State of California
The Resources Agency
Department of Fish and Game

FISH BULLETIN 179

CONTRIBUTIONS TO THE BIOLOGY OF CENTRAL VALLEY SALMONIDS

VOLUME 1

Edited by

Randall L. Brown
Department of Water Resources
Sacramento, California

2001

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Preface

The Salmonid Symposium was organized by an ad hoc committee of state and federal fishery biologists concerned with the management of Central Valley (CV) salmon and steelhead trout (*Oncorhynchus* spp.) populations and their habitats. It was held at Bodega Bay, California on October 22–24, 1997. Topics covered included research on various CV salmon and steelhead populations, ocean fishery management, history of upper Sacramento River hatchery operations, and steelhead management policy.

Dedication

Fish Bulletin 179 is dedicated to the memory of Nat Bingham. Zeke Grader penned the text, but the feelings and inspiration come from the California community of fishermen, salmon biologists and managers.

It was about 10 years ago, the news had just come out that only 191 winter-run chinook had returned to the Sacramento River that year, when, in a call, Nat said something to the effect: "We've got to do something. This run will not go extinct on our watch." With that pronouncement, he set in motion a whirlwind of activity that, although we weren't certain in what direction, determined this magnificent run of salmon, spawning in the tributaries of the Upper Sacramento in the heat of the summer, those fish Livingston Stone chronicled more than a century before, would not be lost.

The campaign to save the winter-run began, and the eventual captive broodstock program and all of the products of that effort, was much like FDR's approach to the depression. That is, try something, do something, but just don't sit there. Nat Bingham, an ardent student of history may well have thought of that. Nat was going to do something. Initially, he considered a pen-rearing program at the National Marine Fisheries Service's Tiburon Laboratory, but after gathering the agencies and scientists together an alternate plan began to evolve. The fact that his original concept was rejected didn't bother him. He cared more that an action plan to save the run was now in motion.

Nat also knew that to save fish—again, as a student of history—the battle had to be engaged on many fronts. A captive broodstock program might prevent extinction of the winter-run, but action had to be taken to correct the problems that had led to the drastic decline of these fish. In a score of years the number of spawners had plummeted from almost 120,000 to less than 200. Litigation, lobbying Congress, cajoling farmers and water districts became Nat's almost daily activity until he died.

Nat had come from a famous old Connecticut family and started commercial fishing in the Bahamas as a teenager. He arrived in Berkeley in the sixties and shortly after that began commercial fishing salmon and albacore out of the East Bay. A few years later he ended up on California's north coast where, as a salmon troller, he began to take an interest in the factors affecting salmon productivity. He familiarized himself with the watersheds and the streams and was soon working with groups such as the Salmon Unlimited and the Salmon Trollers Marketing Association. He helped install and operate hatch box programs aimed at jump-starting runs that had nearly been extirpated from damage to the watershed. He saw first hand that logging, road building and a host

of other land use activities were decimating the runs. Unlike most of his contemporaries, he would speak out. And, he railed against what he described as the "code of silence" among those in fisheries who would not actively defend the fish. "No more silence" was his mantra.

Outspoken yes, but Nat was also a gentle person who did not see those across the table as enemies but merely people who needed to be educated about the fish, who needed to understand what the fish needed. He never personalized a fight. He was never anti-logging, anti-grazing, anti-farming, or anti-urban water usage, he was just pro-fish. He never saw winning for the fish as defeating someone else. He was the practitioner of what many now call "win-win."

He was also tireless. In the early 1980s, at the height of an El Nino, he took over as president of a beleaguered Pacific Coast Federation of Fishermen's Associations (PCFFA), a more or less coastwide umbrella group of family-based fishing organizations. Ocean conditions associated with El Nino had devastated salmon production and left the group's coffers nearly empty. Over the next decade he found himself fishing less and spending more time helping with the organization and working on battles to save salmon from the Central Valley to the Columbia. He worked with tribes and ranchers in the Klamath Basin and with the timber industry in coastal watersheds—always trying to save, to rebuild salmon runs. He built alliances with conservation organizations and he looked for opportunities to work with those generally considered his adversaries—from timber industry executives, to power companies, to heads of agricultural and urban water districts. There were few meetings on salmon where Nat was not present.

In the early 1990s seeing no end to the fight for salmon survival, Nat decided to step down as President of PCFFA, a job he could very well have held for life, to sell his boat and dedicate himself exclusively to efforts to restore salmon habitat and rebuild the runs. PCFFA was able to cobble some monies together from government and private foundation contracts and grants and put Nat on the road. For the next seven years his beat-up Toyota pickup, held together it seems by bumper stickers, could be seen up and down the Central Valley, in the Sierra or the Trinity or in some coastal watershed. Nat the salmon disciple, the crusader would be working patiently and in his quiet way to convince people to do things differently so salmon could not only survive, but thrive.

In the spring of 1998, things were looking up for Nat. Quietly working behind the scenes he was able in six-month's time to help establish a winter chinook conservation hatchery on the mainstem of the Sacramento, just below Shasta Dam. Nat called it the Livingston Stone Hatchery, a name that has stuck. Moreover, negotiations with Pacific Gas & Electric were progressing for the removal of dams on Battle Creek to establish an additional "homestream" for

the winter run. But it was also a tiring period, the Pacific Fishery Management Council meetings (to which Nat was appointed to a few years before) were particularly arduous. At the end of the April Council meeting Nat's wife Kathy was diagnosed with terminal cancer and by the end of the month she was gone. Nat kept his spirits up, but he was exhausted physically and mentally and within a week of Kathy's death, he was gone too.

