BAKKAFROST

ESTABLISHED 1968

The Finest Salmon from
SCOTLAND

Pancreas Disease & Hydrozoan Blooms

WHAT USEFUL INDICATORS CAN WE MEASURE?
WHY? INTERVENTION PRIORITY, RISK, PROGNOSIS

MEASURABLES
(LEAD AND LAG INDICATORS)

Gill health

- **AGD-RPL : amoeba count per swab** (LEAD)
- Gill pathology scoring (LAG)

Blood health

- Biomarker : serum iron, ability to make more blood cells (LEAD)
- PCV (packed cell volume) : % red cells in blood volume (LAG)

Heart health

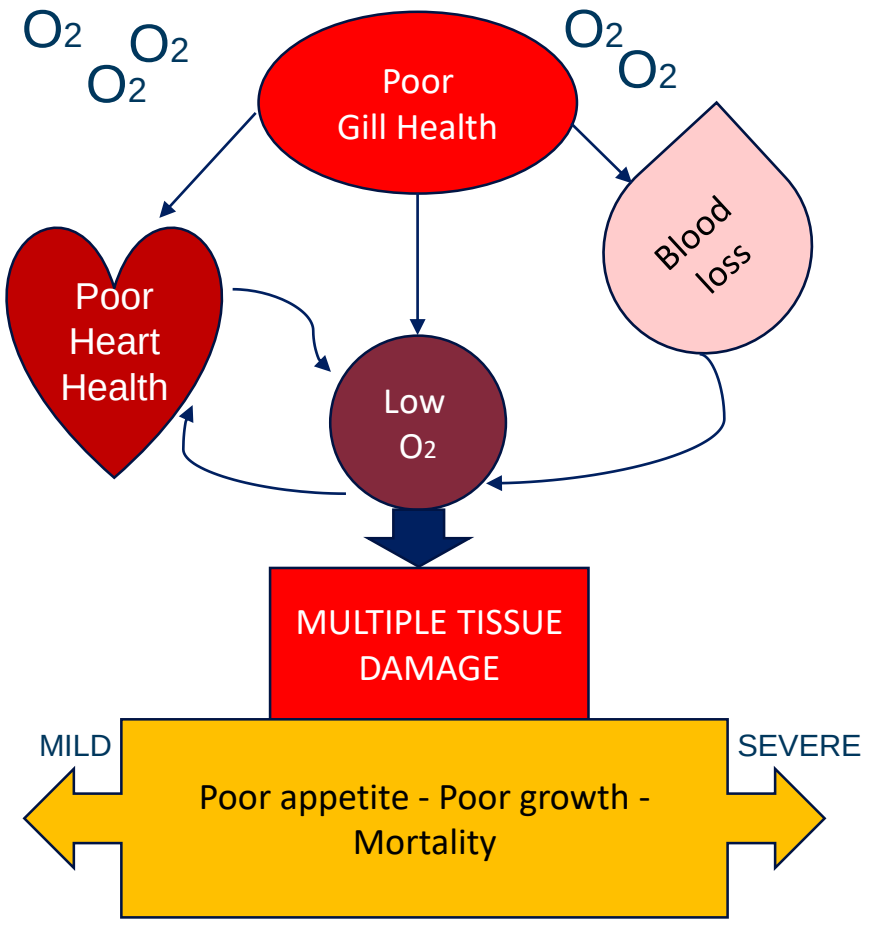
- **Biomarker CKMB : heart tissue damage** (LEAD/LAG)

Oxygen delivery

- **Biomarker Lactate** : anaerobic metabolism, compromised oxygen delivery (LEAD/LAG)

