Alaska Hatchery Research Program Science Panel meeting January 26, 2024

Hybrid meeting (in-person meeting in Anchorage and other virtual guests, connected via Microsoft Teams)

Summarized meeting notes and decision points

Attendees

Science Panel

Milo Adkison, ADF&G

John Burke, ADF&G and Southern Southeast Regional Aquaculture Association (SSRAA; retired from both)

Chris Habicht, ADF&G

Jeff Hard, Northwest Fisheries Science Center, National Marine Fisheries Service (NMFS; retired)

Ron Josephson, ADF&G (retired)

Bill Smoker, University of Alaska (retired)

Bill Templin, ADF&G

Alex Wertheimer, NMFS (retired)

Other Attendees

Bev Agler, ADF&G

Chance Gray, Sitka Sound Science Center (SSSC)

Alex McCarrel, ADF&G

Chance Gray, SSSC

Kristen Gruenthal, ADF&G

Kyle Shedd, ADF&G

Garold V. "Flip" Pryor, ADF&G

Erica Chenoweth, ADF&G

Mike Wells, Valdez Fisheries Development Association (VFDA)

Lauren Bell, SSSC

Katie Harms, Douglas Island Pink and Chum, Inc (DIPAC)

Eric Prestegard, DIPAC (retired)

Samuel May, United States Department of Agriculture (USDA)

Scott Wagner, Northern Southeast Regional Aquaculture Association (NSRAA)

Jodi Neil, ADF&G

Sara Gilk-Baumer, ADF&G

Lorna Wilson, ADF&G

Introductions and Meeting Goals

- Science Panel greetings and introductions
- Meeting Goals
  - Update on AHRP products and analyses
    - Remaining work and timeline are in the lab
      - laboratory analysis, genotyping, pedigrees, data analysis, archiving/documentation, and writing publications need to be completed for both PWS pink salmon and SEAK chum salmon
    - No more sample collection under this study design past 2023
  - Discussion and planning of final products and communications
  - Discussion of the end-of-project transition to further investigations

2023 Contractor Report

- SEAK Stream sampling summary (chum salmon) – Sitka Sound Science Center (SSSC) [PowerPoint available]
  - **Alex M.** presented the 2023 chum project field report
    - Review of project goals and history
    - Review of survey methods
      - 2 teams to maximize coverage on Fish Creek
      - Carcass surveys (as happened every year)
      - Mark-recapture surveys (this was the 3rd year)
      - Otolith and scale harvest for analysis (as happened every year)
    - 2023 Stream Survey results
      - Large chum salmon return meant significant number of samples this year compared to past years, noticeably smaller body sizes
      - Fish Creek sampling results:
        - 6,650 carcasses
        - 283 live fish
        - 6,602 otoliths
        - 6,775 scales
      - Max processed 400 fish a day; 100% sampling goal physically impossible due to large run size
      - Better weather in 2023 season compared to 2022
      - Noticed fish stranded/mortality in low level isolated pools
      - Sex ratios continued to be skewed toward female
      - Otoliths
        - 83% hatchery origin
        - Primarily from DIPAC hatchery
        - Second highest percentage of all years (2021 was highest of study years)
      - Scale data
        - Comparable to previous years; dominated by Age-4 fish
      - Body Length
        - Size decrease trend across sampling decade
        - Both sexes were under 500mm average in 2023

        - Proportion of Run
            - 39.6% of total run sampled
    - **Lauren B.** presented the "Moving Forward" section
        - Suggestions for future publications
        - Questions about Data Access
    - Discussion
        - Relationship between fish size and abundance explored; the trend of smaller size tracks with poor returns or high returns; smaller, lower weight 4-year-olds dominate the runs
        - High praise shared for SSSC accomplishments
        - **Science Panel** will need to address sampling proportion change over time within the sampling season and its effect on data analysis
            - Minimum sampling was estimated at 10% of total proportion for a given day (2023)
        - SP member requested an update on the status of the database:
            - **Kyle S.** confirmed that the website originally hosting the data portal no longer exists; a copy of the database is intact and at ADF&G.
        - **Sam M.** shared that he, **Peter W.** and SSSC have assisted in the development of the future questions to be explored and strongly support getting a Post Doc to work on the questions.

