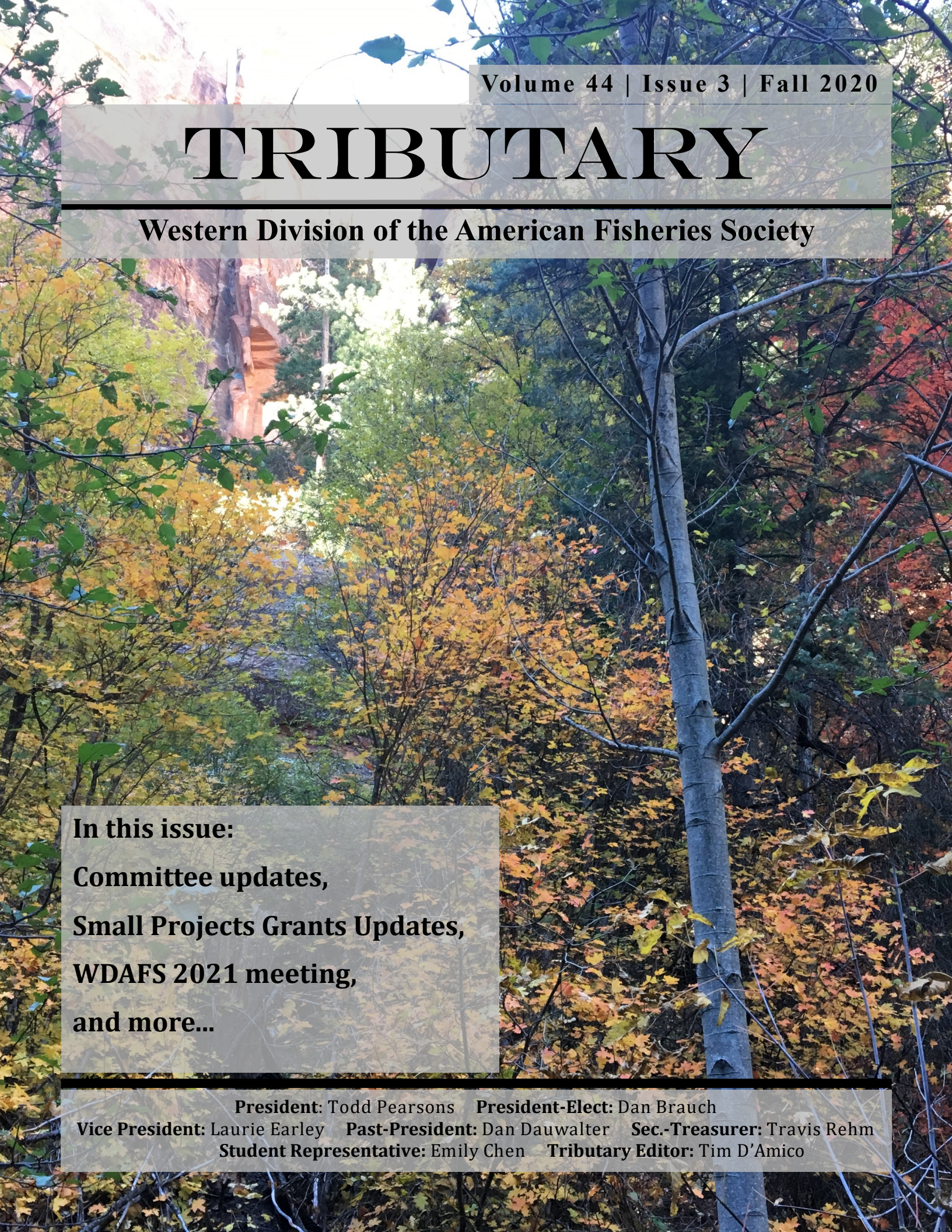


Volume 44 | Issue 3 | Fall 2020

TRIBUTARY

Western Division of the American Fisheries Society

In this issue:

Committee updates,

Small Projects Grants Updates,

WDAFS 2021 meeting,

and more...