Tissue damage / stress

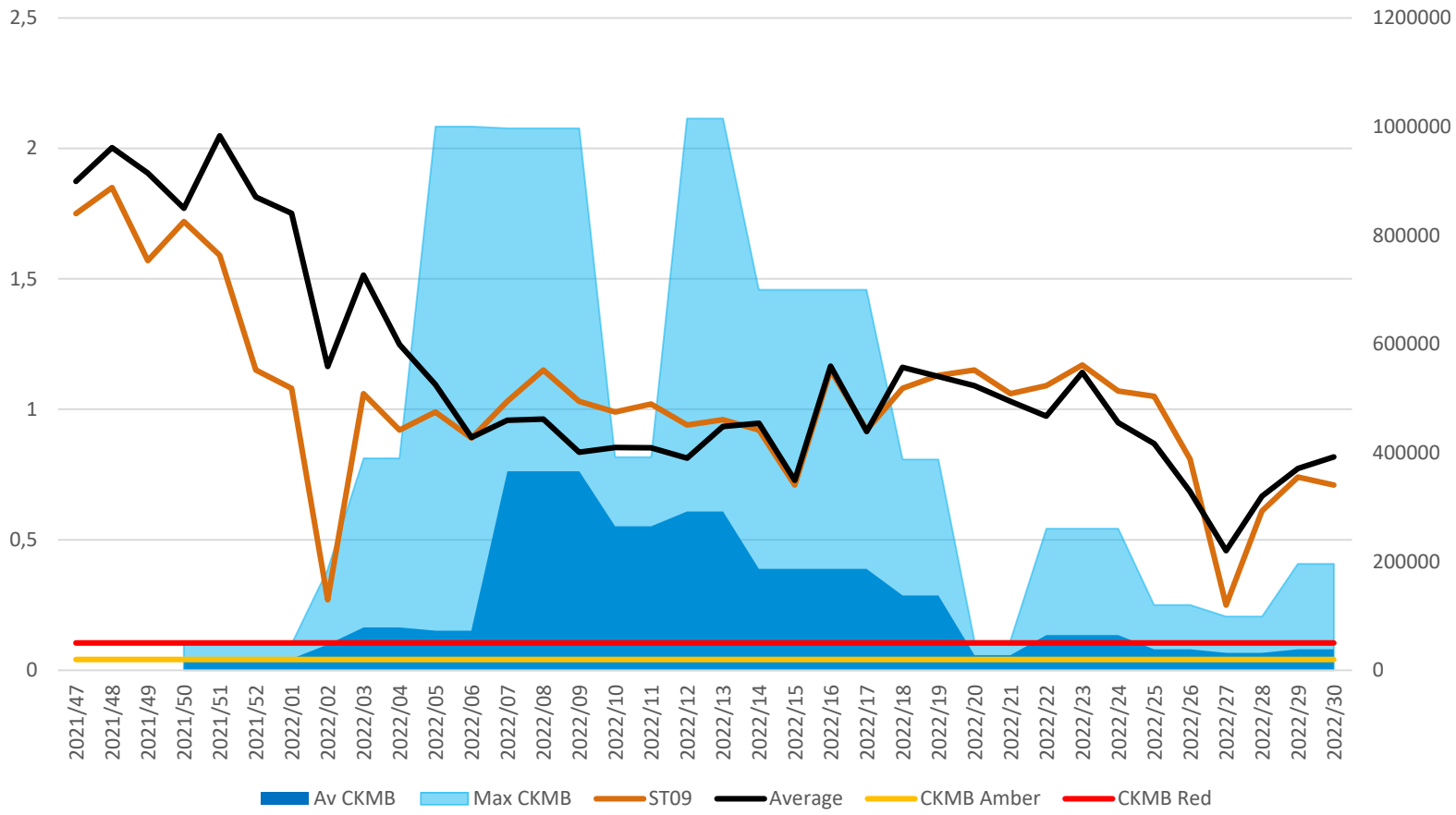
- **Biomarker Lactate** (LEAD)
- Biomarker Zinc (LEAD/LAG)
- Biomarker Albumin (LAG)
- Biomarker osmoregulation CL (LEAD /LAG)
- **Biomarkers (tissue specific) : Liver-AST/ALT, Muscle-CK, Heart-CKMB** (LEAD/LAG)



MONITORING PANCREAS DISEASE

Case Study – 21Q3

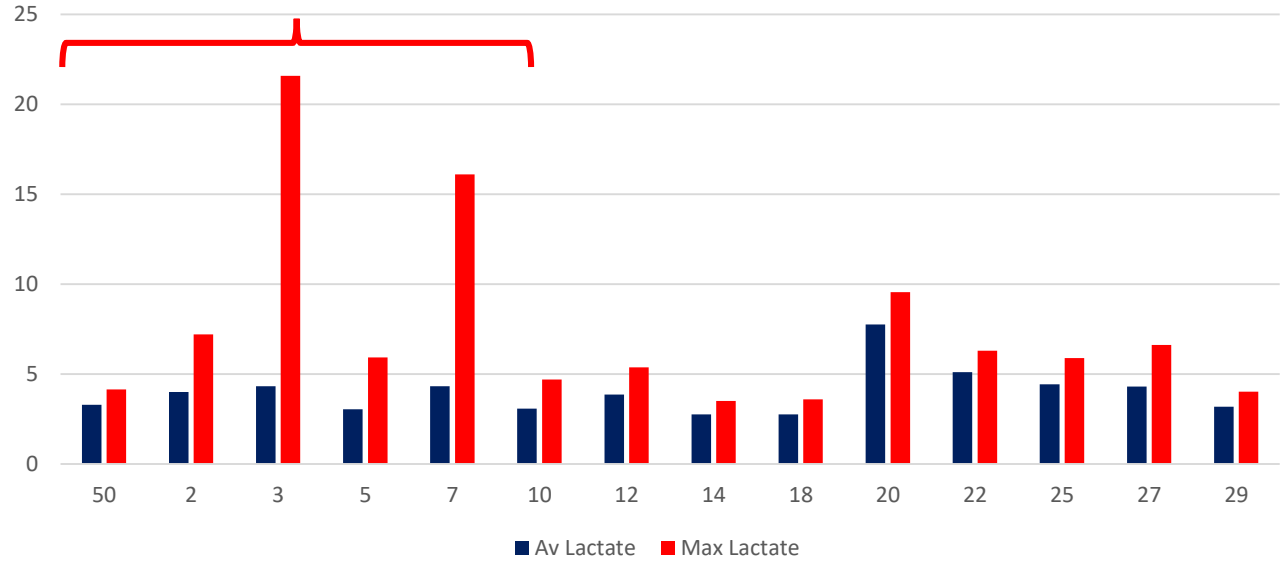
- Early suspicion of PD – 1 pen
  - Average CK MB amber
  - Max CK MB red
  - Drop in SFR
- Monitor fortnightly
- AGD present – early FW treatment
- **Maintain low stress & good gill health**
- Approx 4 months – recovery
- **Individuals with compromised heart**
  - **Risk during Q3**

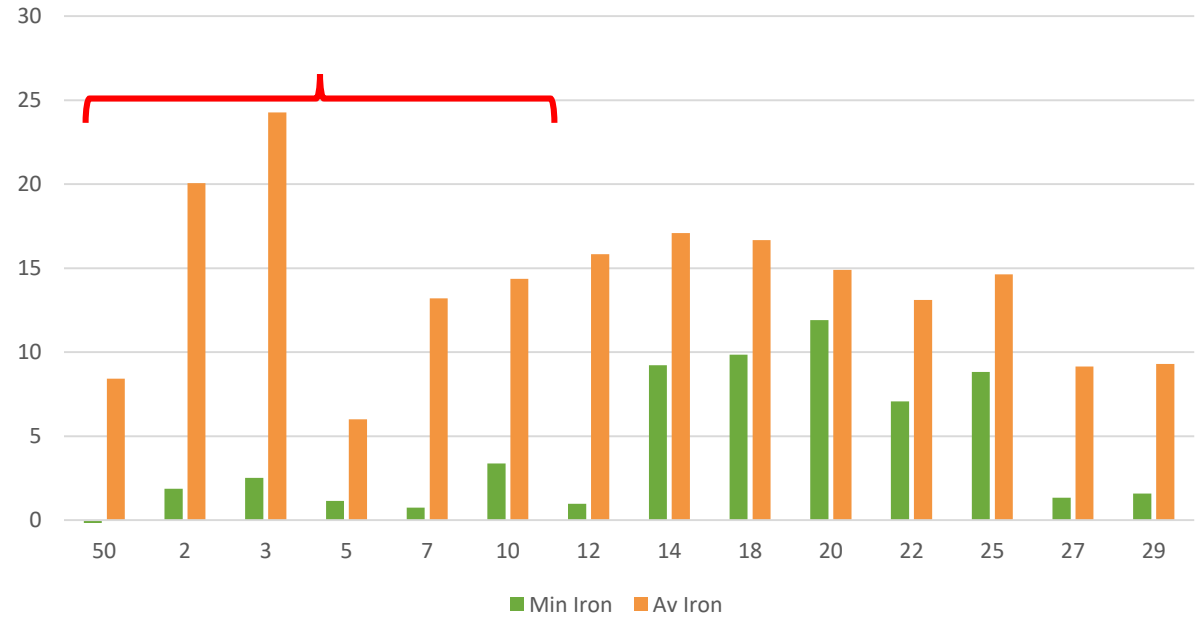


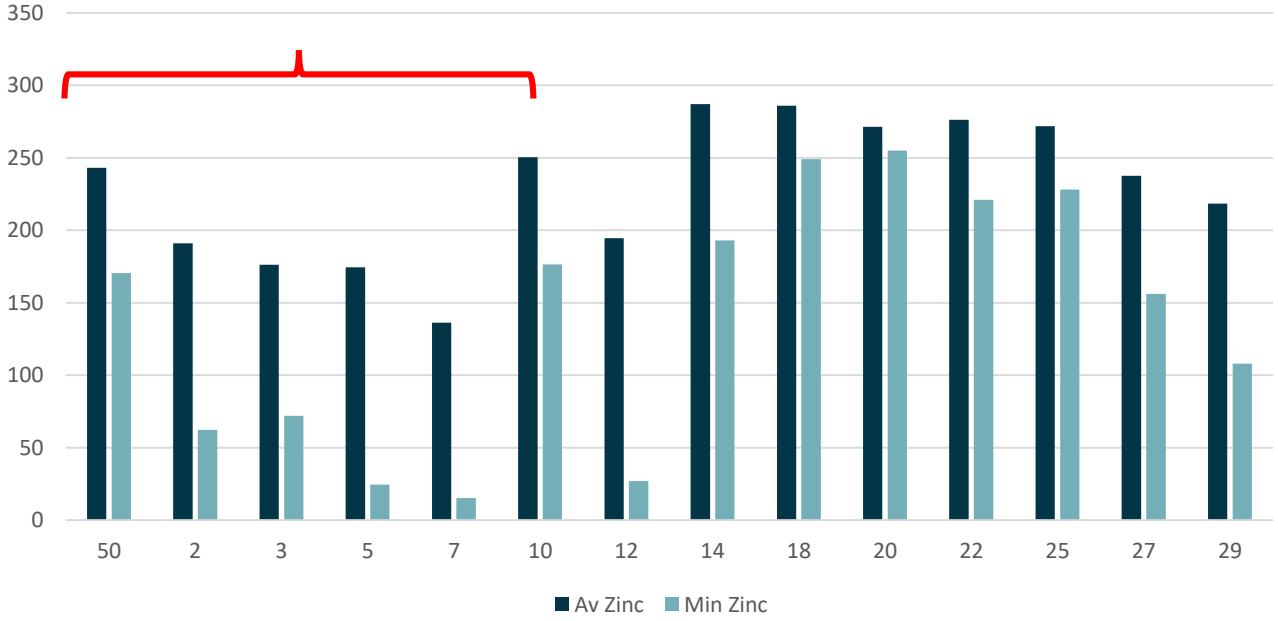
MONITORING PANCREAS DISEASE

Case Study – 21Q3

- Lactate increased
  - Managed by controlling AGD
- Zinc & Iron decreased
  - Aligns with increased heart damage

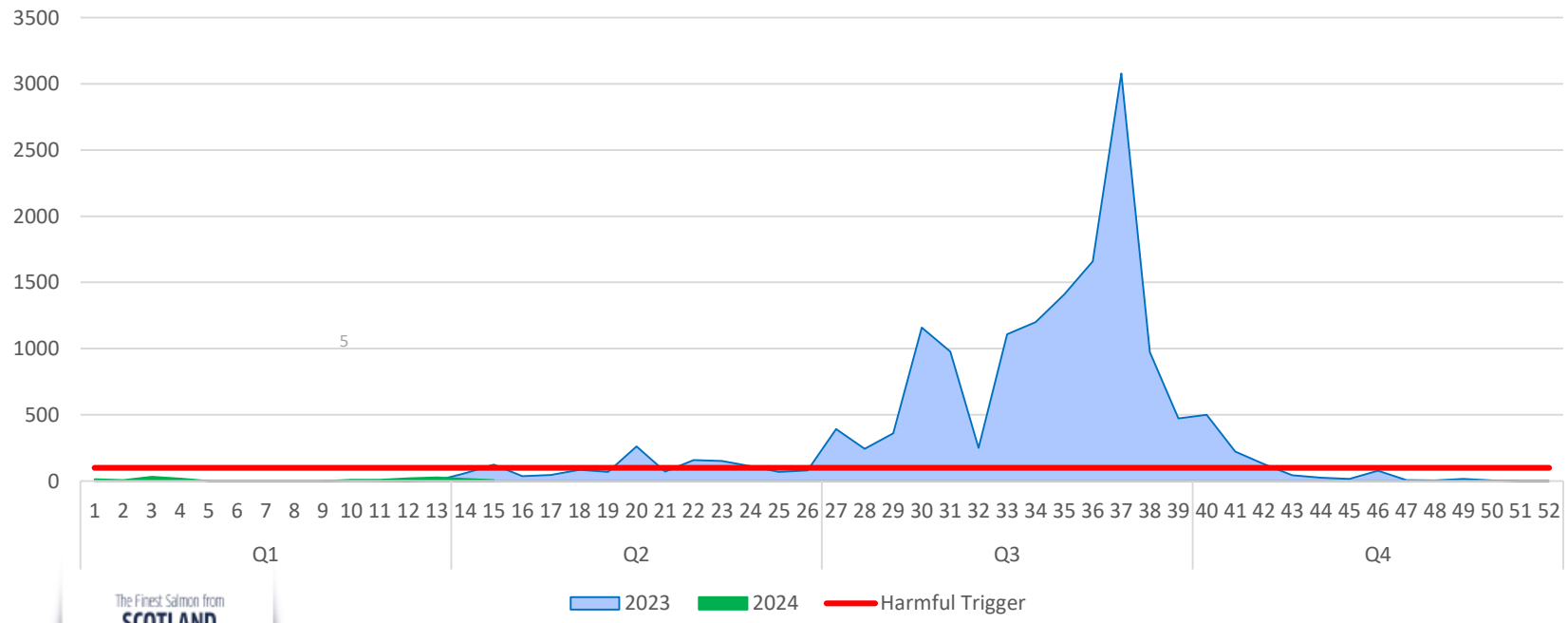






HARMFUL JELLYFISH - SCOTLAND

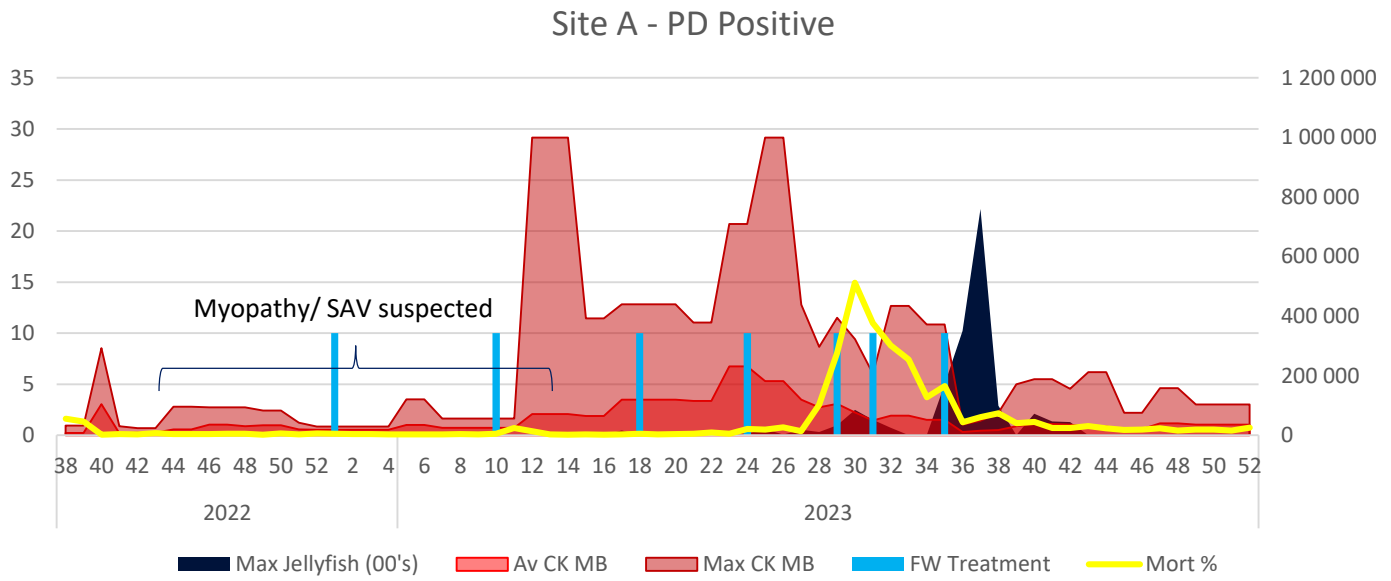
- Increasing prevalence of harmful hydrozoan blooms across Scotland
  - Muggiaea atlantica
  - Lizzia blondina
  - Solmaris corona
  - Apolemia
- Extended period of exposure – May - November
- No foolproof mitigation - exposure managed

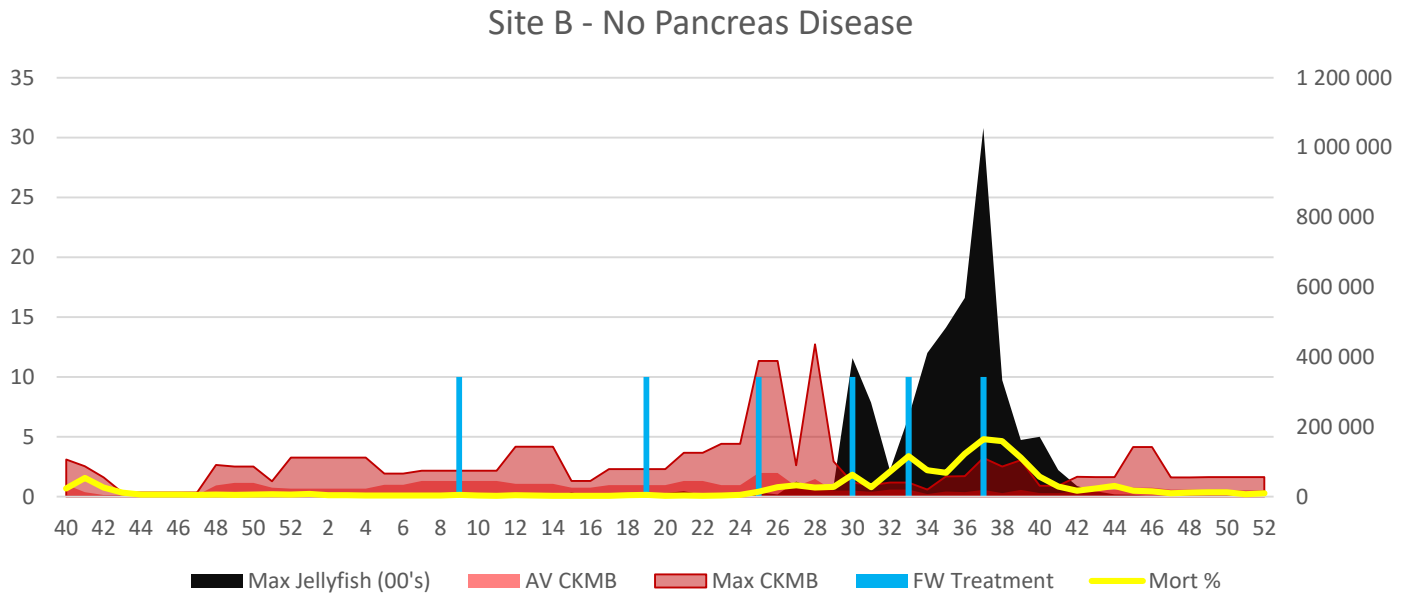


PANCREAS DISEASE & JELLYFISH

Case Study – 22Q3

- Two sites – same management area
- Site A = PD positive
  - Suspected shortly after input
    - No PCR confirmation until week 13 – 22 weeks later
  - Reduced appetite, no impact to mortality
  - FW treatments for AGD undertaken
  - Week 24 onwards = progression towards recovery
    - Still elevated CKMB/CK in % population
- Site B = PD negative
  - Some elevations in CKMB, not as severe
- Jellyfish detections from week 28
  - Site A = worse mortality outcome, lower JF
  - Site B = worse JF conc & duration, lower mortality





CONCLUSIONS

Case Study – 22Q3 - Conclusion

- **Pancreas Disease is a significant complicating factor in managing water bourne insults**

- Going forward
  - Improved vaccination strategy – based on Norwegian and other Scottish operator experiences – increased Clynav use
    - Aim to reduce viral shedding
    - Aim to reduce heart & tissue damage in event of outbreak
  - Strengthen jellyfish management policy
    - Feed suspension guidance
    - Improved mitigation techniques (skirts, bubble nets, better aeration systems, other?)

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HEALTHY LIVING

Thank you for listening

Photo credit: Scott Wilson

The Finest Salmon from SCOTLAND