pest and disease risks of ornamental fish importation and keeping, sustainability of protein sources in fish feed.

Candidates with industry sector electives (C, D, E, F, G) shall also be able to:

- 7.7. Deliver clear written and oral instructions to non-veterinarians (aquaculture managers, government officers, companion animal clients) detailing diagnosis and treatment or follow-up options.

Learning outcomes relating to epidemiology and regulatory control:

- 8. For candidates with the Aquatic Animal Disease Control and Regulation elective (B) **detailed knowledge** of the following is required. For those candidates with industry group electives (C, D, E, F, G), a **detailed knowledge** is required for aspects relevant to their elective. A **sound knowledge** is required for other aspects, and candidates with the elective of Pathobiology of Aquatic Animals (A).
 - 8.1. Veterinary epidemiology and statistics, as applied to aquatic animal disease control:
 - 8.1.1. Methods of disease or production problem identification
 - 8.1.2. The ecology and natural history of diseases of aquatic animals
 - 8.1.3. The application of disease control strategies and methods of their evaluation (including economic evaluation), disease surveillance and monitoring.
 - 8.2. Appropriate methods to prevent the introduction and translocation of aquatic animal diseases exotic to Australia or New Zealand.
 - 8.3. State and Commonwealth Government reporting obligations for diagnosis of suspected exotic diseases, plus sound knowledge of AQUAVETPLAN operational manuals for emergency disease control and eradication.
 - 8.4. Requirements for development of biosecurity protocols for disease prevention including sampling protocols for reduction of introduction risk of important pathogens.
 - 8.5. Disease eradication and disinfection/decontamination requirements for significant endemic and exotic diseases of major commercial species of aquatic animals in Australia and New Zealand.
 - 8.6. Administration of aquaculture activities, especially disease control aspects, including international and national organizational structures: aims; legislation; staff training and continuing education.
- 9. Candidates with the Aquatic Animal disease control and regulation elective will also be able to:

- 9.1. Provide clear written and oral advice on control and treatment options for endemic and exotic diseases in any species of cultured or non-cultured finfish, crustacean and mollusc in Australia (or in New Zealand for New Zealand candidates), with due consideration for legislative requirements including prescription, environmental discharges, food safety and residue issues.
 - 9.2. Develop biosecurity and quarantine protocols for facilities to control disease incursion risks.
 - 9.3. Develop health management plans including determining key production parameters to monitor, surveillance sampling protocols and trigger points for full diagnostic investigations.
10. All candidates shall be able to:
- 10.1. Maintain knowledge of relevant refereed scientific literature, using library and computer based searching skills and critically evaluate current theories in aquatic animal health.
 - 10.2. Demonstrate sufficient understanding to recognize, investigate and formulate sound and rational approaches to new or rare aquatic diseases.

EXAMINATIONS

Refer to the *Fellowship Candidate Handbook*, Section 5.

The Fellowship examination has **four separate, autonomous components**:

1. **Written Paper 1** (*Component 1*) (three hours)
Basic science and principles of Aquatic Animal Health
2. **Written Paper 2** (*Component 2*) (three hours)
Applied Aspects of the Subject, 30% will be focused on the candidate's elective
3. **Practical Examination** (*Component 3*) (two hours)
Practical will include content common to all candidates and also the candidate's elective sub-specialty.
4. **Oral Examination** (*Component 4*) (two hours)
Oral will include content common to all candidates and also the candidate's elective sub-specialty.

The written examination will comprise of two separate three-hour written papers taken on two consecutive days. There will be an additional 20 minutes perusal time for each paper, during which no writing on the examination paper is permitted. In each paper you must answer all four (4) questions, worth 45 marks each, giving a total of 180 marks per paper. There is no choice of questions in paper one. Choice within questions in paper two has been provided to allow candidates to answer in respect to their chosen elective. Questions may be long essay type, a series of shorter answer sub-questions, or multiple-choice questions. Marks allocated to each question and to each subsection of questions will be clearly indicated on the written paper.

Written Paper 1:

This paper will apply to **all Fellowship candidates in Aquatic Animal Health** and will assess the candidate's knowledge of the principles of Aquatic Animal Health as described in the Learning Outcomes. Answers may cite specific examples where general principles apply, but should primarily address the theoretical basis underlying each example.

Written Paper 2:

This paper will assess the candidate's ability to apply the principles of Aquatic Animal Health. Of this examination, 30% will be focused on the candidate's elective (with sufficient species choice within questions to cater for all candidates).

Pathobiology aspects will assess knowledge of the aetiology, pathogenesis, pathological features, and diagnosis of animal diseases, as described in the Learning Outcomes. Aquatic Animal Disease Control aspects will assess field investigation skills directed at understanding aquatic animal disease aetiology, pathogenesis, and epidemiology; knowledge and skills for limitation of disease impacts through treatment, environment and movement control; and issues of food safety, occupational health and safety, disease response and public relations relevant to control of aquatic animal diseases.

Practical Sub-specialty Examination: consists of two (2) parts:

Written answers will be required. No perusal time will be given for the practical exam. The practical will consist of a series of ten (10) questions with sub-questions, equating to a total of 150 marks. Marks allocated to each question and to each sub-question will be clearly indicated on the written paper.

Practical Part 1: Case studies in disease investigation (1.0 hour – 50% marks).

