Perspective on the status of Parentage-Based Tagging

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What is Parentage-Based Tagging (PBT)?

• Use of parentage analysis to determine age and origin of hatchery-produced fish

• How is PBT different from the plethora of other study types which employ parentage analysis to track organisms, including salmon?
  • Scale
  • Nature of the application (i.e., questions associated with partial replacement of Coded-Wire Tag system)
Subsample of Milestones

- 2006 Peer-reviewed publication of required analysis methods
- 2010 Software implementing analysis methods developed and distributed
- 2011 Report documenting successful application in Snake River Steelhead and Chinook Salmon
- 2013 Thesis documenting successful application in Sacramento River Chinook Salmon. Peer-reviewed documentation of successful application in Snake River Steelhead
- 2014 Thesis documenting successful application in Klamath River Coho Salmon. Collection of PBT samples for all Columbia River hatchery programs initiated
- 2015 Publication of PSC-funded economic and operational feasibility study. Fishgen.net launched.
- 2017 & 2018 peer-reviewed documentation of the feasibility of PBT in BC Coho Salmon and Chinook Salmon
• Initially used 96 loci via TaqMan

• Plan to move to haplotype genotyping* via GTSeq

* C. Garza pers comm.
• Started with 2008 broodstock

• Initially used 96 loci via TaqMan

• Now using several hundred loci via GTSeq
Summary of ongoing PBT programs in the Columbia River (outside the Snake River)

- Chinook salmon
  - Sampling started 2012+ (Klickitat was 2008)
  - Same loci as Snake River PBT Program
  - 26 populations +

- Steelhead
  - Sampling started 2012
  - Same loci as Snake River PBT Program
  - 11 populations
Chinook PBT broodstocks

Not sampled
- spring
- fall

- Spring
- Spring & Summer
- Summer

Map showing distribution of Chinook PBT broodstocks with sampling data from 2015+, 2012, 2013+, and 2008+. Not sampled areas are indicated by grey circles.

Summary of ongoing PBT programs in British Columbia

• Chinook salmon
  • Sampling started 2014
  • Using 390 loci via amplicon sequencing
  • 10 populations +

• Coho salmon
  • Sampling started 2012
  • Using 490 loci via amplicon sequencing
  • 25 populations +
Summary of ongoing PBT programs on Washington Coast

• Chinook salmon
  • Sampling started 2013+
  • 14 populations
  • Samples being collected, but not analyzed yet
Features of PBT

• Efficient method for marking hatchery production. Often allows a larger proportion to be marked than would otherwise be feasible

• Increases options for population monitoring

• Shares several of the same limitations as other tag types (including CWT), and introduces additional challenges

• Provides additional, potentially beneficial, information
What has changed since the PSC feasibility review?

• GBS vs ExN: Robust GBS protocols were developed and shared. These protocols have been successfully been tested and adopted by many laboratories.

• Geographic scale at which PBT is feasible (publication of CDFO work on Coho Salmon and Chinook Salmon).
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