Wrap Up and Plans

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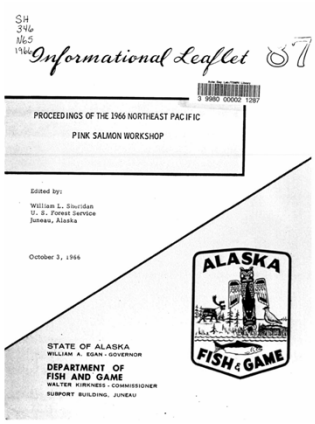
It's fun for me and I hope useful for you to look back on this occasion of the 25th workshop—it's been half a century. It's remarkable that some topics have been persistently important, that some have waxed and waned in importance, and that remarkable advances in several sciences have found their way into pink and chum fisheries science. This is an idiosyncratic review. I visited briefly Auke Bay Labs' library at TSMRI and pulled several of the Workshop's proceedings off the shelf. I chose the 1966 Proceedings (Figure 1) because it was the oldest one on the shelf and it represented the 1960s (statehood, a young ADFG, a brand new Auke Bay Lab—then a salmon science institution and the founder of these workshops). I chose the 1974 Proceedings (Figure 2) because it was the first workshop I attended (the time of cold winters before the PDO shift, depressed runs, when artificial production was beginning). And I chose the 1993 Proceedings (Figure 3) because it was the workshop I chaired and it pretty much brought us into the modern day's list of important problems. It occurred after the Exxon Valdez Oil Spill and was largely affect by it and it occurred after the seismic crash of the market for pinks and chums in the early 90s. I've tried to tie these early workshops to topics and papers in our present workshop—I apologize for missing some.

1966

Figure 1. The 1966 Workshop was the third after '62 and '64. It was chaired by Charles Meacham. Panels focused on setting escapement goals, allocating the runs to catch and escapement on abundance forecasts based on parental spawner abundance, abundance of fry,and of maturing fish in coastal waters; and on the economic condition of the fishery. Participants identified 3 priority research topics: forecasts, escapement goals, and freshwater ecology. Note the Auke Bay Lab catalog number SH 346 N65—where you can find the series of Pink an Chum Proceedings shelved.



The 1966 topics seem pretty modern. Bill Sheridan* was Rapporteur and summarized the major topics—Optimum Escapement, Forecasting, and Future Prospects. Establishing escapement goals is a current topic for us, what seems dated is his statement that they "are essential…for protection against the encroachment of foreign competition." He didn't mean competition in the marketplace for fishery products, he meant high seas competition for catch—which pretty much ended a decade later when treaty negotiations ended those fisheries. Our modern breath catches a little at the half-century-old prediction that "in Prince William Sound definition of optimum escapement will become a reality in 3-4 years". The session on forecasting included presentations on early efforts to sample fry at sea (Use of the tow net in forecasting runs of pink salmon to Kodiak…by RW Tyler, Forecasting…on the basis of fingerling catches at sea by AC Hartt, Early sea life…by JW Martin) that presage much of our workshop this year. The same session included one (by Pearson) on application of morphometry and meristics to racial studies of pinks; by the time of our workshop the problem has been tremendously advanced by the science of genetics (our papers by Sato and Araujo, eg). The '66 workshop, like ours, included presentations from prominent economists (J Crutchfield), from processors & marketers (JR Gilbert, RE Silver, W Yonker); the new world in which pinks and chums are marketed would have been a shock to them then.