This will be common to all candidates and will use projected images and video from seven (7) cases with subtopics to assess the candidate's ability, for example, to undertake a diagnostic investigation and detect, describe and interpret macroscopic changes and behavioural changes, and develop specific or differential diagnoses of aquatic animals. The focus will be interpretation of gross pathology and behavioural changes, sampling, and cytological interpretation across a range of aquatic animal culture systems. The candidate may be required to write morphological and/or aetiological diagnoses and brief interpretative comments. The candidate is informed of the species and if necessary the tissue.

Practical Part 2: will concentrate on the candidate's elective area (1.0 hour – 50% marks)

Three (3) cases with sub-topics will be assessed.

A) Pathobiology will be assessed by **microscopy**, which primarily assesses the candidate's ability to identify, describe and interpret morphological changes in histopathological sections, and/or cytological or haematological smears. The candidate may also be provided with electron micrographs for basic evaluation. The candidate is informed of the animal species.

B) Aquatic Animal Disease Control and Regulation will utilise case studies in more detail, requiring the candidate to demonstrate the range of required skills for comprehensive control of aquatic animal diseases, commencing for example with thorough history taking skills when presented with a case presentation outline.

The candidate will be required, for example:

To detail the diagnostic work up, and interpret laboratory results which will be provided.

Using the diagnosis from the case studies, to demonstrate a decision tree framework for choosing control or eradication options, (use of whiteboard will be optional), and to define key steps in the implementation of the chosen route of clinical, farm management or regulatory emergency disease response.

Develop a surveillance program for the pathogens identified in the case studies.

Participate in a mock media interview to communicate diagnostic investigation results to the public.

Industry group electives (C, D, E, F, G) will include aspects of both these categories, relevant to the elective.

Oral Examination (2 hours):

The oral examination provides the candidate with a further opportunity to demonstrate knowledge of Aquatic Animal Health as described in the Learning Outcomes. Of this, 30% will be focused on the candidate's elective sub-specialty.

The oral examination may cover case-based material or more general discussion, including areas of recent interest or controversy in Aquatic Animal Health. The oral examination is designed to test practical aspects of the Learning Objectives. To pass this examination, the candidate must be able to demonstrate the required level of knowledge in the learning outcomes to the examiners and to support their opinions with citations of the veterinary literature. Ten (10) cases or topics are presented with supporting questions asked verbally in a face-to-face setting. The oral examination has a total of 100 marks with each case allocated 10 marks. Three (3) cases will be focussed on the candidate's elective sub-speciality. Images and pathology reports are likely to be used during this examination.

TRAINING PROGRAMS FOR FELLOWSHIP IN AQUATIC ANIMAL HEALTH

Refer to *The Fellowship Candidate Handbook*:Section 3.3

Directly Supervised Training (DST) Residency Program

Directly Supervised Training involves regular, in-person, one-on-one contact between the candidate and supervisor. The candidate should have daily access to the supervisor. A minimum requirement for directly supervised training is that at least once a week there should be a formal meeting between the candidate and supervisor to review work in progress.

This directly supervised training may be provided by full-time formal training programs, which are residency-style programs that involve at least two years of full-time directly supervised training (DST). These programs are undertaken at a location with suitable facilities, case material, and supervisor(s). Training will involve structured periods of study, clinical experience and research in an academic environment. The candidate has face-to-face access to the supervisor(s) for five days of the week. Both the candidate and the supervisor must spend at least 25 hours per week working in the discipline (i.e. a full-time DST [five days per week] requires a minimum of 96 weeks for completion).

Training should provide intensive training in all aspects of Aquatic Animal Health, encompassing all major groups of aquatic animal species of commercial significance in Australia or New Zealand, but with emphasis on the candidates elective subject.

The candidate should be actively involved in the diagnosis and reporting of gross pathological and histopathological results from **necropsy cases** (especially for pathobiology candidates), and the assessment

of environment and management factors involved in disease expression (especially for disease control candidates).

Alternatively, a remote directly supervised training program (outlined below) may be submitted for approval.

Remote Directly Supervised Training Program

A remote direct supervised training program comprises 96 weeks of supervised training made up of:

- 88 weeks of remote directly supervised training (including 8 days of directly supervised training)
- Four weeks of directly supervised training in related disciplines
- Four weeks of directly supervised externship.

Remote Direct Supervised Training Component

The training program will include a minimum period of 88 weeks (440 working days) of remote direct supervised training (RDST) in the primary discipline of Aquatic Animal Health. RDST is defined as the candidate working in their own workplace and their activities being overseen by a supervisor in a different location. This will involve regular, one-on-one, daily (i.e. on working days, but not necessarily exclusively restricted to those days) contact between the supervisor and the candidate either in person, by telephone or internet conferencing (email, skype, web-based discussions or other appropriate technologies). The purpose of this meeting is for the candidate to receive support and advice about cases they have been managing. Daily contact with the supervisor will be recorded in a **'Daily Contact Diary'**. On occasions, when daily contact cannot be made, the reason for this failure shall be recorded in the daily contact diary.

The candidate and supervisor will meet formally once every seven days either in person, by telephone or synchronous internet conferencing. This meeting will be formally documented in the **'Weekly Meeting Report'**. Case information and data/images related to all cases from the previous week shall be transferred from the candidate to the supervisor prior to the meeting in order to ensure a complete and thorough review of each case. The purpose of this meeting is for the supervisor to become familiar enough with the case details that they can make an independent judgment of the appropriateness of the candidate's decisions and actions and provide feedback. Cases that the supervisor feels can be adequately understood without direct observation may be included in the remote supervision activity log.

