

Chum Salmon progress on genetic markers



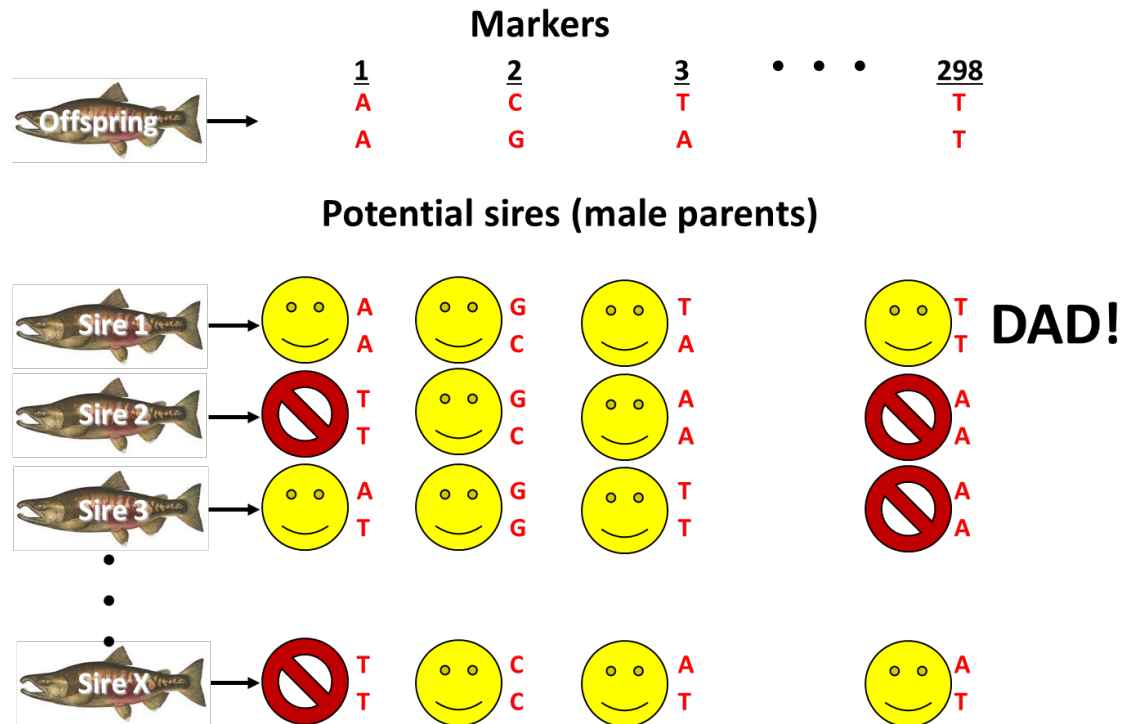
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Alaska Department of Fish and Game
AHRP Informational Meeting
March 9, 2022

Alaska Hatchery Research Program

- 1) What is the genetic structure of pink and chum in PWS and SEAK?
- 2) What is the extent and annual variability of straying?
- 3) What is the impact on fitness (productivity) of natural pink and chum stocks due to straying hatchery pink and chum salmon?