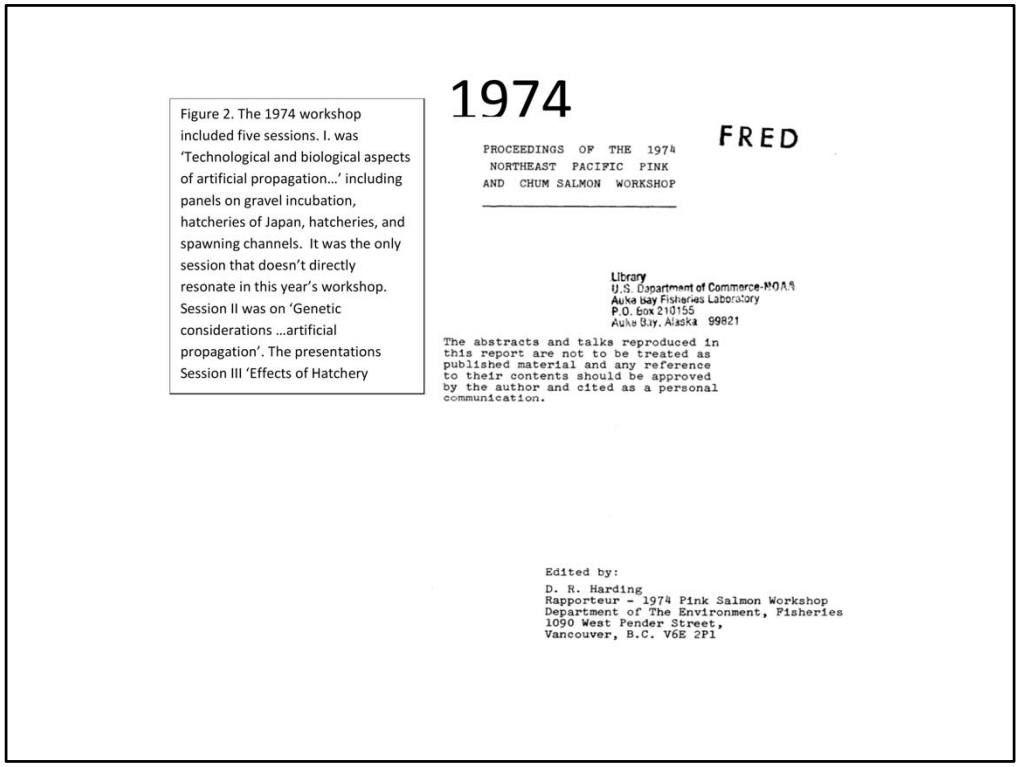
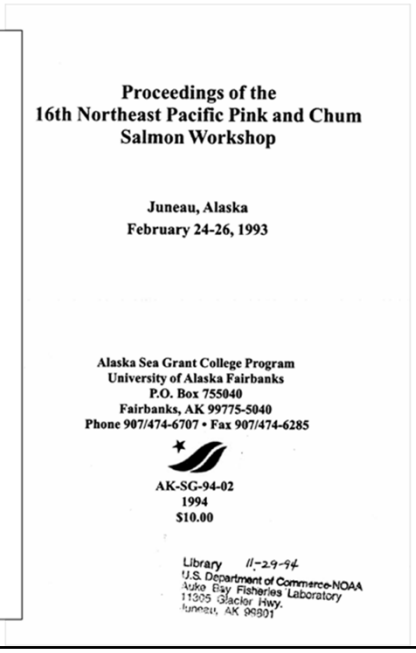


Figure 2. The 1974 workshop included five sessions. I. was 'Technological and biological aspects of artificial propagation…' including panels on gravel incubation, hatcheries of Japan, hatcheries, and spawning channels. It was the only session that doesn't directly resonate in this year's workshop. Session II was on 'Genetic considerations …artificial propagation'. The presentations Session III 'Effects of Hatchery

The 1974 workshop wasn't as concerned with harvest management but was dominated by talk of artificial propagation. It began with a Session of panels on artificial propagation: "Gravel Incubation", "Hatcheries of Japan", "Pink and Chum Salmon Hatcheries", and "Spawning and Incubation Channels". The papers reflected the technological and institutional foment of the 1970s as the modern era of artificial production, particularly in Alaska and BC, got underway. There was a short Session on genetic considerations that shows us that the modern conservation concerns inherent in artificial production were understood in outline and that they (we) had no idea how powerful molecular genetic techniques would become (in our workshop look at the amazing change in these tools reflected in the papers of Seeb, Hard, Tallmon, Sato, Araujo, Habicht). There was an "Effects of Hatchery-reared Stocks" session that was concerned with the effects of Chinook and coho hatcheries on wild stocks of pinks and chums through predation. The research theme of marine life of salmon was again well represented. There was new attention being paid to "Habitat Improvement and Protection", a theme familiar to us in this year's workshop even though the state of the art then involved removing large wood from streams (Gubernick's report on restoration at Harris River, Blair's at Resurrection Creek and Davila's on Marx Cr).