All of this information should be retained digitally by both the candidate and the supervisor so that it can be reviewed by the examiners or member of the CEC if required.

Direct Supervised Training (DST) Component

The candidate and supervisor will meet formally for a minimum of two days once every six months to co-visit facilities and to review the performance of the candidate. This meeting will be formally documented in the **'Co-visit Report'**.

Other Requirements

In addition to case responsibilities, the candidate should be involved in formal training activities such as clinical rounds, resident seminars, research meetings, journal clubs, exotic disease preparedness activities, and industry disease control programs and should attend relevant lectures or continuing education courses.

The candidate is encouraged to participate in regional, national and international meetings relevant to disease investigation and diagnosis.

Reporting RDST

Daily Contact Diary (Appendix 1)

Candidates must maintain a diary of all activities and contact with the supervisor. This diary must be submitted after the first three months then with each annual supervisor report for review by a member of the CEC.

Weekly Meeting Report (Appendix 2)

The weekly meeting report details the date of the meeting and the nature and the outcome of each weekly discussion. This report must be signed by the supervisor and submitted after the first three months then with each annual supervisor report for review by a member of the CEC.

Activity Log Summary RDST (Appendix 4)

This report must be signed by the supervisor and submitted with each annual supervisor report for review by a member of the CEC.

Activity Log (Appendix 5)

A six month section to be submitted for assessment by the CEC at any stage after the first twelve months of training.

Reporting DST

Co-visit Report (Appendix 3)

The co-visit report details the cases seen during direct supervised training. This report must be submitted with each annual supervisor report for review by a member of the CEC.

Activity Log Summary DST (Appendix 4)

The activity log summary shall be kept for cases associated with both direct and remote direct supervised training.

Activity Log (Appendix 5)

A six month section to be submitted for assessment by the CEC at any stage after the first twelve months of training.

Electives

Candidates must submit a proposal for an elective sub-speciality from the following list when submitting their training program for approval. Sub-speciality electives as defined in the Learning Outcomes are:

- A) Pathobiology of aquatic animals
- B) Aquatic animal disease control and regulation
- C) Production fin-fish
- D) Ornamental aquatic animals
- E) Temperate production aquatic animals
- F) Tropical production aquatic animals
- G) Aquaculture invertebrates

In order to achieve the required Learning Outcomes, candidates should study the following for their elective sub-specialty. Species listed are for Australian and New Zealand candidates and the Australasian region.

Candidates from other regions will be required to cover a similar spectrum of species, but may substitute major species listed with major culture species from their region (to be discussed on case-by-case basis with elective nomination).

Pathobiology of aquatic animals: the study of diseases and the mechanisms of disease in aquatic species to include pathology and pathogenesis of infectious and non-infectious disease agents or causes.

Aquatic animal disease control and regulation: treatment and control methods to mitigate the risks of disease incursions and impacts on aquacultured species: Including strategies and techniques of medication, vaccination, environmental and husbandry management.

Production fin-fish: systems of animal husbandry and health maintenance pertaining to major fin-fish species to include farm design, diagnosis, treatment, and protection of farmed food producing fin-fish (as distinct from shell-fish farming systems) from disease threats. A **detailed knowledge** of diseases affecting major aquaculture food fish species of the region is required, and **sound knowledge** of diseases affecting minor aquaculture species, wild fish and the mechanisms of disease relevant to fin-fish.

Ornamental aquatic animals: systems of animal husbandry and health maintenance, pertaining to major fin-fish and shellfish species used for domestic and commercial non-food producing markets and public aquaria. To include aquarium design and maintenance, diagnosis, treatment, and protection of such ornamental aquatic species from disease threats.

Temperate production aquatic animals: systems of animal husbandry and health maintenance pertaining to major fin-fish and shell-fish species of a temperate climate zone. To include the farm design, maintenance, diagnosis, treatment and population protection from disease threats of, or pertaining to, salmonid, tuna, mulloway, yellowtail kingfish, Australian freshwater native fish, edible oysters, mussels and abalone. .

Tropical production aquatic animals : systems of animal husbandry and health maintenance pertaining to major fin-fish and shell-fish species of a tropical climate zone. To include farm design, maintenance, diagnosis, treatment and population protection from disease threats of or pertaining to marine prawns, freshwater crayfish, barramundi, marine grouper, cobia, pearl oyster, Australian freshwater native fish farms from disease threats.

Aquaculture invertebrates : systems of animal husbandry and health maintenance pertaining to major shell-fish species to include the farm design, maintenance, diagnosis, treatment and population protection from disease threats of or pertaining to marine prawns, freshwater crayfish, lobsters, marine crabs, edible and pearl oysters, mussels, clams, abalone, sea cucumber from disease threats.

Case thresholds are recommended to ensure the candidate's range of training experience, and must include all major species groups.

For complex cases, it is suggested thresholds be calculated on a points basis rather than case number. In such calculations, a guide for diagnostic input would be to consider 1 complex / on-going farm or industry level case (10 points) as equivalent to 5 simple cases involving multiple fish, such as simple parasitic infection in a cage of fish, (2 points each), or 10 simple cases involving a single fish and 1 discipline (1 point). (Complex cases involving 1 fish may be rated as 2 points.) The points allocated should also be adjusted to reflect whether the Candidate had primary or secondary case responsibility. For example the Candidate should adjust on a pro-rate percentage basis his or her involvement in the case, eg. 50% case responsibility means 50% of the case point allocation, 25% case responsibility means 25% case point allocation.