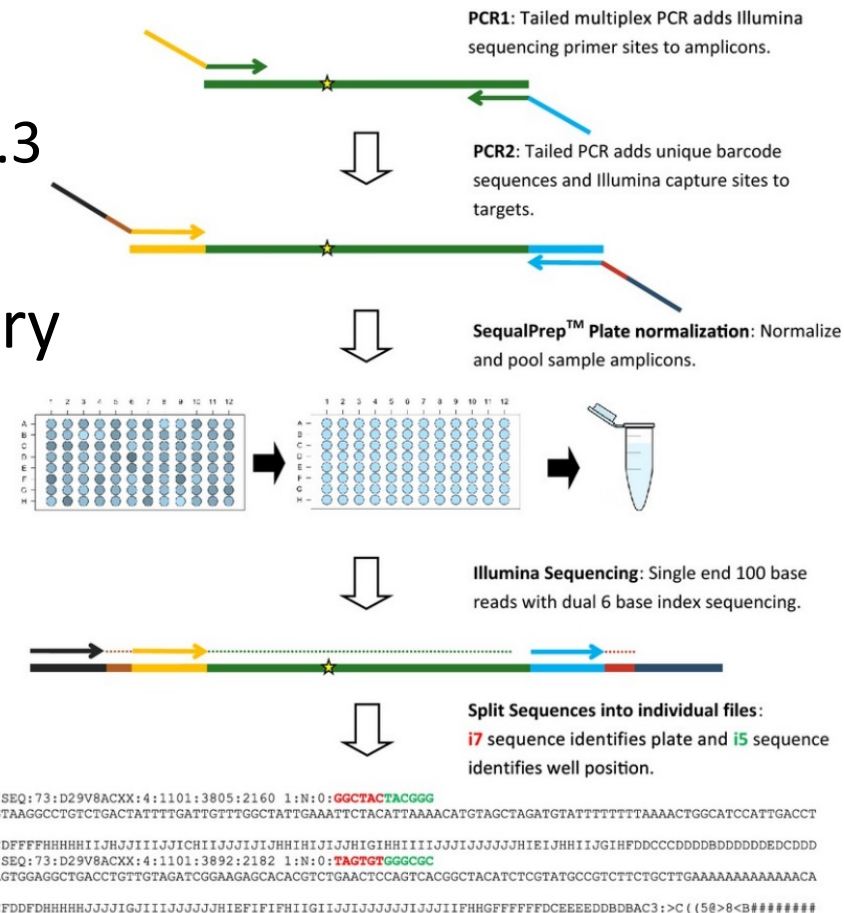
Genetic marker characteristics

- Similar needs to pink salmon markers
 - ~300 genetic markers
 - High information content: mean minor allele frequency (MAF) > 0.3



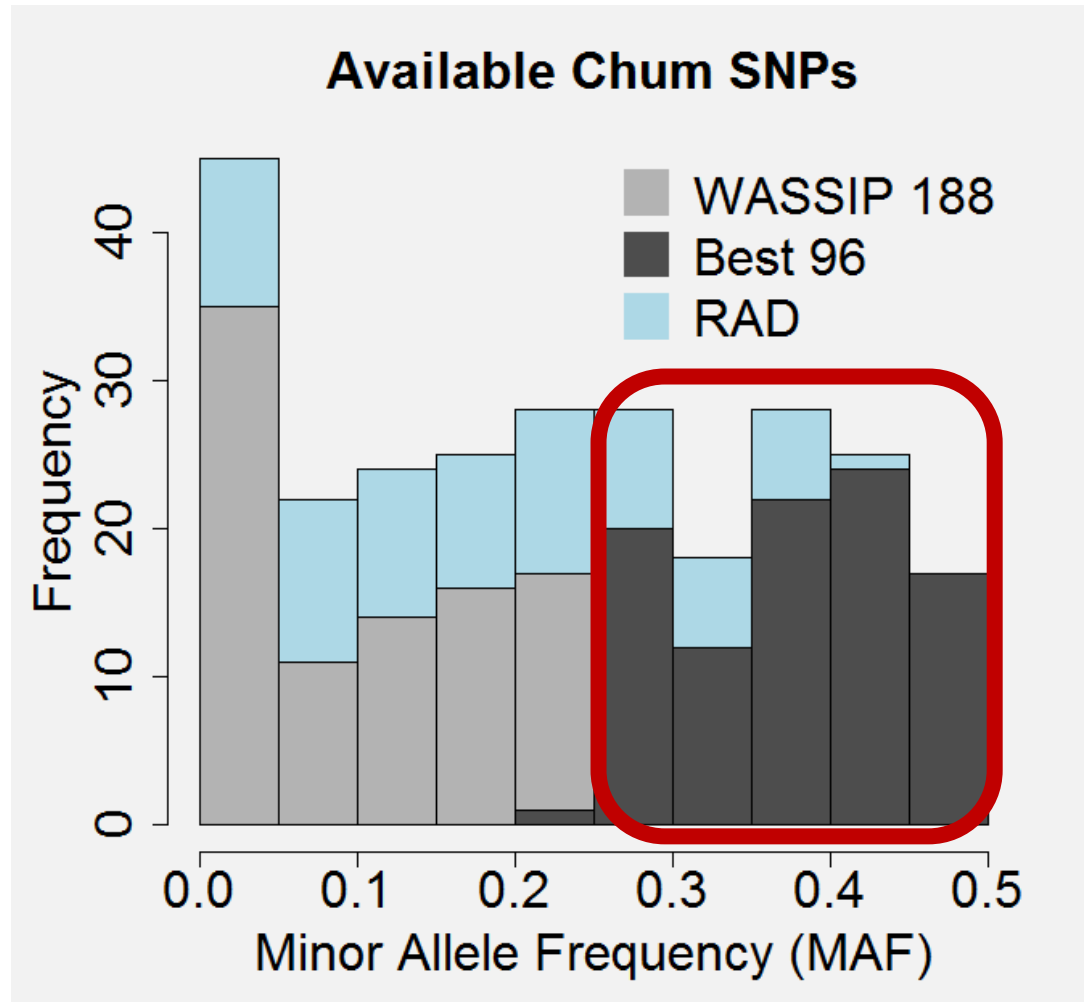
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- Ideally compatible with newer high-throughput GTseq chemistry



