

# **AGD (gill issues) in Scotland – Industry perspective**

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# AGD in Scotland - Recap



Year	Occurrence
Up to 2011	Rare/intermittent cases, negligible impact
Mid to late 2011	First reports of gills challenges - AGD
2012	Multiple farms – significant impact
2013	Greatly improved situation – less sites affected – lower impact
2014 to date	.....



# 2014 to date

- Very positive situation - AGD
- Minimal issues
- Majority of gill scores <1
  - Sensitivity of sampling at this level
- However.....
  - PGD & other gill pathologies – much more challenging
  - In some cases: Impact on lice management



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# Overall scale / impact

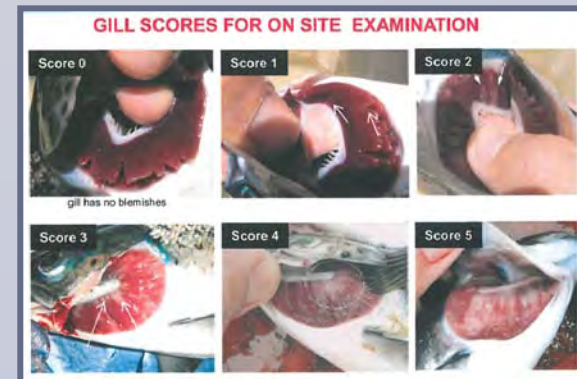
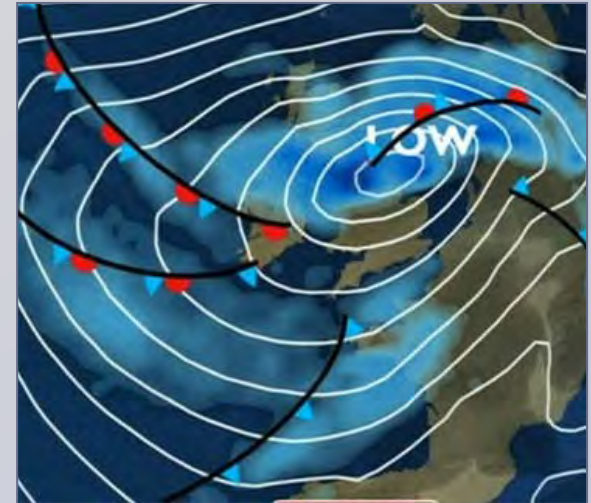
- Very difficult to assess
- Has varied from year to year
- Multiple gill challenges
  - AGD, PGD, Plankton blooms, jellyfish....
- Early intervention the norm
  - Often combined with lice management
- Increasing trend in production/tonnages



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# Lots of unknowns

- 4 years: 4 different experiences
- WHY???
- Environmental conditions?
  - Temperature, Rainfall
  - Perceived / real differences
  - Difficult to measure
- Improved management?
  - Experience & learning
- Other factors?
  - Industry growth plans
  - Lice management



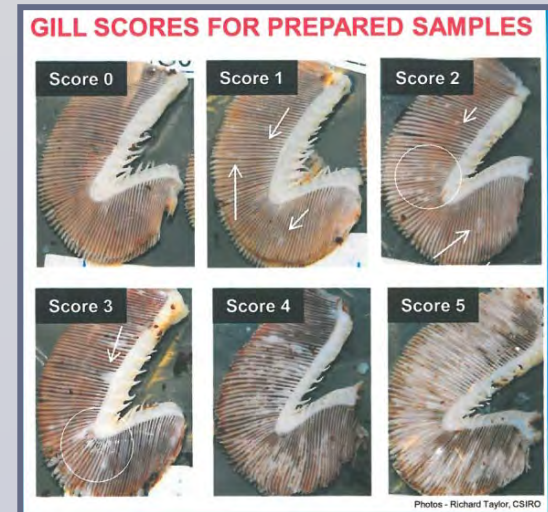
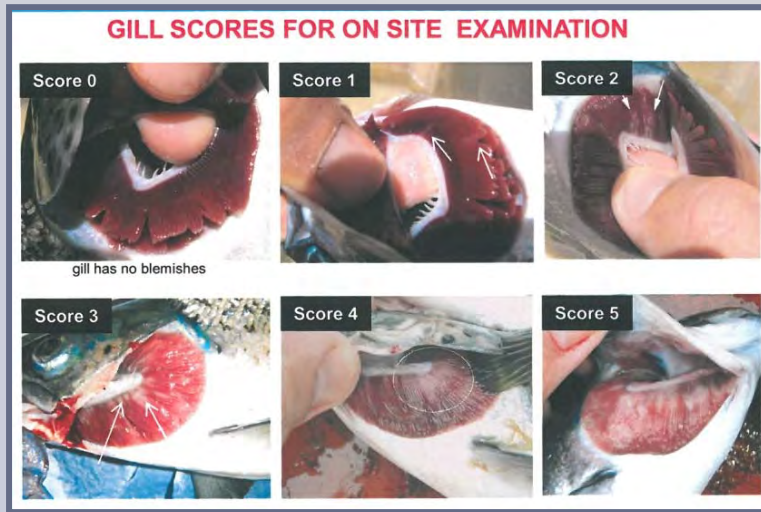
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# Industry activities 2011 → early 2014