If possible, at least some complex / ongoing cases should be included for each industry group (as defined by the elective options), especially for industry-wide electives (Pathobiology and Disease Control & Regulation). As environmental aspects may be major components of disease expression, pathology cases may also involve disease control aspects, though the weighting should be towards investigation and diagnosis. Disease control cases should include some laboratory aspects. For species group electives, not less than 25% of the recommended minimum case points should be completed in the candidate's elective sub-specialty.

There is an acceptance that in some candidate's circumstances not all the suggested case thresholds can be achieved, though the overall case load should reflect an equivalent work load. It is the responsibility of the Candidate to demonstrate to their Supervisor and the Chapter (or discipline) representatives of the TCC that the overall work load and composition are sufficient to achieve the learning outcomes.

A: Minimum case numbers for aquatic animal pathobiology elective:

Recommended Minimum Cumulative Total Case Number

Species	Complex disease investigation	Laboratory diagnosis / necropsy & / or histo*	Treatment & management advice.***	Minimum Cumulative Total Case Number
Fish - Complex / farm level case / on-going problem	30			
Fish – production species**		50		
Fish – minimum total points**		100		200
Mollusc cases	5	30		50
Crustacean cases	5	30		50
Case points – major elective species group	30	50		100
Other species	Optional	Optional	Optional	

600

* Coded as: Codes s= surgery; t= treatment; m = control through husbandry changes; r = regulatory action for control ; sp = surveillance program development & / or implementation.

Note : To achieve the minimum total case number of 600, the balance of cases of 200 can be made up by a mixture of any category of species.

B: Minimum caseload (expressed as points) for disease control and regulation elective: *Case scores take into account case complexity, equating 5 simple cases involving multiple fish (for example a simple parasitic infection in a cage of fish, 2 points), or 10 simple cases involving single fish (1 fish) to one complex ongoing farm or industry level problem(10) . Complex cases contribute to total laboratory diagnosis scores

**Fish – production = farmed or major wild harvest species. Fish –other = pet, display, incidental wild sample.

*** Laboratory diagnosis scores are additional for aquatic animal disease control candidates, demonstrating overall knowledge of the subject and contributing to the overall and species group totals, but with no minimum requirement.

* Coded as: Codes s= surgery; t= treatment; m = control through husbandry changes; r = regulatory action for control ; sp = surveillance program development & / or implementation.

Note : To achieve the minimum total case points of 1200, the balance of points of 450 can be made up by a mixture of any category of species.

C: Caseloads for industry sector electives (Production fin-fish; Ornamental aquatic animals; Temperate production aquatic animals; Tropical production aquatic animals; or Aquaculture invertebrates): These should comprise a combination of pathobiology and disease control disciplines across all species, with a minimum of 25% in species within their elective. The latter must include both disciplines. The discipline division is not currently specified but the % of the above case loads in each category should total 100.

Species	Recommended Minimum Cumulative Case points (points value in brackets)					Minimum Cumulative Total Case Points
	Complex disease investigation	Simple case investigations	Laboratory diagnosis / necropsy &/or histo*	Treatment & management advice***	Sum columns 2-4	
Fish – production	15 (150)	30 (30)	20 (20)	100 (100)	300	300
Fish – all other (aquarium & wild)*	15 (150)	30 (30)	20 (20)	50 (50)	250	250
Mollusc cases	5 (50)	5 (5)	5 (5)	30 (30)	90	90
Crustacean cases	5 (50)	5 (5)	5 (5)	30 (30)	90	90
Other species (shark/ rays/amphibian/other invertebrates etc)	Optional	Optional	Optional	Optional	(750)	20
Minimum Total case points	400					1200

TRAINING IN RELATED DISCIPLINES

Refer to the Fellowship Candidate Handbook Section 2.4.2

Candidates for Fellowship must spend time as stipulated by the Fellowship Candidate Handbook in one or more related disciplines. Related disciplines appropriate for Fellowships in **Aquatic Animal Health** can be in any related discipline subject, including the following: Veterinary Anatomical Pathology: Veterinary Clinical Pathology, Veterinary Public Health, Veterinary Microbiology, Veterinary Parasitology,

Molecular Biology, Immunology, Nutrition, Toxicology, Veterinary Epidemiology, and Small Animal Medicine and Veterinary Surgery.

EXTERNSHIPS

Refer to the Fellowship Candidate Handbook Section 2.4.1

ACTIVITY LOG

Refer to the Fellowship Candidate Handbook Sections 2.9

The **Activity Log** (AL) should be recorded in a format consistent with the template available on the College website: Activity Log for **Clinical Discipline**. *Examples of an AL (Options 1 and 2) are included in Appendix 1 of these Guidelines.*

ACTIVITY LOG SUMMARY

Refer to the Fellowship Candidate Handbook Section 2.8

The cumulative **Activity Log Summary** (ALS) should be recorded in a format consistent with the template available on the College website: Activity Log Summary - by **Technical Procedure**, further subdivided by **Species**. *An example of an ALS is included in Appendix 4 of these Guidelines.*

PUBLICATIONS

Refer to the Fellowship Candidate Handbook Section 2.10

RECOMMENDED READING LIST

The candidate is expected to read widely within the discipline, paying particular attention to areas not part of their normal work experiences. This list of books and journals is intended to guide the candidate to some core references, including comparative texts, and other source material. Candidates also should be guided by their supervisor. *The list is not comprehensive and is not intended as an indicator of the content of the examination.*

AQUATIC ANIMAL SPECIFIC

Essential Reading:

OIE 2007. . International Aquatic Animal Health Code. OIE
http://www.oie.int/eng/normes/fcode/A_summry.htm .