PAST-PRESIDENT'S HOOK

Dan Dauwalter

Has it been one year already? It seems like yesterday I was kicking off my presidency by hosting the Division Excom in Boise for our fall mid-year retreat that culminated in an epic ax throwing contest. Now, in one week I hand the WDAFS baton to Todd Pearsons who will lead the Division over the next year as incoming president. It will be a challenging year, but rest assured we are in excellent hands.

I recently had an opportunity to write a blog for my employer, Trout Unlimited, and reflect on what AFS has meant to me over the past few years and over my career. I encourage you to read it (link below). We all join AFS because it is our professional home and being involved in your professional society does nothing but keep you in tune with the profession and open doors for you. Case in point, I was connected with fishery managers from Victoria, Australia to speak at their 2015 angler conference by Mike Allen (U. of Florida), and I met Mike through AFS back in my Southern Division days. Really, Australia? Wow! You'll often hear (and I was reminded recently by a colleague): "You'll get more out of AFS than you put into it." So True. And I really think the take home is reflected in my blog's title: **AFS provides a sense of community**. I found this to be so true over the past year as the Division navigated, and continues to navigate, these unprecedented times. The blog is here: https://www.tu.org/blog/american-fisheries-society-provides-tu-scientists-a-place-of-community/

Not unexpectedly, I have unfinished business. We are very close to finalizing a financial sustainability and investment plan for the Division (part of my President's Plan of Work). Following on the native fish emphasis on my plan of work, I'm hoping to revisit our scholarship program along with some endowment and fundraising options (maybe a native fish name and focus?). I'm planning to continue to pursue this over the coming year as past-president.

We are already planning for our 2021 Western Division annual meeting that will be hosted by the Utah Chapter on May 10-14, 2021. We had planned to hold the meeting in person in Ogden, Utah, but COVID will result in a vastly different flavor of meeting. As a result, the meeting will be entirely virtual. This creates a ton of complexity and challenges for meeting planning, but also provides some opportunity. Sarah Seegert, President of the Utah Chapter, and Todd Pearsons, President of WDAFS in a week, are the meeting chairs and you can be sure they are on top of it. You can expect a great meeting that helps to meet the core function of AFS: science dissemination and education of our profession.

Todd has already set the fall mid-year excom meeting in October where we'll set the annual budget and direction of our program over the coming year. It is a huge bummer that it won't be in person because it's a great time to meet and spend time with new Division excom members. Regardless, if you want to get more involved in the Division, now is the time to put your hand up. Program directions are being set and committees are being populated. You'll get to work with great people and make connections rarely possibly in your day job.

It's been a pleasure to serve you as Division President, and I look forward to the next year as past-president working with new excom members and officers under Todd's leadership. Thank you so much!

Dan Dauwalter
WDAFS President
ddauwalter@tu.org

Dan with a golden perch (yellowbelly; *Macquaria ambigua) from Victoria, Australia's Goulburn River in 2015.*

WDAFS COMMITTEE UPDATES

Resource Policy & Environmental Concerns Committee

Bob Hughes (WDAFS Resource, Policy & Environmental Concerns Committee)

Comment on the Columbia River Systems Operation draft Environmental Impact Statement

Marked declines in Columbia/Snake River salmon followed the construction of mainstem dams (particularly the Lower Snake River dams) as shown by Ebel et al. (1989), Nehlsen et al. (1991) and Huntington et al. (1996). Management of the Columbia/Snake River system is based on naive beliefs in technological fixes for sustaining fishes (Meffe 1992; Lackey et al. 2006; Williams 2006). Therefore, the WDAFS and the Idaho and Oregon Chapters have periodically commented on the need to improve Columbia/Snake River system operations (CRSOs) since at least 1999 (ICAFS 1999; ORCAFS 2000, 2020; WDAFS 2010, 2011). Those comments generally supported the repeated rejections of the Federal CRSOs and Biological Opinions issued by Judge James Redden based on his opinion that the plans failed to protect threatened and endangered fish species as required by the Endangered Species Act (Blumm & Paulsen 2013). For further insights into the decades of politicization of the CSRO science and biological opinions by federal agencies, see VanDevelder (2011). As part of its continuing concerns with the CRSOs, the WDAFS commented on the latest draft environmental impact statement (DEIS) (see hotlink). Our 4 major concerns were that USACOE's DEIS:

