# CKMR on SP albacore

- **Goal:**

  have an initial estimate of absolute adult abundance for SC23 in 2027 (CV of 15%)

- First sampling design conducted in 2020 based on best insights from 2018 stock assessment, updated in 2024 to account for more recent stock assessments (*which predicted a larger population)
- Design based on three years of sampling adults and juveniles (2024 to 2026)
- Additional considerations around population structure analyses, lab work

# Population Structure

- Evidence of some population structuring although drivers are unclear
- Investigation of genetic evidence ongoing using modern approaches (*DArTseq*)
- Possibly enough population structure to impact CKMR models and sampling strategy
- Sampling design accounted for the possibility that sampling would be able to access a broader pool of adults than juveniles (i.e. that some juvenile grounds would be unsampled)
- CKMR population model to include sensitivities to population structure

# Sample collection

- Sampling goal revised in 2024 to 40,000-85,000 fish in 3 years
- Sampling effort has responded effectively
- Number of kin found in initial DNA sequencing tracks well with upper end of the current sampling goals

- Distribution of samples between regions is more uneven than initially planned for
- Might bias population estimates if a key pool of potential parents has been undersampled
- Only an issue if there is fine population structure across the longitudinal axis

- Additional model uncertainty due to ongoing developments of epigenetic ageing for SP albacore (cf. some age estimate of the sampled fish are required for CKMR)

# Sample collection

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| | Mar 2025 – Feb 2026 | Project total |
|---|---|---|
| Solomon Islands | 6308 | 12957 |
| New Caledonia | 6227 | 8936 |
| New Zealand | 7076 | 19333 |
| Marshall Islands | 108 | 120 |
| Fiji | 481 | 6739 |
| Tonga | 60 | 1942 |
| Cook Islands / Samoa | 0 | 353 |
| French Polynesia | 2462 | 6767 |
| South of PF (US fleet) | 6618 | 6618 |
| **Total** | **29340** | **63412** |

Accessed from BioDaSys + Tufman2 on 6 Mar 2026

# Genetic analysis

- ~17,000 individuals sequenced in 2025, another ~15,000 to be sequenced this/next month. Still lots of effort to come.

- Sequencing process optimised
- Found 18 kin pairs (15 half-sibs, 3 PoPs)
- Less than 5% of samples rejected for QC issues
- More variance in sample collection/storage/shipping methods than desired (issue for metadata maintenance and lab handling)

# Modelling

- CKMR-based population models under development
- Similar to a 'traditional' stock assessment except it uses signal from observed kin pairs to estimate population size (instead of, e.g., CPUE and changes in size distributions)
- Developed independently from the 2027 stock assessment (although the option to include CKMR information is an objective for the next generation of WCPFC stock assessments)
- Spatial structure TBD but will be decided based on genetic evidence (i.e. it may not match the one used in the 2027 stock assessment)
- Sample ages will be derived from length (collected for all samples) and model will account for uncertainty in the length-at-age relationship
- Ageing uncertainty wasn't accounted for in the initial sampling design so it may result in more uncertainty in the final population estimate

# Final thoughts

- CKMR requires integration of best knowledge and methods across field sampling, life-history, stock structure and population modelling
- Progress across any of those fronts is a success in itself that can assist other management efforts
- A true inter-disciplinary effort!

- Sampling in 2026 is critical to the success of the project
- Population structure questions MIGHT be resolved for 2027, but accurate age estimates will remain an issue