OIE 2006. *Manual of Diagnostic Tests for Aquatic Animals*. 5th edition, World Organisation for Animal Health (OIE), 2006. http://www.oie.int/eng/normes/fmanual/A_summry.htm

Bondad-Reantaso, M.G., McGladdery, S.E., East, I., and Subasinghe, R.P. (eds.), Asia Diagnostic Guide to Aquatic Animal Diseases. *FAO Fisheries Technical Paper No. 402*, Supplement 2. Rome, FAO. 2001. 240 p. <http://library.enaca.org/NACA-Publications/ADG-complete.pdf>

Bower, S.M., McGladdery, S.E. (1997): Synopsis of Infectious Diseases and Parasites of Commercially Exploited Shellfish: URL: <http://www-sci.pac.dfo-mpo.gc.ca/sealane/aquac/pages/intro.htm>

Ferguson, Hugh W. (Ed) 2006. Systemic Pathology of Fish (Second Edition). Scotian Press, London. (367 pp)

Other Standard Reference Texts:

Fish diseases:

Roberts R.J. 2001 *Fish Pathology* 3rd Edition. WB Saunders London

Austin, B., Austin, D.A. *Bacterial Fish Pathogens: Disease of Farmed and Wild Fish*. (3rd Ed 1999 or 4th Ed, 2007). Springer-Praxis Series in Aquaculture and Fisheries. Praxis Publishing, Chicester. ISBN: 978-1-4020-6068-7

Treves-Brown, K.M. *Applied Fish Pharmacology (Aquaculture Series)* Springer. 2000

Lom J and Dykova I. 1992. Protozoan parasites of fishes. Elsevier, Amsterdam London New York & Tokyo.

Noga E.J. 1996. Fish Disease. Diagnosis and Treatment. Mosby-Year Book Inc, Missouri

Stoskopf, M. K. 1993. Fish Medicine. W.B. Saunders Co. Philadelphia

Woo, P.T.K. and Bruno, D.W. Fish Diseases and Disorders.

Vol 1. 1995. Protozoan and Metazoan Infections. CABI Publishing.

Vol 2. 1998. Non-infectious Diseases. CABI Publishing.

Vol 3. 1999. Viral, Bacterial and Fungal Infections. CABI Publishing.

Reddacliff, G. L. 1985 Diseases of Aquarium Fish, Post Graduate Committee in Veterinary Science, Sydney.

Fish histology

Amin, Mortensen, Poppe (1992) Histology Atlas, normal structure of salmonids. APL, Bodo, Norway

Hibiya, Takashi, 1982. At Atlas of Fish Histology. Normal and Pathological Features, Kodansha, Tokyo.

Yasutake, William J. and Wales, Joseph H. 1983. Microscopic Anatomy of Salmonids: An Atlas, U.S. Department of the Interior, Washington D.C.

Crustaceans

Bell, TA and Lightner, D 1988. A Handbook of Normal Penaeid Shrimp Histology. World Aquaculture Society Publication, Allen Press, Ic, Lawrence, Kansas.

Lightner, D.V. 1996. A Handbook of Shrimp Pathology and Diagnostic rocedures for Diseases of Cultured Penaeid Shrimp. World

Aquaculture Society, Baton Rouge, LA. 304p.

V. Alday do Graindorge and T. W. Flegal. 1999. Diagnosis of Shrimp Diseases, with emphasis on the black tiger shrimp. ISBN 974-662-093-2. Multimedia Asia Co., Ltd, Bangkok. (Electronic publication)

Evans, L.H. and Jones, J.B. (Eds). 2001. Proceedings, International. Symposium on Lobster Health Management, Adelaide, September 1999. Muresk Institute of Agriculture, Curtin University Publication. pp 75-87.

http://espace.lis.curtin.edu.au/archive/00000270/01/International_symposium_on_rock_lobster_health_management.doc.pdf

Molluscs

Elston. R.A. 1999. Health Management, Development and Histology of Seed Oysters. World Aquaculture Society, Baton Rouge, LA 70803 USA.

Berthe, Franck et al. Histology and Anatomo-Pathology of Molluscs a guide for diagnosticians. (2003 or later). Bruno Chollet, Isabelle Arzul, Céline Garcia & Franck Berthe Eds. CD format. Available from the European Community Reference Laboratory, Ifremer, La Tremblade, France.

Grizel, H. (éd.). An Atlas of Histology and Cytology of Marine Bivalve Molluscs. 2003. Edited by Henri Grizel 201 pages, col & b/w plates, figs. ISBN 2-84433-111-4. Office International des Epizooties. (Out of print, but newer versions expected).

Fisher, W.S. (1988) Disease Processes in Marine Bivalve Molluscs. American Fisheries Society, Special Publication 18, Bethesda, Maryland.

Pearl oysters,

Humphrey, JD and Norton JH. 2005. The Pearl Oyster *Pinctada maxima* (Jameson, 1901). An Atlas of Functional Anatomy, Pathology and Histopathology. Northern Territory Government Printing Office.

Giant Clams

Norton JH and Jones GW. 1992. The giant clam: an anatomical and histological atlas. Australian Centre for International Agricultural Research, Canberra. Printed Watson Ferguson & Co, Brisbane.