- Allowed too little time for comprehensive review during a pandemic
- Considered no alternative for fish passage at Grand Coulee and Chief Joseph Dams
- Preferred alternative did not consider breaching the 4 lower Snake River dams
- Preferred alternative will not achieve self-sustaining, natural origin, harvestable salmon populations

Comment on the draft Columbia and Lower Snake Rivers Temperature Total Maximum Daily Load

Excess water temperatures caused mostly by landscape devegetation, heated standing water in reservoirs and climate change have long limited rehabilitation of Columbia/Snake River salmonids (Quinn et al. 1997; Petersen & Kitchell 2001) just as it has been directly or indirectly implicated in salmon physiological stress, morbidity and mortality (McCullough 1999; Keefer et al. 2008; Caudill et al. 2013). Despite established concerns with excess temperatures for salmonids, the states of Idaho, Oregon and Washington did not determine total maximum daily loads (TMDLs) for the Columbia/Snake River. Therefore, the USEPA did so (but half-heartedly). The WDAFS reviewed the draft TMDL and found it seriously lacking in its ability to protect sustainable salmonid populations (see hotlink)—essentially recommending that the states allow salmon to go extinct. Our major concerns were that USEPA's draft TMDL:

- Minimized the effects of past & future climate change
- Ignored basin-wide pressure & stressors—particularly inflows from the Snake River in Idaho and the Columbia River in British Columbia
- Recommended that the states relax their temperature standards
- Failed to clearly define the aggregate temperature load allocation
- Failed to model the natural background temperature conditions
- Failed to develop a heat loading scheme for migrating salmon

The Washington Department of Ecology (WA Dept of Ecology) and Oregon Department of Environmental Quality (DEQ provided comments) raised similar concerns.

WDAFS COMMITTEE UPDATES, cont.

Resource Policy & Environmental Concerns Committee Report, cont.

References

Blumm MC, Paulsen A. 2013. The role of the judge in Endangered Species Act implementation: District Judge James Redden and the Columbia basin salmon saga. Stanford Environmental Law Journal 32 (87). Available at: https://ssrn.com/abstract=2051638 or http://dx.doi.org/10.2139/ssrn.2051638

Caudill CC, Keefer ML, Clabough TS, Naughton GP, Burke BJ, Peery CA. 2013. Indirect effects of impoundment on migrating fish: temperature gradients in fish ladders slow dam passage by adult Chinook Salmon and Steelhead. PLOS ONE https://doi.org/10.1371/journal.pone.0085586

Ebel WJ, Becker CD, Mullan JW, Raymond HL. 1989. The Columbia River-toward a holistic understanding. pp. 205-219 in Dodge DP (ed) *Proceedings of the International Large River Symposium. Canadian Special Publication in Fisheries and Aquatic Sciences 106. Department of Fisheries & Oceans. Ottawa.*

Huntington C, Nehlsen W, Bowers J. 1996. A survey of healthy native stocks of anadromous salmonids in the Pacific Northwest and California. Fisheries 21:6-14.

ICAFS (Idaho Chapter of the American Fisheries Society). 1999. Resolution of the Idaho Chapter of the American Fisheries Society on the role of dams and Snake River Salmon and Steelhead recovery. The Tributary 24(3):2.

Keefer ML, Peery CA, Heinrich MJ. 2008. Temperature-mediated *en route migration mortality and travel rates of endangered Snake River sockeye salmon. Ecology of Freshwater Fish 17:136-145.*

Lackey RT, Lach DH, Duncan SL (eds.). Salmon 2100: the future of wild Pacific salmon. American Fisheries Society, Bethesda.

McCullough DA. 1999. A review and synthesis of effects of alterations to the water temperature regime on freshwater life stages of salmonids, with special reference to Chinook Salmon. USEPA, Seattle.

Meffe GK. 1992. Techno-arrogance and halfway technologies: salmon hatcheries on the Pacific coast of North America. Conservation Biology 6:350-354.

Nehlsen W, Williams JE, Lichatowich JA. 1991. Pacific salmon at the crossroads: stocks at risk from California, Oregon, Idaho, and Washington. Fisheries 16:4-21.