<u>Planning 2024-2025</u>

- **Bill T.** addressed the importance of archiving analyzed and unanalyzed samples; requested a status summary of all sample types and data;
    - **Bev A**. - Otoliths
        - Otoliths for pink and chum are physically in the archive of ADF&G Mark, Tag, and Age Lab (MTAL; except for pink otoliths mailed back to GCL or Cordova for PGOD event analysis)
        - All samples exist in the MTAL database
    - **Kyle S.** - Data
        - Contractor that created the hatchery wild database no longer active; copy of database housed at ADF&G
        - ADF&G created a salmon biological data warehouse that joined all the data sets together, now maintained by ADF&G, so effectively 2 copies of the data secured
    - **Chance G.** – Scales
        - Scale data typically sent to SSSC directly and then sent to ADF&G
        - 2023 Chum scale cards are at SSSC, and 2022, (mailed back after reading by DIPAC to SSSC)
        - **Decision point**: **Katie H.** will check in with the DIPAC lab, get all scales into a single unit;
            - **Bill T.** requested housing at ADF&G
            - Future conversation can be held about how best to keep them together

        - Note: keep in mind scales can now be scanned and digitized off acetate as well.
    - GCL holds all tissue samples in their physical archive and genetics database.

- **Currently outstanding analyses or products from previous years**
    - Repairing otoliths and tissue matches (PGOD event)
        - Final set of PWS salmon samples for PGOD were genotyped at the end of August, currently doing otolith-heart matching analysis now
        - Metadata in database will also be repaired after matching process complete
        - Pink RRS analysis pending the repair of the otolith matching
    - Discussion
        - Pink salmon pedigree reconstruction anticipated to be completed by early fall 2024
        - Computing power required for pink pedigree reconstruction was dramatically increased when SP made the decision to look at strays across all streams in the study
            - Currently tackling biometric challenges like finding more computing infrastructure
                - Follow up discussions with Sam M. included using a hybrid FRANz + *sequoia* approach if computing issues remain an obstacle
            - Discussion: SP member brought up interest in analysis of identifying natural straying rates but in discussion was reminded of small sample sizes leading to wide error bars

- **Design planning for Chum RRS analysis**
    - GCL has received all samples for southeast chum and the otolith reads from MTAL
        - 2023 DNA extractions ongoing
        - 2022 DNA extractions completed (all former sample years extracted)
        - **Kristen G.** has finalized the GT-seq primer panel
        - Reminder that no genotyping happened until all collections were complete so that the Science Panel had all of the information available to decide which samples to genotype; in previous meetings we decided to cast the net broadly; decision was to genotype any conceivable pedigree sample, screening out hatchery fish each year by cherry picking
        - Spring 2024, Anticipate genotyping: as of this summary, about 1,200 sequenced and genotyped. Upload for analysis pending locus-build in GCL database.
    - Discussion
        - **SP** member noted all chum age classes are included even though some are of more interest than others; the decision to run 100% of the samples was made before the scale age information was available.
    - **Kyle S.** explained that with chum salmon RRS will be more even more complex than pink salmon due to variable sampling rates across different return age

classes; the mark recapture experiment and the live/dead counts are important pieces of information; once GCL has data, **SP** input will be key to deciding the best ways to approach the analysis, as happened with the Prince William Sound pink salmon

- **Decision point: Kyle S.** will put together an overview of the data we have for chum in SE (available data on chum salmon field work, proportions sampled, and ages) and distribute it to the SP who will setup a short meeting sometime to talk about any adjustments to the design.

- **Reports and Publications**

  - Salmon baselines
    - Pink salmon - Wei Cheng (GCL) is well on her way to a final draft – completion expected in 2024
    - Chum salmon - Andy Barclay (GCL) is also making good progress – completion expected in 2024
  - PWS pink comprehensive RRS 2024
    - Given discussions today, update the timeline to having some pedigrees by summer of 2024, which will push the publication back to spring of 2025
      - Hoping to submit by fall/winter of 2024
      - **Decision point: SP** will decide authorship after review, depending on level of contributions to writing
  - SEAK chum comprehensive RRS 2025
    - Timeline will be updated on this upon the completion of the pink comprehensive and discussions on design and obtaining genotypes
    - Currently aiming for fall/winter 2025
  - Other publications or documentation?
    - Sam May's model
      - Status update: has been reviewed and resubmitted (Royal Society open science publication)
      - Interesting interactions with the review process (unexpected result of a positive demographic effect being actively disliked/downplayed by reviewer)
        - Important finding: essentially that straying into wild streams equates to more fish reproducing which equates to more fish being produced; one way to interpret it is that demographic swamping outweighs maladaptation for recruitment but still has a negative effect on diversity; begins to be a conversation about value systems (diversity or recruitment)
      - Thanks to the SP and GCL for their contributions and reviews
      - Also mentioned his fine-scale homing paper which isn't on the agenda but was reviewed by the SP and is published open access
    - Whole genome work on pink salmon
      - This paper used pink disaster funding but uses AHRP samples
      - Post doc out of Purdue doing analytical work and leading draft publication

        - Brief review of some results including difference found between hatchery and wild on Chromosome 10, believed to be associated with run timing and another locus on Chromosome 6, possibly associated with circadian rhythm, paper is still coming together.
    - GCL also pulled together some additional DNA to export to this lab for targeted long read sequencing to figure out the actual haplotypes
    - Expected timeline is a draft in the next few months
        - **Decision point: SP** will have the opportunity to review and comment, once a late-stage draft is available.
  - Discussion:
    - **Sam M.** and **Peter W.** are working on a short note-style publication aiming to quantify the total exvessel value of hatchery origin strays in PWS and how much they would be worth to catch
        - A draft will be sent around once they have it written
- Final product(s) from Science Panel
  - Synthesis of results / perspective paper
    - Past discussions raised the possibility of producing a paper separate from other project publications.
    - Discussion points
        - **Bill T.** shared a personal preference for a peer reviewed paper for the synthesis rather than only posting on ADFG website; other potential formats were mentioned such as a different viewpoints synthesis or as a panel discussion
        - **Sam M.** mentioned that Ben Americus (former meeting attendee) put together a synthesis of AHRP history and primary findings, what could have been done better in hindsight and recommendations for future programs; he created some good text, available potentially for SP to revisit when time
        - General agreement by **SP** that if there is time to get it done, would be great to do; publish as in a fisheries journal; will continue to think about what outlets might be appropriate

- **<u>Data Requests</u>**
  - Revisited SSSC Powerpoint [see Contractor report section above]
    - Review of "possible publications from these data" slide
    - Recent poster presentation at AFS was rell-received, generated interest
    - No projects active currently
  - SSSC, **Sam M. and Peter W.** support full-time 2 year post-doc position
    - SSSC has a 2-year budget proposal prepared to share
    - **Sam M.** able to support but not full-time
    - Discussions will be continued after the meeting
  - Reviewed "Data access" PowerPoint slide
    - Questions of how to access data in the future

        - Options include: refer people to ADFG or point to different repositories associated with publications
    - Current status review – everything at ADF&G, no data portal active
    - SSSC used to have full access to all data on hatcherywild.org portal
        - would share drafts of publications with SP
    - **Decision point: Kyle S.** will work with **Lauren B.** and SSSC to connect them to a copy of all the data once available on the data portal
    - **Update 2024-03-20:** ADF&G data portal to hatcherywild.org data will be publicly accessible by the end of March 2024 via a tab next to "Results" on https://www.adfg.alaska.gov/index.cfm?adfg=fishingHatcheriesResearch.findings updates

- **Timeline**
    - Last public meeting (March 2025?); Last Board of Fish presentation (March 2025?); Final Product – Symposium, workshop or other in 2025?
        - This timeline is being left to a future conversation depending on Board of Fish needs; more productive to review when we have more information
        - pink results available in March 2025 and chum not until fall 2025
        - Planning 14 months out is challenging; also might be delayed until 2026
        - Members of the public are interested in a public information meeting
        - Could be used as summary for pink results and Chum could be incorporated into a final product symposium or workshop
- **Financial Review**
    - Flip P. reviewed the Proforma budget
        - Project remains solvent through end of FY24 and beyond to FY26, though as of this meeting some numbers still need updated; items of note include the following:
            - GCL expenses going forward
            - Database storage costs going forward
            - How funds might be assigned as part of project-end events: extra meetings, travelling show in different towns
            - Post Doc position question – funding from which source and focus on core questions; should be enacted soon if so
                - 2-year post Doc position is recommended; students are much more expensive
            - Northern Fund is no longer a funding source option
        - Final expense estimates will be fine-tuned; optimally by March 2024
            - The final payments by processors and operators could be adjusted; Finance will work to identify adjustments going forward