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# Monitoring protocol



- Standardised approach (based on lice monitoring)
- Voluntarily adopted by all companies
- 6 point “Taylor” chart (Skretting)
- All gills checked: GS = highest individual gill score
- Supported by wet preps, histology, PCR



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# Information exchange

- Information exchanged across all sites (weekly)

## Stock Information

e.g. Stock type, generation

## Environmental Information

e.g. Temp, salinity

## Treatment Information

e.g. H2O2/FW, dose, duration,  
morts

## Comments

## Gill Scores



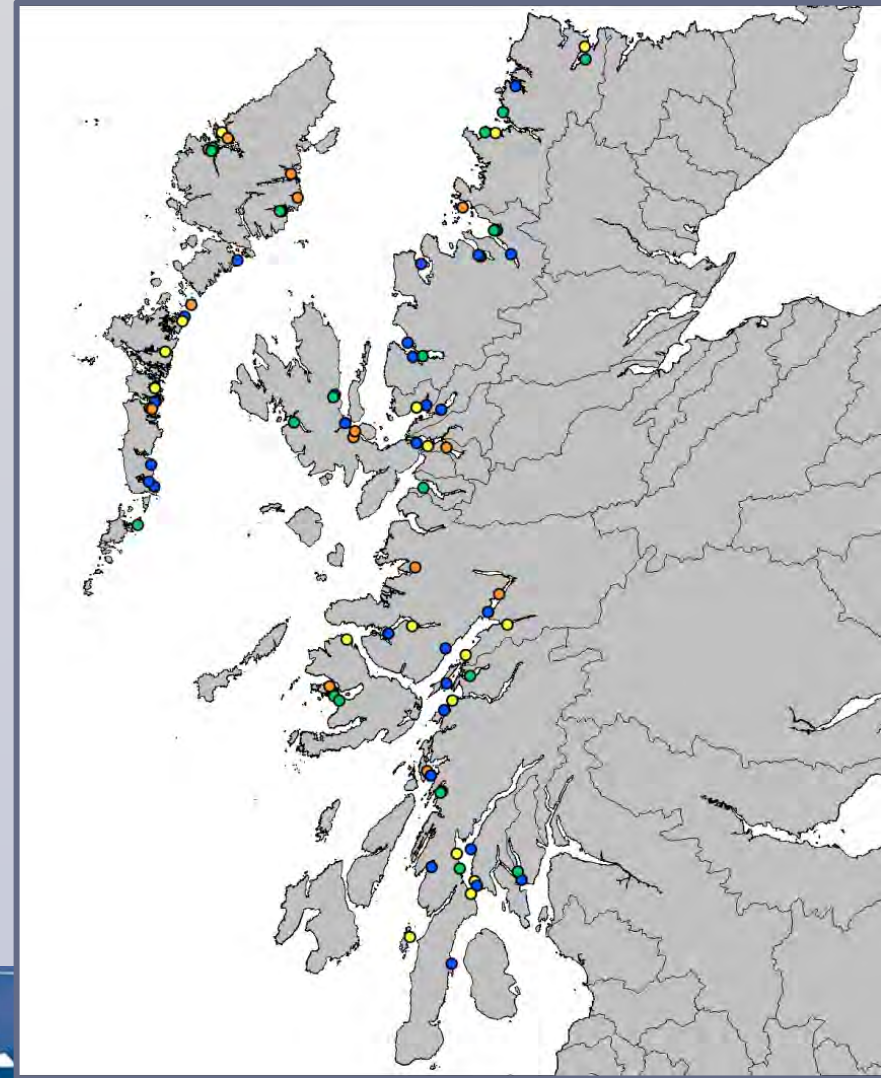
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# Summary report