Abalone

Bevelander, G. 1988. Abalone: Gross and Fine Structure. Boxwood Pr. ISBN-10: 0940168057 ISBN-13: 9780940168053

Handler, J. 2000. (Ed). Abalone Histology Atlas (CD format). Marine and Freshwater Resources Institute, Victoria.

General aquatic animal landmark reference resources:

Kinne, O. (Ed.) Diseases of Marine Animals.

Vol. 1. 1960 Protozoa to Gastropoda. John Wiley and Sons, Chichester.

Vol. 11, 1983 Bivalvia to Scaphoda. Biologische Anstalt, Helgoland, Hamburg.

Vol. 111, 1984 Echinodermata to Vertebrata. John Wiley and Sons, Chichester.

Vol. IV. Part 1, 1985. Pisces. John Wiley and Sons, Chichester.

Hine PM, Wain JM, Boustead NC. The leucocyte enzyme cytochemistry of fish. New Zealand Fisheries Research Bulletin No. 28. 1987.

Harrison, FW (Ed) Microscopic Anatomy of Invertebrates. Wiley-Liss, Inc

Volume 5. Mollusca I, 1994

Volume 6 Mollusca II (199?)

Volume 10: Decapod Crustacea, 1992

Factor, J R. 1995. Biology of the Lobster *Homarus americanus*. Academic Press, San Diego, California.

Bliss, Dorothy E. (Ed.) 1982/85. The Biology of Crustacea. Vols. 110 Academic Press, New York.

Dall, W. Hill, B.J. Rothlisberg P.E. and Staples, D.J. 1990. The Biology of the Penaeidae. Advances in Marine Biology Vol. 27. Academic Press, London.

Bayne, B.L. 1976. Marine Mussels: Their Ecology and Physiology, Cambridge University Press, Cambridge.

Kennedy, V S, Newell, I E, and Edle, A F. 1996. The Eastern Oyster: *Crassostrea Virginica*. University of Maryland Sea Grant Publications. 1996. (UM-SG-TS-96-01). 750 pp.

Text Books - not essential but useful for reference if available

Brown, L. (1993) Aquaculture for Veterinarians. Pergamon Press

Moller H. and Anders, K. 1986. Diseases and Parasites of Marine Fish, Moller Kiel.

Buller NB. *Bacteria from fish and other aquatic animals*. CABI Publishing, Wallingford. 2004

Untergasser, D. 1989. Handbook of Fish Diseases. T.F.H. Publications, Inc. (*Useful - aquarium fish*)

Hallegraeff GM. Aquaculturists' Guide to Harmful Australian Microalgae. CSIRO Division of Fisheries and Fisheries Industry Training Board of Tasmania, Hobart. 1991.

National Research Council. 1981. Nutrient Requirements of Coldwater Fishes No. 16. National Academy Press, Washington D.C.

Roberts, R. J. and Bullock A. M. 1989 The Nutritional Pathology of Fishes In: Fish Nutrition J. E. Halver (Ed.) Academic Press, London. pp.423-473.

Sidransky, H. 1985. Nutritional Pathology (Biochemistry of Disease Series, Vol 10) (Hardcover: 416 pages). Publisher: CRC . ISBN-10: 0824773039. ISBN-13: 978-0824773038

Stirling, Hadrian P. 1985. Chemical and Biological Methods of Water Analysis for Aquaculturists. Institute of Aquaculture, Stirling.

Thorsen, J.C. (1994) Bluebook. Suggested procedures for the detection and identification of certain finfish and shellfish pathogens. Fish Health Section of the American Fisheries Society

Ellis A.E. 1988. Fish Vaccination, Academic Press, London. (Later vaccination ref to follow)

Useful Journals and Proceedings: (alphabetical)

Disease specific aquatic animal or invertebrate journals:

Bulletin of the European Association of Fish Pathologists

Diseases of Aquatic Organisms

Journal of Aquatic Animal Health

Journal of Fish and Shellfish Immunology

Journal of Fish Biology

Journal of Fish Diseases

Journal of Invertebrate Pathology

Fish Health Section of the American Fisheries Society

Fish Health Section of the Asian Fisheries Society

Fish Health Section of the World Aquaculture Society

Fish Pathology (Japanese, English papers or abstracts)

General aquatic animal journals that contain significant health / disease papers:

Aquaculture

Aquaculture nutrition

Journal of Shellfish Research

Fish and Shellfish Immunology

Harmful Algal Blooms

Discipline based journals that contain significant numbers of aquatic animal papers:

Parasitology / International Journal of Parasitology / Experimental Parasitology

Journal of Protozoology

Virology

Microbiology / Journal of Applied Microbiology

Environmental Toxicology

Aquatic Toxicology

Immunology

Developmental & Comparative Immunology

Comparative Biochemistry and Physiology, Part C: Toxicology & Pharmacology

Other Key Aquatic Animal Websites

Anon 2000. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, Volume 1, The Guidelines (Chapters 1-7). Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ). Paper No. 4 - Oct 2000.
<http://www.environment.gov.au/water/quality/nwqms/volume1.html>

Herfort A. *Aquatic Animal Diseases Significant to Australia: Identification field guide*. Second edition 2004. Agriculture, Fisheries and Forestry – Australia, Canberra. <http://www.disease-watch.com/documents/CD/index/index.htm>