Nat's life is the stuff of a great book. The important thing, however, for those of us left working for the survival of the salmon to remember what he did and how he did it—and, how he lived his life. With Nat's life as our inspiration, we will win.

Zeke Grader

In Appreciation

With the release of this Fish Bulletin, we extend our appreciation and those of our fellow biologists to its editor, Dr. Randall L. Brown. As local readers are aware, Randy retired last year from State service where he was employed for over 34 years by the California Department of Water Resources.

He will be forever remembered for his great devotion to improving our understanding of salmon biology in the Central Valley and San Francisco Bay-Delta Estuary of California. Randy's professionalism, support, encouragement and friendship to all of us in the salmon community is greatly respected and appreciated. His tireless efforts to enhance salmon monitoring and research as a coordinator in the Interagency Ecological Program, Chief Biologist for the Department, member of numerous committees related to salmon and their management, and as a leader in conducting multiple workshops, meetings, conferences, and symposiums on salmon has greatly improved our knowledge of salmon. Our progress in the area of salmon population genetics, salmon–hydrodynamics interactions, monitoring and evaluation techniques, population dynamics, data management and other fields are directly related to his personal efforts and accomplishments.

We join together to thank Randy as a friend and colleague for his excellent work and wish him the best in his retirement and all future endeavors.

Marty Kjelson
Terry J. Mills

Acknowledgements

Pulling this volume together would not have been possible without the support of Marty Kjelson and Terry Mills. We first discussed the concept over Chinese food a year or so before the Bodega meeting. Periodic meetings before and after Bodega kept me on track—to the extent that is possible.

Special thanks to the symposium presenters for converting their talks to papers. Joe Miyamoto of the East Bay Municipal Utility District receives the award for being, by far, the first to submit a manuscript.

I would also like to acknowledge several authors who did not present papers at Bodega but who were willing to contribute material to help make this a more balanced compendium.

Several anonymous peer reviewers took their valuable time to review the articles and their comments made for a better product.

L.B. Boydstun, of the California Department of Fish and Game, deserves recognition for allowing us to use the Department's Fish Bulletin series and to serve as the DFG sponsor. This is in keeping with L.B.'s long history of working with his agency, NMFS and the commercial and recreational fishing industry to scientifically manage a resource of special significance to California.

Finally, we should all thank Lauren Buffaloe (DWR) for a tremendous job of editing and formatting the articles and to Barbara McDonnell (DWR) and Sam Luoma (CALFED) for funding publication of the Fish Bulletin.

Randall L. Brown

Foreword

The impetus for publication of this Fish Bulletin came from conversations among several biologists working on salmonid issues in the Central Valley and the Sacramento-San Joaquin Estuary. These discussions centered on the idea that more information being developed about these economically, environmentally, and aesthetically important species needed to be available in the open literature. Marty Kjelson, Terry Mills and I developed the concept of a symposium followed by published proceedings. The Interagency Ecological Program's Central Valley Salmonid Team endorsed the concept and a successful symposium was held at the Bodega Marine Laboratory in October 1997.

Originally Marty and Terry agreed to co-edit the proceedings. Due to the press of other work, they were unable to take on much of the day-to-day work on the volume but did provide guidance and suggestions for ways to move the publication from concept to reality. I take responsibility for the final selection of papers and the final technical editing of the papers.

As you will find, I selected papers with varied writing styles. Some papers, such as the ones by Yoshiyama and others and by Black, are longer than would be typically found in journals. I believe they make a significant contribution to our understanding and decided to publish them without major revision. Others are more succinct and could be published in the open literature.

Those readers that attended the Bodega symposium will find that not all the papers presented have been included in this volume and that papers not presented are included. Several of the presenters were unable to find the time to prepare a manuscript. On the other hand, other authors had information of interest. The blend seemed to make the best sense in view of the objective of making a wide variety of information available to salmonid biologists and managers.

This volume also includes some material that could be considered duplicative in that two different papers may discuss the same question—for example, through-Delta survival of juvenile salmonids. I included these papers to provide different perspectives on important questions. I ask the reader to consider the papers, and the data, and reach his or her conclusions as to the interpretations. As with most difficult environmental issues, one must carefully consider all the available data before deciding to accept or reject a hypothesis.

I do recommend that you consider recommendations, made specifically by L.B. Boydstun, Peter Baker, Emil Morhardt, Wim Kimmerer and others, and John Williams about the need to (1) better coordinate salmonid related work in the Valley, the estuary and the ocean; (2) focus more on collecting and analyzing data that can be used to validate conceptual and mechanistic models; and (3) make the information more readily available in the open literature. Along those lines I suggest that symposium such as this be held every two to three years, including publication of the proceedings. Authors should not stop with publication in proceedings but should also publish in appropriate journals. Hopefully the next symposium will have more than one paper dealing with steelhead.

Randall L. Brown
Fair Oaks, California
September 1, 2001

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