- Most recent gill scores
  - Summary maps (colour coded)
  - All other supporting info
- Treatments
  - Historical
  - Recent
  - Future
- Positive feedback



# Meetings

- SSPO “Health Managers Group”
  - Company biologists / veterinarians
- Meet based on need
- Exchange experiences and current situation
- Forum for disseminating information
- Other industry meetings as required



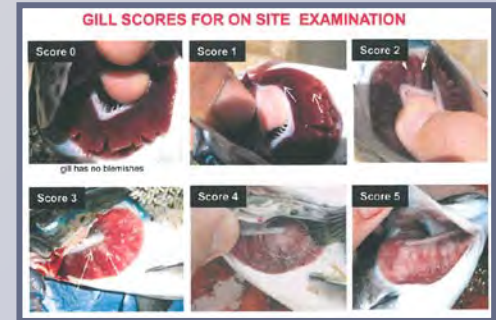
# 2014 / 2015 “Refinement”



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# Monitoring protocol

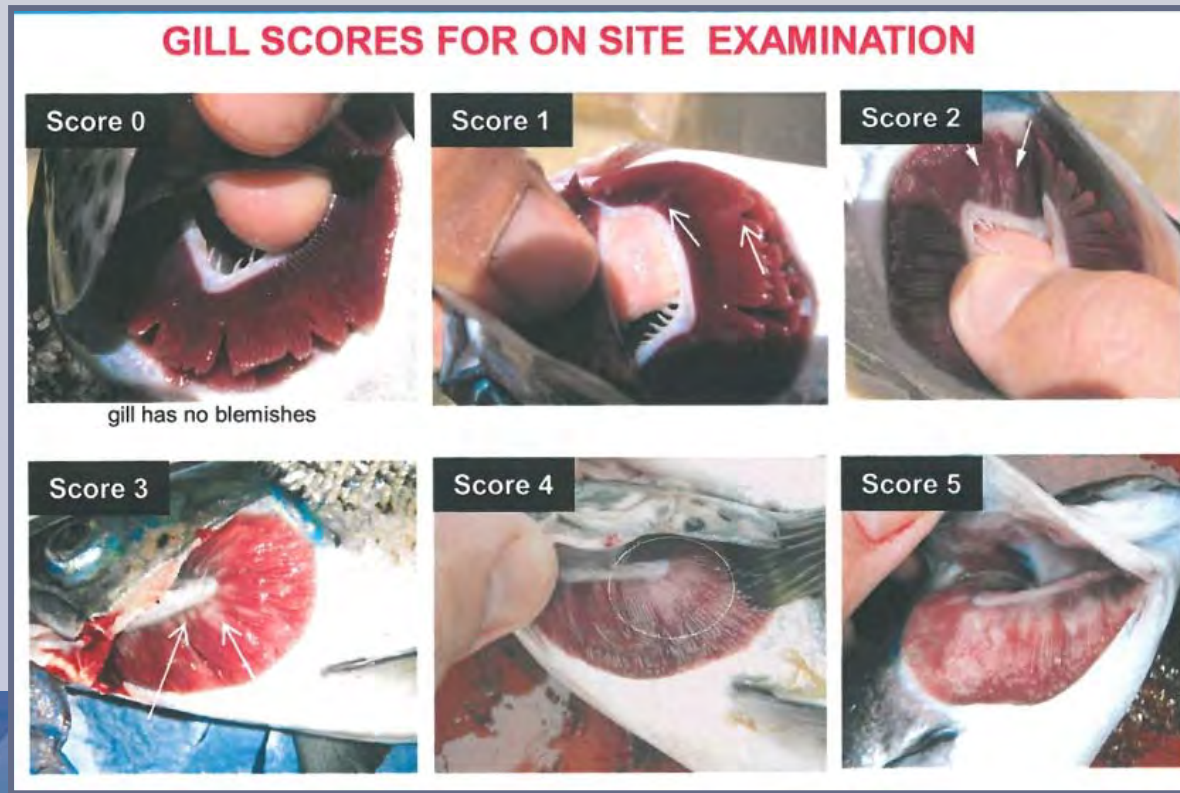
- Discussions about suitability of existing gill score (2013-2014)
  - Within Scotland
    - Working well
    - Was refinement needed (resolution)?
    - Some using it to guide an “overall” gill health score
  - GHI 2014
    - Others having same discussions
      - Industry / Research
    - Steering group discussions



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# On-farm: AGD


- Keep existing protocol for AGD
  - Works well as a practical guide



# On-farm: PGD

- Existing chart cannot assess PGD
- Agreement to clearly separate AGD and PGD
- Marine Harvest chart

**PGD Scoring Card**



**Score 1** **Score 2** **Score 3**

**Score 4** **Score 5**

- Score 1: very slight thickening OR very few lamellae affected
- Score 2: frequent thickening, but tips only
- Score 3: almost all lamellae have thickened tips and some have thickenings progressing to ~50% of the length of the lamellae
- Score 4: most lamellae have thickenings progressing to more than 50% of the length of the lamellae
- Score 5: almost all lamellae are thickened along the entire length.

Images by Ali Duce and Karl Scott, Marine Harvest Scotland

# On-farm: Other challenges

- Important in their own right
- Help judge AGD & PGD
- Hamish – Thanks!!

## Gill pathologies other than AGD



Fig. 1. Proliferative-type gill disease with white/pale patches at ends of gill filaments which are also shortened.



Fig. 2. Healed small jellyfish damage showing focal erosion and complete loss of gill filaments.



Fig. 3. Gill necrosis with bacterial (*Tenacibaculum* sp.) infection showing as yellow colouration.



Fig. 4. Small harmful jellyfish/siphonophore damage to the inner gill arch (necrosis, haemorrhage and *Tenacibaculum* sp. infection) and focal loss of gill epithelium (circle)



Fig. 5. Thickened, swollen gill filaments due to jellyfish (*Aurelia aurita*) damage.



Fig. 6. Harmful algae pathology with splitting of filaments and excessive mucus production.



Fig. 7. Haemorrhagic gills with multifocal petechiae



# Treatment



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# Treatment

Treat as early as possible



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# Hydrogen Peroxide

- Only practical option for most
  - Mainly using tarpaulins
  - Some well boats
  - Rapid site treatment (vs.FW)
  - Lice management



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# Hydrogen Peroxide

- Research

- H<sub>2</sub>O<sub>2</sub> efficacy (also lice)
- Una McCarthy + team



- 2015: Aqua Pharma / IoA / (SSPO)
  - Medicine dispersion within tarps
  - MSc students (IoA)



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# Fresh water

- Very limited use in Scotland
- One tank site (all treatments = FW)
- Others - None since 2012
- Why?
  - Availability of FW resources
    - Location/presence
    - Regulatory/ownership obstacles
  - Emergence of H2O2 / Tarps



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# Fresh water - Research

- SSPO / SARF project completed
  - Resource to support industry
    - Challenges
    - Location
    - Ownership
    - Regulatory



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# Pharma / Feed companies

- Pharma
  - Encourage search for new options
  - Challenges – technical & commercial
- Feed
  - Commercially available functional feeds
  - Continued work in this area
  - Industry supportive / encouraging



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# Future

**AGD / *Paramoeba* sp. / gill health accepted  
as a long-term challenge for Scotland**

- Continue monitoring and information exchange
- Support research / development activity
  - National and international links/projects





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Stay vigilant, avoid complacency!



*Thank you*



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