National Aquatic Animal Health Technical Working Group – Standard Operating Procedures and advisory documents. <http://www.scahls.org.au/NAAH-TWG/index.htm>

GENERAL AND COMPARATIVE RESOURCES

General Veterinary Pathology

**Cheville NF. *Cell Pathology* Iowa State University Press, Ames.

**Kumar, V, Abbas, AK, Fausto, N *Robbins and Cotran Pathologic Basis of Disease*. 7th edn. Elsevier Saunders (2005).

**McGavin MD, Zachary JF. *Pathologic Basis of Veterinary Pathology* 4th edn. Mosby, St Louis (2007).

**Slauson, DO, Cooper, BJ. - *Mechanisms of Disease*, 3rd edn. Mosby (2002).

Anatomical Pathology

**Aughey E, Frye FL. *Comparative Veterinary Histology with Clinical Correlates* Manson Publishing Ltd London (2001).

***Maxie MG editor. *Jubb, Kennedy & Palmer's Pathology of Domestic Animals*, 5th edn. Elsevier. Volumes 1-3 (2007).

McGavin MD, Zachary JF. *Pathologic Basis of Veterinary Pathology* 4th edn. Mosby, St Louis (2007).

**Meuten, DJ - *Tumours in Domestic Animals*, 4th edn. Iowa State Press (2002).

Robinson WF, Huxtable CRR. *Clinicopathologic Principles for Veterinary Medicine* Cambridge University Press, Cambridge (1988).

Geering WA, Forman AJ, Nunn MJ. *Exotic Diseases of Animals. A Field Guide for Australian Veterinarians*. Australian Government Publishing Service Canberra (1995).

Quinn PJ, Carter ME, Markey B, Carter GR. *Clinical Veterinary Microbiology* Mosby, London (1994).

Key general journals (particularly issues from the immediate past 5 years).

Aust Veterinary Journal.

Veterinary Aquatic Animal Health Fellowship Guidelines 2012

© 2012 The Australian and New Zealand College of Veterinary Scientists ABN 00 50 000894 208

General Websites

Animal Health Australia (to access AUSVETPLAN through publications link):

<http://www.animalhealthaustralia.com.au/aahc/home-page.cfm>

APPENDIX 1: DAILY CONTACT DIARY

Aquatic Animal Health Daily Contact Diary				
<i>Date</i>	<i>Time</i>	<i>Mode of Contact</i>	<i>Purpose of Contact</i>	<i>Outcome of Contact</i>

APPENDIX 2: WEEKLY MEETING REPORT FOR USE BY CANDIDATES IN AQUATIC ANIMAL HEALTH (With examples from each discipline type elective).

WEEKLY MEETING ACTIVITY LOG		Fellowship Candidate Name:											Feedback from Supervisor	
Date	C	Spec	Animal / Gp ID, no in gp, age/size, sex	Problem / Clinical Syndrome**	Farm Invest	Water Quality	Necropsy (inc wet exam.)	Histo	Other lab	DIAG NOSIS	Solution proposed / undertaken** OPTIONAL	Outcome – disease control OPTIONAL	PI*	
Aquatic Animal Pathobiology candidate example														
4.6.2008	FF	Salmon	10x, Fry 1g, 10,000, 1 tank	Multi (sudden deaths)		+	+		Bact, haem	NSF or muscle lysis			JH*	
5.6.2008	FF	R. Trout	2+, F x 6	Morts, routine monitoring		+	+			NSF			JH*	
5.6.2008	M	Pac Oyster	x30, Broodstock	Routine Certification		+	+			2 x Haplo, new finding			KN*. JH	
6.6.2008	M	Pearl Oyster	x 150, 5 g spat	Post movement monitoring		+	+			Haplosporidia	Advised CVO, Regulatory control suggested	Slaughter & ring surveillance prog developed other molluscs	KE* JH	
8.6.2008	FO	Oscar												
Aquatic Animal Disease Control candidate example														
4.6.2007	FF	Salmon	1g fry, 1 tank 10,000	Sudden death	+	+	+			NSF or muscle lysis			KE*	
5.6.2007	M	Abalone		Sudden death			+	+					KE*	
7.7.2007	FO	Oscar	“George”	Skin (mass)			Biopsy+			Fibroma		No recurrence	KE*	
10.6.08	M	Pearl Oys		Haplo ID on histo	+							Slaughter & ring surveillance prog developed other molluscs	KE* JH	

* P I = Initial of Principal Investigator* (major contributor), and other contributors ** Use standard Clinical Syndromes codes

*** Coded as: Codes s= surgery; t= treatment; m = control through husbandry changes; r = regulatory action for control ; sp = surveillance program development & / or implementation

C = category of elective : FF = Fin Fish, FO = Finfish Ornamental, M = Mollusc,

Signature of Supervisor:

**APPENDIX 3: COVSIT REPORT FOR USE BY CANDIDATES IN AQUATIC ANIMAL HEALTH
(With examples from each discipline type elective).**