1993

Figure 3. The 1993 workshop had eight sessions. Salmon Oceanography, Enhancement Programs: Case Histories, Salmon Biology, Homing and Migration, Forecasting, Freshwater Habitat, Exxon Valdez Oil Spill, and Bibliographies



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By 1993 the workshop no longer included sessions on the technologies of artificial production. The technologies of incubation (substrate incubators) and short term rearing (estuarine net pens) had emerged, along with a few spawning channels, as the standard and the Alaskan institution of private-non-profit hatchery programs had come to predominate. And the size of artificial production, measured by the number of eggs taken and of fry released had reached the modern-day maximum. There was a session of three case histories—on Hood Canal Chum by the late Howard Fuss and Ross Fuller, on NSRAA's Hidden Falls program in SE Alaska by Bachen, and on Prince William Sound by Olsen. In our workshop we had Rabung's and Burke's historical reviews of the hatchery program in Alaska, MacDowell's report on economic impact, Doherty's on the allocation of hatchery production among fisheries.

But the '93 workshop and ours both were both significantly motivated by conservation concerns over the interactions of wild and hatchery-produced pinks & chums: The '93 Salmon Oceanography session had three papers on ecological interactions in Prince William Sound (from Cooney & his students and colleagues); and it had one on the then-emerging phenomenon of a widespread decline of ocean growth and body size measured from archived chum scales (from Helle & colleagues).

The Salmon Biology session had a paper on estuarine growth of pinks measured from otolith microstructure (Volk, et al) that, along with the Helle paper, is echoed in our workshop by retrospective studies of marine growth in archived scale structure (3 papers from Ruggerone, Agler, Wilson). That session had the first report on Gharrett's (& my) studies of outbreeding depression in hybrid pink salmon—a potential outcome of interbreeding of hatchery and wild salmon-- and a research theme that continued in our workshop two decades later with reports by Oxman, Manhard, and colleagues.

The '93 workshop had two presentations on Homing and Migration: Sharp et al reported on their heroic wire tagging study of pink populations in western Prince William Sound that seemed to demonstrate widespread straying between natural populations, which has strong effects on our present day efforts to set limits on straying of hatchery-bred fish (in the following workshop Habicht and colleagues reported a likely interference with homing from the tags themselves; the Sharp study was never published in the open literature.) And Myers reported on new models of oceanic migrations based on high seas tagging, a picture that has changed with modern genetic analysis. There were half a dozen papers in '93 in a session on Forecasting, but none of them incorporated estuarine or oceanic sampling—a departure from the early workshops not found in our workshop—we had several papers relating oceanic conditions to growth and abundance, from Orsi, Farley, Trudel. In '93 there was a 3 paper session on Harvest Management of mixed stocks (again driven by conservation concerns over effects of hatchery production on wild stocks) including a first report on the potential of otolith thermal marks by Hagen & Munk, an analysis of harvest trends in PWS by Geiger and Templin's run reconstruction of pinks in PWS. Each of these has strong echoes in the present-day proposal for hatchery-wild interaction research presented to us by Steve Reifenstuhl and by a session of papers on harvest management, particularly in the face of hatchery-produced fish (papers by Ericksen, Piston, Wilson, Shaul).

There was a large session on assessment of damage by the Exxon Valdez oil spill in 1989. This work dominated the careers of many of our colleagues for decades. Maybe we should be grateful by now that there is no session on that disaster.

Despite the then-recent crash in the market for pinks and chums there were no papers on the markets or the economics of the industry in the '93 workshop; our workshop had a session of half a dozen papers related to the modern recovery from that crash, and the role of Alaska hatchery production in it—MacDowell's report on economic impact of hatchery production, Riutta's report on sustainability certification in the marke, Riggs' on product development, Garner's and Fick's and Knapp's on world markets, Jordan's on shifts in the fishery itself.

What's new this year? I suspect that we'll hear more about Chenoweth's report on whales as predators, and Beckman's physiological tools for investigating growth energetics in situ. The large program of research on interactions of hatchery and wild pinks and chums laid out by Reifenstuhl will be a big step forward based on the tools developed over the past decades and reflected in these workshops (mass marking with otolith thermal marks to identify strays, molecular genetic studies of gene flow, quantitative studies of fitness enabled by parental analysis) if it can be funded by the proposed partnership of the State of Alaska, the hatchery operators, and the industry.

Dick Beamish's call, in his keynote address, for this workshop to grow up and become a regularly sponsored international meeting is new and timely and in my view appropriate—though discussions of protecting this meeting as an informal venue for yet-to-be-published data have occurred throughout the history of the workshop, probably at each one, and we've never changed.

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*Sheridan's own pioneering work of the early 60s on the relationship of pink run timing to geography—early runs enter colder mainland streams, late runs warmer island streams—came to my mind listening to Jeff Hard describe their new work on clock genes.