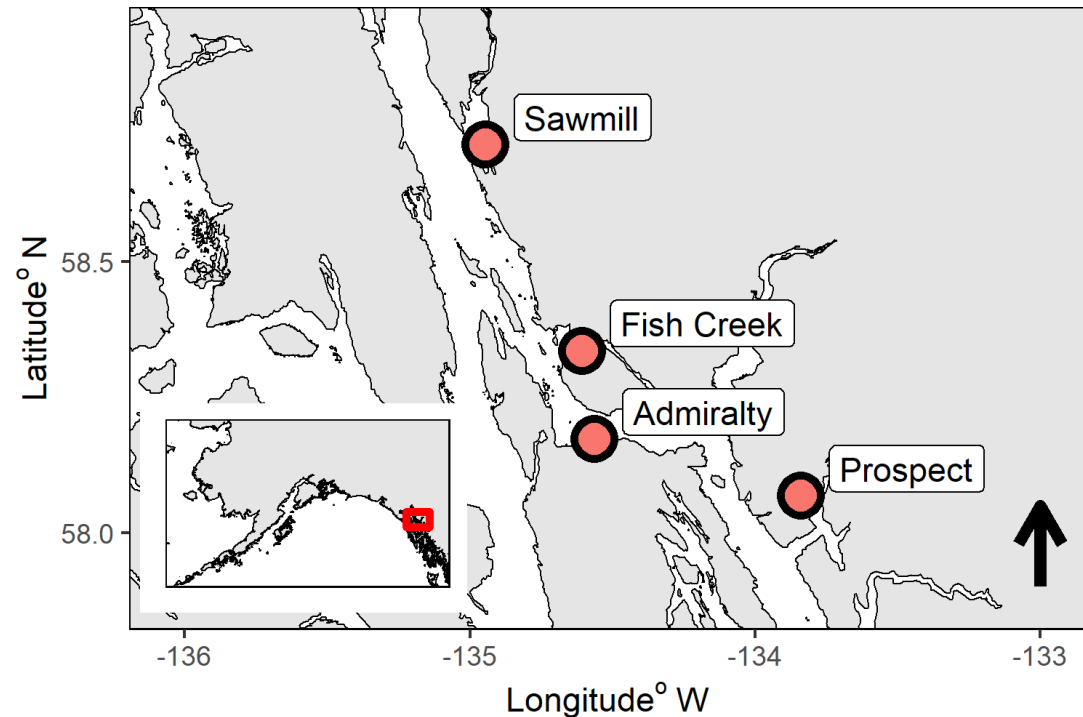
Genetic markers currently available

- TaqMan chemistry (old)
 - ADF&G “WASSIP 188”
 - UW “RAD 72”



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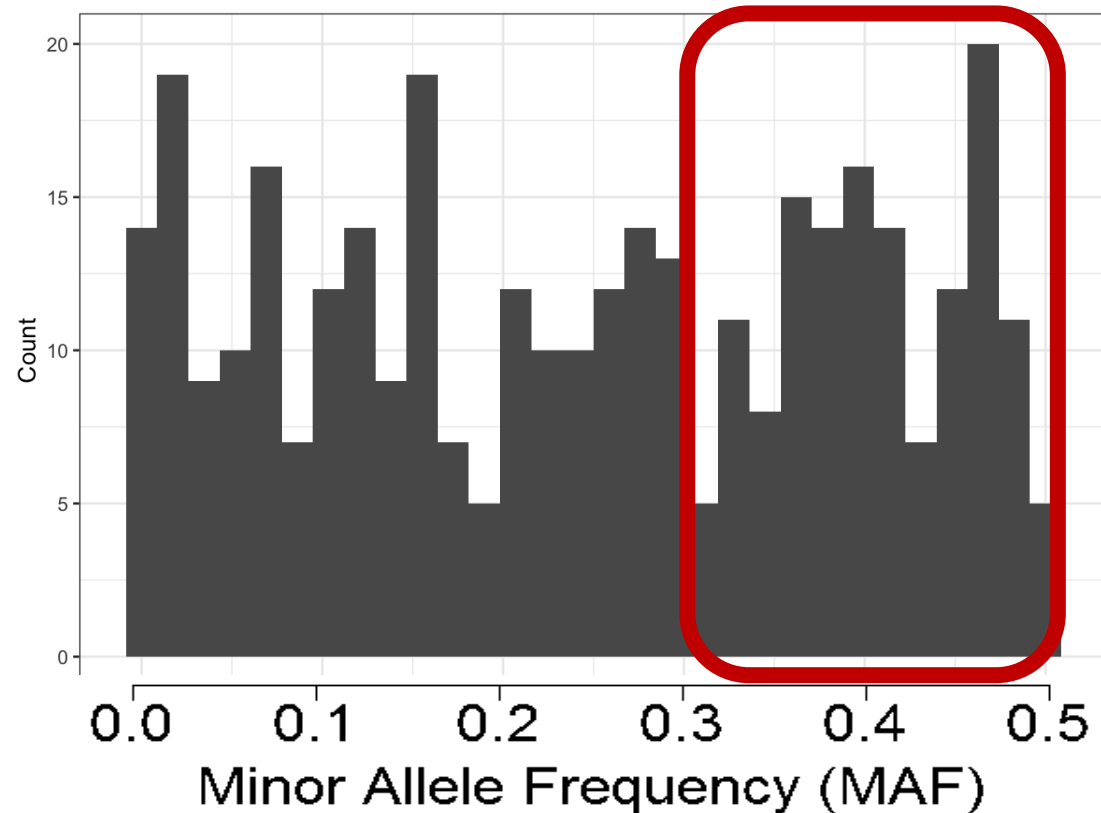
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- GTseq chemistry:
WDFW 350 SNP panel (“Oke.350”)
 - Fish Creek samples sent to NOAA for testing



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 - 61 SNPs overlap with WASSIP baseline
 - MAF > 0.3 for 137 SNPs
 - No microhaplotypes identified

Insufficient for our incomplete pedigrees



Progress and next steps

- Purpose-build a chum GT-seq panel for parentage
 - 300-400 markers
 - Single-SNP MAF > 0.3
 - Microhaplotypes, if possible
- Progress to date
 - Restriction site-associated DNA sequencing (RADseq) completed Fall 2021
 - 48 natural-origin chum from each of Fish, Sawmill, and Prospect Creeks
 - 24 DIPAC broodstock
 - 24 DIPAC hatchery strays in Fish Creek
 - SNP discovery and genotyping in progress
- Next steps
 - Filter data for high MAF loci (preferentially retaining microhaplotypes)
 - Rank loci by information content
 - Design primer sets for top ~500 loci
 - Optional: include the Best 96 and/or 137 high MAF Oke.350 SNPs (cross-compatibility)
 - Optimize panel in lab (iteratively cull loci)

Acknowledgements

- Alaska Hatchery Research Program
 - State of Alaska
 - Seafood industry
 - Private non-profit hatcheries
- Pacific Salmon Commission
 - Northern Endowment Fund
- Sitka Sound Science Center
 - Field collection
- ADF&G Mark, Tag and Age Lab
- ADF&G Gene Conservation Laboratory



Questions?