COVSIT ACTIVITY LOG		Fellowship Candidate Name:											
Date	C	Spec	Animal / Gp ID, no in gp, age/size, sex	Problem / Clinical Syndrome**	Farm Invest	Water Quality invest	Necropsy (inc wet exam.)	Histo	Other lab	DIAGNOSIS	Solution proposed / undertaken*** OPTIONAL	Outcome – disease control OPTIONAL	P I*
Aquatic Animal Pathobiology candidate example													
4.6.2008	FF	Salmon	10x, Fry 1g, 10,000, 1 tank	Multi (sudden deaths)			+	+	Bact, haem	NSF or muscle lysis			JH*
5.6.2008	FF	R. Trout	2+, F x 6	Morts, routine monitoring			+	+		NSF			JH*
5.6.2008	M	Pac Oyster	x30, Broodstock	Routine Certification			+	+		2 x Haplo, new finding			KN*. JH
6.6.2008	M	Pearl Oyster	x 150, 5 g spat	Post movement monitoring			+	+		Haplosporidia	Advised CVO, Regulatory control suggested	Slaughter & ring surveillance prog developed other molluscs	KE* JH
8.6.2008	FO	Oscar											
Aquatic Animal Disease Control candidate example													
4.6.2007	FF	Salmon	1g fry, 1 tank 10,000	Sudden death	+	+	+			NSF or muscle lysis			KE*
5.6.2007	M	Abalone		Sudden death				+	+				KE*
7.7.2007	FO	Oscar	“George”	Skin (mass)			Biopsy	+		Fibroma		No recurrence	KE*
10.6.08	M	Pearl Oys		Haplo ID on histo	+							Slaughter & ring surveillance prog developed other molluscs	KE* JH

* P I = Initial of Principal Investigator* (major contributor), and other contributors ** Use standard Clinical Syndromes codes

*** Coded as: Codes s= surgery; t= treatment; m = control through husbandry changes; r = regulatory action for control ; sp = surveillance program development & / or implementation

C = category of elective : FF = Fin Fish, FO = Finfish Ornamental, M = Mollusc,

Signature of Supervisor:

Aquatic Animal Health

Case scores take into account case complexity, equating 5 simple cases involving multiple fish (for example a simple parasitic infection in a cage of fish), or 10 simple cases involving single

APPENDIX 4: ACTIVITY LOG SUMMARY (BY ACTIVITY AND SPECIES)

PROCEDURE (No of cases)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Current TOTAL	Previous TOTAL	Cumulative TOTAL
FARM / TANK INVESTIGATION	Case scores*														
1. Fish – farm problem**															
1. Fish – other**															
1. Mollusc															
1. Crustacean															
1. Other															
<i>1. Elective gp if not above</i>															
NECROPSY	Case scores*														
1. Fish – production															
1. Fish – other															
1. Mollusc															
1. Crustacean															
1. Other															
<i>Elective gp if not above</i>															
HISTO / OTHER LAB	Case scores*														
1. Fish – production															
1. Fish – other															
1. Mollusc															
1. Crustacean															
1. Other															
<i>Elective gp if not above</i>															
CONTROL / TREATMENT	Case scores***														
1. Fish – production*															
1. Fish – other*															
1. Mollusc															
1. Crustacean															
1. Other															
<i>1. Elective gp if not above</i>															
Total															

fish to one complex ongoing farm or industry level problem.

**Fish – production = farmed or major wild harvest species. Fish –other = pet, display, incidental wild sample

*** There are no minimum requirements for Control and Treatment scores for pathobiology electives, or histology / other lab procedures for disease control electives, but sufficient activity is required to demonstrate the overall knowledge of the subject.

NAME: SUBJECT: DATE: Number of Cases/Activities

Signature of Supervisor:

APPENDIX 5: ACTIVITY LOG FOR USE BY CANDIDATES IN AQUATIC ANIMAL HEALTH (With examples from each discipline type elective).

ACTIVITY LOG				Fellowship Candidate Name:									
Date	C	Spec	Animal / Gp ID, no in gp, age/size, sex	Problem / Clinical Syndrome**	Farm Invest	Water Quality invest	Necropsy (inc wet exam.)	Histo	Other lab	DIAGNOSIS	Solution proposed / undertaken*** OPTIONAL	Outcome – disease control OPTIONAL	P I*
Aquatic Animal Pathobiology candidate example													
4.6.2008	FF	Salmon	10x, Fry 1g, 10,000, 1 tank	Multi (sudden deaths)			+	+	Bact, haem	NSF or muscle lysis			JH*
5.6.2008	FF	R. Trout	2+, F x 6	Morts, routine monitoring			+	+		NSF			JH*
5.6.2008	M	Pac Oyster	x30, Broodstock	Routine Certification			+	+		2 x Haplo, new finding			KN*, JH
6.6.2008	M	Pearl Oyster	x 150, 5 g spat	Post movement monitoring			+	+		Haplosporidia	Advised CVO, Regulatory control suggested	Slaughter & ring surveillance prog developed other molluscs	KE* JH
8.6.2008	FO	Oscar											
Aquatic Animal Disease Control candidate example													
4.6.2007	FF	Salmon	1g fry, 1 tank 10,000	Sudden death	+	+	+			NSF or muscle lysis			KE*
5.6.2007	M	Abalone		Sudden death				+	+				KE*
7.7.2007	FO	Oscar	“George”	Skin (mass)			Biopsy	+		Fibroma		No recurrence	KE*
10.6.08	M	Pearl Oys		Haplo ID on histo	+							Slaughter & ring surveillance prog developed other molluscs	KE* JH

* P I = Initial of Principal Investigator* (major contributor), and other contributors ** Use standard Clinical Syndromes codes

*** Coded as: Codes s= surgery; t= treatment; m = control through husbandry changes; r = regulatory action for control ; sp = surveillance program development & / or implementation

C = category of elective : FF = Fin Fish, FO = Finfish Ornamental, M = Mollusc,

Signature of Supervisor: