TREATMENTS TO CONTROL MORTALITY CAUSED BY BKD

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INJECTABLE ERYTHROMYCIN

- Returning anadromous adult spring and summer Chinook Salmon
- Usually injected once as they are processed at the trap
- Idaho injects 10-20 mg/kg
- Intraperitoneal (IP)
- Limit prespawning mortality
  - Incorporation of antibiotic into the egg
ALTERNATIVES TO ERYTHROMYCIN?

• Injectable erythromycin has not been produced in years
• Search for a substitute began
• Other macrolides
  – Azithromycin Zithromax™
  – Tildipirosin Zuprevo™
  – Tulathromycin Draxxin®
OR RETURN TO ERYTHROMYCIN?

• Renewed interest in obtaining injectable erythromycin

• I was asked to survey PNFHPC members and others to gauge interest and potential usage for injectable erythromycin under a new INAD
## Predicted Injectable Erythromycin Use

<table>
<thead>
<tr>
<th>AGENCY</th>
<th>ROUTE</th>
<th>DOSE (mg/kg)</th>
<th>MIN # TREATED</th>
<th>MAX # TREATED</th>
<th># INJECTIONS</th>
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<td>IP</td>
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<td>1500</td>
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<td>DS</td>
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<td>21,000</td>
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DIMINISHING ADULT RETURNS

• Climate change
  – Warmer water temperatures

• Ocean conditions
  – The Blob
  – Son of the Blob
  – Godzilla

• Lower numbers of returning adults
  – Possible nutritional stress

• Implement the full integrated management program for BKD
  – High BKD segregation
ADULT BROOD INJECTIONS

DISINFECTION
100 mg/L for 30 minutes

NUTRICEUTIAL/FUNCTIONAL FEEDS
SEGREGATED RELEASES

ERYTHROMYCIN MEDICATED FEED
100 mg/kg for 28 days

ELISA-BASED CULLING
EGGS FROM FEMALES WITH ELISA VALUES ABOVE 0.25
POTENTIAL USES

• Captive broodstock
  – Multiple injections throughout life

• Other salmonids
  – Fall Chinook Salmon
  – Coho Salmon
  – Rainbow Trout
  – Cutthroat Trout
  – Brook Trout

• Warm and cool water species
  – Other susceptible bacteria
• Annual epizootics of BKD
• Outbreaks occur from June until January
• Successful treatments if diagnosed early
• Erythromycin medicated feed
  – 28 day treatment
  – 100 mg/kg/day
TREATMENT IN 2016?

- Due to the problems in getting medicated feed in 2015
- Hatchery manager preparing for treatment in 2016
- Contact feed company for availability of pre-mix of erythromycin medicated feed
- Not enough to treat half the fish for 14 days
- Contacted Dr. Moffitt
CONCLUSIONS

• Erythromycin appears to have support among conservation salmon hatcheries
• Injectable absolutely needed for captive broodstock programs
• Absolutely needed for high BKD segregation programs
• Other salmonid hatchery programs can benefit if BKD is a problem
• Potential warm and cool water broodstock uses
  – Susceptible bacteria
• Erythromycin is still used in human medicine
CONCLUSION

• Need sponsor for erythromycin
  – Feed premix
  – Injectable
• Need to develop early detection methods
  – qPCR techniques
  – Fin, water, mucus, gill
• Need to label more antibiotics for BKD
  – Draxxin
  – Aquaflor
QUESTIONS?