ORCAFS (Oregon Chapter of the American Fisheries Society). 2000. Resolution of the Oregon Chapter of the American Fisheries Society on Snake River Salmon and Steelhead Recovery. Piscatorial Press Spring:12-14.

ORCAFS (Oregon Chapter of the American Fisheries Society). 2020. Comments and questions regarding Columbia River Systems Operations draft environmental impact statement. Available at: http://orafs.org/wp-content/uploads/2020/04/OR-AFS-Snake-R-Dam-Letter-4-13-2020.pdf

Petersen JH, Kitchell JF. 2001. Climate regimes and water temperature changes in the Columbia Rivr: bioenergetic implications for predators of juvenile salmon. Canadian Journal of Fisheries & Aquatic Sciences 58:1831-1841.

Quinn TP, Hodgson S, Peven C. 1997. Temperature, flow, and the migration of adult sockeye salmon (Oncorhynchus nerka) in the Columbia River. Canadian Journal of Fisheries & Aquatic Sciences 54:1349-1360.

VanDevelder P. 2011. The reckoning: a looming decision on endangered salmon will set the stage for momentous battles over the future. The Oregonian. Available at: https://www.oregonlive.com/opinion/2011/02/

WDAFS COMMITTEE UPDATES, cont.

Western Native Fishes Committee

Luke Schultz & Tim D'Amico (WDAFS Western Native Fishes Committee)

The Western Native Fishes Committee is continuing our push to update the western native fishes database between bouts of a busy field season for most of our members. For those not familiar with the western native fishes database or our updates, we are compiling updated spatial distribution data with relevant recent literature by species for a suite of over 250 native fish taxa across North America (available here: https://databasin.org/search/#query=western%20native%20fishes). When this project is finished, we envision this database as a central repository for WDAFS members, as well as the public, to find information for a given species. As always, should you be interested in helping with the database, or any other WNFC endeavors, please feel free to email us.

Early Career Professionals Committee

Alexander Tasoff (WDAFS Early Career Professional Commitee)

AFS conferences provide many opportunities for early career professionals (ECPs). These prospects include networking, recognition, and even job interviews. Our recent AFS conference absolutely supported ECPs by dedicating an entire day to them!

Perhaps the most important aspect of that day, if not the entire week, was performing mock interviews with ECPs. Oftentimes, employers ask very difficult interview questions to judge the responses of interviewees. Our volunteers helped ECPs know how to counter these questions, thereby increasing their chances of a successful interview event.

Two grants were awarded to ECPs for attending the AFS conference this year. Furthermore, to award one of them, we guided an ECP through registration into AFS! Any ECP wanting to join AFS is encouraged to contact our committee to learn more about enrollment. Welcome, and congratulations to our AFS Virtual Meeting Attendance Grant winners!

Because of the outstanding AFS conference workshops we are postponing our first webinar until later this fall or winter – likely in November. If you want to co-host, be a presenter, or have topic ideas please contact our committee (atasoff.wdafs@gmail.com). Topics should relate to ECP or student development, job searches, etc. in fisheries. We hope to speak with you in the near future!

WDAFS COMMITTEE UPDATES, cont.

WDAFS Early Career Professional Grant Winners

Alexander Tasoff (WDAFS Early Career Professional Commitee)

Cat Adams – Colorado State University, Fort Collins

I first started participating with AFS through the Colorado State University student chapter while pursuing my undergraduate degree there in Fisheries and Aquatic Sciences and Conservation Biology. Immediately, my experiences and network formed through the community fostered my personal and career growth through meetings, club activities, and mentorship opportunities which provided invaluable experience.

I have been very fortunate to have these experiences and relationships lead to the work I have done studying early life stages of Razorback Sucker for my Master's degree and currently a Research Associate position studying native Johnny Darter in South Platte streams.

I have always loved the opportunity to learn of all the current work going on in our field and to share the work I have done with others at AFS meetings. My career goal is to provide functional aid and/or guidance, either through research or direct management, of native aquatic ecosystems, a goal I believe cultivated by the sharing of information at AFS meetings and publications.

Arturo Ramírez-Valdez – University of California, San Diego

I am very proud to be part of AFS. I have been looking for the opportunity to attend the AFS meeting; that opportunity will come to the realization this year.

I have participated with the Mexico chapter in the past, now as a graduate student at SIO, I am participating with WDAFS. Something I particularly appreciate about the AFS is the inclusivity and supportive attitude towards its members. The AFS' commitment to inclusivity is apparent in both its international presence and commitment to a diversity of specialties within the fishery science. Acknowledging the importance of being inclusive beyond political borders is an issue that I am passionate about since many of the critical issues in fishery management require cross-border collaboration.

My research analyzes how political borders impact our understanding of marine resources, affect management goals, and undervalue conservation efforts. Specifically, in the case of the endangered giant sea bass, I have found that extremely strong asymmetry exists in management, scientific knowledge, and economic inputs across the U.S. – Mexico border. This mean that political regulations have both hidden and created illusions of false historical population collapses, and the total population size is likely higher than previously estimated.

I am very grateful to the WDAFS for supporting students like me. I am inspired to work harder and further my commitments to research.

WDAFS COMMITTEE UPDATES, cont.

Species Spotlight

Alexander Tasoff (WDAFS Early Career Professional Commitee)

California Spiny lobster (*Panulirus interruptus)*

Weighing up to 11.8 kg, the California spiny lobster is currently the largest, extant member of Palinuridae (CDFW, 2018). This species is found in temperate waters from Monterey Bay to Magdalena Bay. Many people assume that lobsters are shallow water creatures. However, this lobster mates in very deep water, and a fecund female can brood up to 800,000 offspring (CDFW, 2018).

The lobster is a keystone species in rocky reef ecosystems. Their opportunistic feeding behavior removes excess algae, invertebrates, and carcasses from rock-strewn seafloors. Lobster predation contributes to maintaining low urchin densities (*Strongylocentrotus sp.) in kelp forests on small spatial scales (Nichols et al., 2015). Those effects suppress urchin grazing on macroalgae, and thereby expands foraging habitats for various invertebrates or fishes (Tenger and Dayton, 2000). Even urchins benefit from the predation, ironically, since lower densities may reduce the occurrence of density-dependent impacts like disease (Lafferty, 2004). Lobsters themselves feed many charismatic marine creatures too. The endangered Giant sea bass (Stereolepis gigas) and California sheephead (Semicossyphus pulcher) devour lobsters of different lengths (CDFW, 2018). Of course, the long-term major predator of lobsters are people.*

California has improved its management of lobster fisheries over the past 100 years (CDFW, 2016). Strict gear regulations allow commercial and recreational fishermen collect lobsters in a sustainable manner. Commercial fishermen must use pots with a soak period of 9 days at most. These pots must have escape hatches for undersized lobsters (CDFW, 2019). Similarly, recreational fishermen can use no more than 5 fishing-hoops with a soak period of 2-hours at most (CDFW, 2019). Technical regulations are implemented to allow juvenile lobsters to mature and reproduce at least once per lifetime (CDFW, 2018). Landed lobsters must exceed a carapace length of 8.25 cm and number to 7 individuals at most per fishing trip *(CDFW, 2019). Also, fishermen are issued a Lobster Report Card that facilitates fisheries-dependent data collection (CDFW, 2019).*

Currently, lobster stocks are considered stable (CDFW, 2016). Incidental catch of undersized lobsters, and other marketable species, is minimal (CDFW, 2016). Furthermore, during 2019, commercial fishermen landed 411.7 tons of lobster from California waters (CDFW, 2020). Lobster fishing issues may occur in the recreational fishery though. Recreational fishermen may underreport landings or tamper with information on *Lobster Report Cards. There was concern of how stray pots may entangle marine mammals in ropes (MBA, 2016). Fortunately, the latter was addressed by commercial fishermen in creating demolition devices on lost pots (Sea Grant, 2020).*

References:

CDFW. (2020). *Final California Commercial Landings for 8675 (Table 3). State of CA:* https://wildlife.ca.gov/Fishing/Commercial/Landings#260042586-2019.

CA Sea Grant. (2020). *California Spiny Lobster (Panulirus interruptus). UCSD: https://caseagrant.ucsd.edu/seafood-*profiles/california-spiny-lobster#cite-3.

CDFW. (2019). *California Ocean Sport Fishing Regulations 8686-2021. State of CA:* https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=177588&inline.

CDFW. (2018). *California Spiny Lobster: Fishing and Life History Information. State of CA: CDFW_Marine Region_lobster-Ver.2_09.18.*

CDFW. (2016). *California Spiny Lobster Fishery Management Plan. State of CA:* https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=121938&inline.

Lafferty, K.D. (2004). *Fishing for Lobsters Indirectly Increases Epidemics in Sea Urchins. Ecol Appl 15(5):* https://doi.org/10.1890/03-5088.

Monterey Bay Aquarium Fdn. (2016). Seafood Watch App (Ver 5.0). iOS 7.0.

Nichols, et al. (2015). *Effects of Predators on Sea Urchin Density and Habitat Use in a Southern California Kelp Forest. Mar* Biol 162: DOI 10.1007/s00227-015-2664-2.

Tenger M.J., Dayton, P.K. (2000). *Ecosystem Effects of Fishing in Kelp Forest Communities. J Mar Sci (57): doi:10.1006/jmsc.2000.0715.*

UPCOMING WDAFS 2021 VIRTUAL MEETING

Amplifying Science in a Changing World

Aquatic resources and the professionals who research and manage them face dynamic challenges. Now more than ever, scientists need to adapt and inform our approach to sustaining aquatic stewardship. However, the advancement and amplification of science has been hindered recently by multiple causes. Science is being threatened from without and within: credible science is being minimized by some in influential positions and some scientists are misrepresenting science in order to advance their personal values. How should professionals prioritize, conduct, and communicate science so that it is amplified while also advancing credibility of the profession?

We welcome symposia and presentations that highlight how science is changing our understanding of the dynamics of the resources we study and our approach to management. Symposia topics could include: climate change, hatcheries, habitat, harvest, recreation, native species, genetics, interactions, ecology, invasive and introduced species, endangered species, water policy, historical perspectives, new technologies, diversity and inclusion, science communication, and others. We are also interested in how science can be used to advance decisions that result in good stewardship such as in resource management, policy development, and best practices. We encourage participation and submissions from people of diverse backgrounds and experiences.

A special focus will be given to generating outcomes from the diversity of symposia presented. Outcomes may include publications, proposals, recommendations, agreements, identification or clarification of uncertainties, and other action items. Generating outcomes within our meeting will leverage collective talent and help us to amplify science for the betterment of our fisheries profession and advancement of aquatic stewardship.

MEETING WEBSITE COMING SOON

WDAFS SMALL PROJECTS UPDATE

Western Pearlshell Mussel (WEPE) Reproduction and Life History Study in Five Watersheds of Montana: Aquatic SWG Implementation

David Stagliano, Montana Biological Survey, Helena, MT
Michelle Anderson, University of Montana Western, Dillon, MT
Kristen Cook, Montana State University, Bozeman, MT

The western pearlshell mussel (WEPE), Margaritifera falcata in Montana has experienced significant statewide range reductions in the last 100 years and is now known from ~80 populations, of which, only ~20 are expected to be viable 100 years from now (A and B-viability) (Stagliano 2010 and 2015). In Montana, non-viable WEPE populations (C and D) have exhibited no signs of recruitment over the past 20–30 years (i.e. no juvenile mussels <30 mm sampled) (Stagliano 2015). Determining which life-history phase (reproduction, host-fish densities, juvenile survival) is most limiting to WEPE survival and recruitment (Figure 1) will allow us to establish guidelines for suitable future management actions towards recovering the state's numerous non-viable WEPE populations.

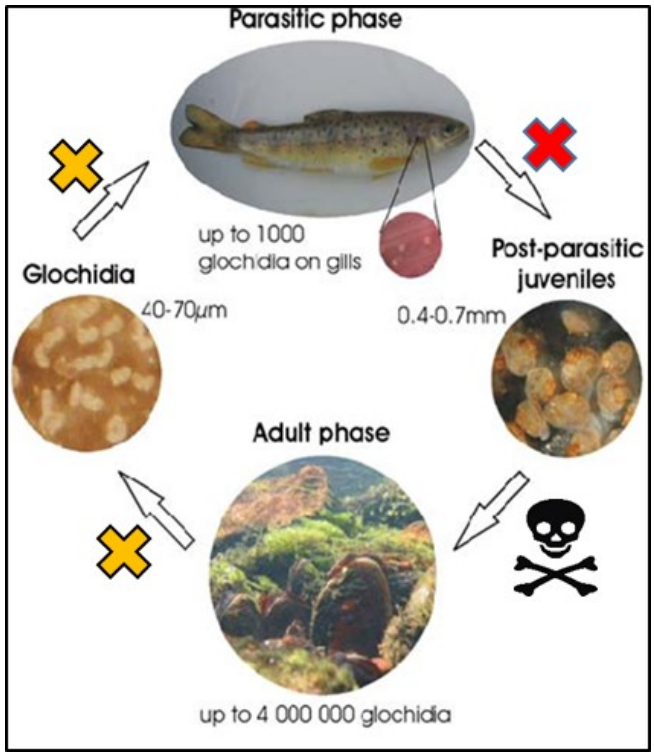


Figure 1. *WEPE life-history diagram with possible limiting factors at various host-fish interaction/ juvenile stages (non-viable).*

Observations and Results 2019-2020

1) Reproduction and Gravidity Status. In both 2019 and 2020, we successfully determined the reproductive status and glochidia release timing of 25 WEPE populations across 5 watersheds with varying elevation, stream temperature regimes and pop. viability.

Overall, in 2019, warmer stream water temperatures and lower snowpack run-off in the Kootenai & Yaak River watersheds in May and June triggered earlier pearlshell gravidity in those populations (by June 5th most WEPE populations were partial-fully gravid), while in the Big Hole, June 10th was the date which most populations were highly gravid; in high elevation populations within the Rock-Flint watersheds we observed 50% gravidity into early July.

In 2020, cooler stream water temperatures, June rains and later snowpack run-off in almost all watersheds (See Kootenai/Big Hole Watershed exception) led to an approximately 7-day later pearlshell gravidity onset in those populations (avg. June 10th most populations were partially gravid), cooler temps at high elevations and in the Yaak River lead to WEPE exhibiting some gravidity into mid-July and even early-August. Glochidia release was not synchronous and occurred over ~3 week time frame in most WEPE populations.

2) Host Fish Glochidia Infections.

We documented WEPE glochidia on all salmonid species captured, including non-native brook, rainbow, brown trout and mountain whitefish (1st time ever field documented). Typically, browns, brook trout and mountain whitefish had low infection rates (<10 glochidia per gill side) compared to Oncorhynchus spp. captured in the same reach.

In streams with native westslope cutthroat trout (WCT) present (Upper Willow, Moose Meadows, Elliston and W.F. Rock Creek) or Columbia Redband trout (Yaak River Basin), WEPE glochidia infection loads were higher on these species' gills compared to

WDAFS SMALL PROJECTS UPDATE, cont.

non-native trout species captured in the same reach (Figure 3).

Synthesis and Conclusions

1) Comparisons among the 25 WEPE populations indicated that while host fish densities and salmonid infection rates were significantly higher at viable, recruiting WEPE streams, benthic sedimentation may ultimately be responsible for recruitment failure in at least 50% of these non-viable populations. The presence of juvenile mussels less than 30 mm (a determining factor in the viability of stream populations) was negatively related to fine sediments. In streams with high-quality benthic habitat (low % fine sediments) (Marshall Creek and Yaak River,), even lower salmonid densities and corresponding infection rates are producing recent WEPE juveniles, so it likely doesn't take many infected fish to produce viable WEPE juveniles, if the benthic habitat is suitable for post-parasitic survival (Figure 1).

Figure 3. Westslope Cutthroat trout with a high glochidia load.

BOOK FEATURE

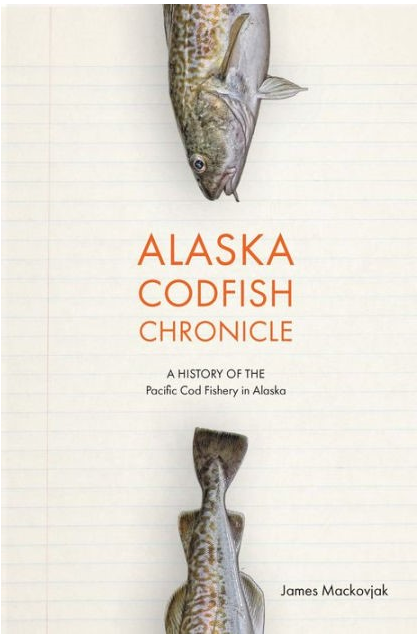
Alaska Codfish Chronicle: A History of the Pacific Cod Fishery in Alaska

James Mackovjak

Cod is one of the most widely consumed fish in the world. For many years, the Atlantic cod industry took center stage, but partly thanks to climate change and overfishing, it is more and more likely that the cod on your kitchen table or in your fast food fish fillets came from Alaska's Pacific Cod Fishery.

Alaska Codfish Chronicle is the first comprehensive history of this fishery. It looks at the early decades of the fishery's history, a period marked by hardship and danger, as well as the dominance of foreign fishermen. And the modern era, beginning in 1976 when the United States claimed an exclusive economic zone around the Alaska coasts, "Americanizing" the fishery and replacing the foreign fleets that had been ravaging the resources in the Gulf of Alaska and the Bering Sea. Today, the Pacific cod fishery is, in terms of poundage, the second largest fishery in Alaska, and considered among the best-managed fisheries in the world.

This history is extremely well documented, does not spare details, and is accessible to general readers. It incorporates nearly a hundred photographs and illustrations and is sprinkled with numerous observations from fishing industry journals and reports, even incorporating poems and recipes, making this an especially thorough and unique account of one of Alaska's most iconic and important industries.



GET CONNECTED
to
WESTERN DIVISION

online
www.wdafs.org

Twitter & Instagram
@westerndivafs

Facebook Group
Western Division American Fisheries Society

Email
WDAFSinfo@gmail.com

Meet Your WDAFS Officers

President
Todd Pearsons
Hometown: Woodland Hills, CA (via Boston, MA)
Education: PhD, Oregon State University
Employer: Grant County Public Utility District (Science), Ephrata, WA
Interests: Underwater photography, Biblical archaeology, Krav Maga, human powered transportation, water sports, drums, blues harmonica

Past-President
Dan Dauwalter
Hometown: Carver, MN
Education: PhD, Oklahoma State University
Employer: Trout Unlimited (Science), Boise, ID
Interests: My interests center on outdoor recreation: mountain biking, rafting, fishing, hiking. I also play hockey, and I traveled Spain, Wales, and Switzerland for two months in 2019. It was the trip of a lifetime (photo from Spain)!

President-Elect
Dan Brauch
Hometown: Meeker, CO
Education: B.S, Colorado State University
Employer: Colorado Parks and Wildlife, Gunnison, CO
Interests: With two high school kids, I enjoy participating in their activities (4-H, science-o, drama, etc) but also find time for hiking, hunting, fishing, and motorsports. My wife, kids and I look forward to expanded travel opportunities.

Vice President
Laurie Earley
Hometown: Colchester, VT, now Chico, CA
Education: M.S. , Auburn University
Employer: Supervisory Fish Biologist and Program Manager, U.S. Fish and Wildlife Service, Red Bluff, CA
Interests: I love outdoor recreation activities in the sun, snow, and water with my husband and two dogs.

Secretary-Treasurer – Travis Rehm
Hometown: Dillon, MT
Education: MS, South Dakota State University
Employer: Spokane Tribal Fisheries
Interests: I enjoy spending my leisure time outdoors. The majority of that time is spent chasing anything that swims with a fly rod or hunting western big game.

Student Representative – Emily Chen
Hometown: Oak Creek, WI
Education: MS, Humboldt State University
Current PhD Student in Carlson Lab at UC Berkeley
Interests: I enjoy *leisurely* outdoor activities such as camping, hanging by the river, crabbing. When indoors I like to paint, strength train, read statistics, and ponder the future of salmon in California

Submit project updates, opinion letters, photos, and more to **westerndivnewsletter@gmail.com**