

Quarterly Journal Article search : April-June 2023
Columbia Basin Fish & Wildlife Library

Baldock, J. R., R. Al-Chokhachy, T. E. Walsworth, and A. Walters. 2023. Redd superimposition mediates the accuracy, precision, and significance of Redd counts for cutthroat trout. *Canadian Journal of Fisheries and Aquatic Sciences* 80(5):825–839. <https://doi.org/10.1139/cjfas-2022-0267>

Species: Yellowstone cutthroat trout

Location: Snake River

Other Keywords: Redd surveys

Banta Winters, D. 2023. Statement of the American Fisheries Society and the Western Division of AFS about the need to breach the four dams on the lower Snake River. *Fisheries* 48(5):215–217.

<https://doi.org/10.1002/fsh.10906>

Species: n/a

Location: Snake River

Other Keywords: Dam removal

Bass, A. L., A. W. Bateman, K. H. Kaukinen, S. Li, T. Ming, D. A. Patterson, S. G. Hinch, and K. M. Miller. 2023. The spatial distribution of infectious agents in wild Pacific salmon along the British Columbia Coast. *Scientific Reports* 13(1). <https://doi.org/10.1038/s41598-023-32583-8>

Species: Pacific salmon

Location: Pacific Coast of British Columbia

Other Keywords: Pathogen transmission

Bhattarai, B., B. Hilliard, W. J. Reeder, R. Budwig, B. T. Martin, T. Xing, and D. Tonina. 2023. Effect of surface hydraulics and Salmon Redd Size on Redd-induced Hyporheic Exchange. *Water Resources Research* 59(6). <https://doi.org/10.1029/2022WR033977>

Species: Pacific salmon

Location: Sacramento River

Other Keywords: Redd surveys, streamflow

Bosch, W. J., S. N. Pandit, B. P. Sandford, G. M. Temple, M. V. Johnston, and D. A. Larsen. 2023. Effects of volitional emigration timing and smolt size on survival and age-at-return in a Pacific salmon hatchery population. *Environmental Biology of Fishes* 106(5):1037–1059. <https://doi.org/10.1007/s10641-023-01395-0>

Species: Chinook salmon

Location: Cle Elum Supplementation and Research Facility (Yakima River, Washington)

Other Keywords: Hatchery releases, migration

Bowersox, B. J., J. S. Hargrove, T. Copeland, and M. R. Campbell. 2023. The genetic composition of wild steelhead based on spatial proximity to a hatchery. *North American Journal of Fisheries Management* 43(2):431–450. <https://doi.org/10.1002/nafm.10861>

Species: Steelhead

Location: Clearwater River, Idaho

Other Keywords: Genetic composition, hatchery effects

Buckner, J. H., W. H. Satterthwaite, B. W. Nelson, and E. J. Ward. 2023. Interactions between life history and the environment on changing growth rates of Chinook Salmon. *Canadian Journal of Fisheries and Aquatic Sciences* 80(4):648–662. <https://doi.org/10.1139/cjfas-2022-0116>

Species: Chinook salmon

Location: Pacific Coast of North America

Other Keywords: Life history pathways, life history diversity

Carim, K. J., D. C. Larson, J. M. Helstab, M. K. Young, and M. F. Docker. 2023. A revised taxonomy and estimate of species diversity for western North American lampetra. *Environmental Biology of Fishes* 106(5):817–836. <https://doi.org/10.1007/s10641-023-01397-y>

Species: Lamprey

Location: Western North America

Other Keywords: Biodiversity, species diversity

Carvalho, P. G., W. H. Satterthwaite, M. R. O'Farrell, C. Speir, and E. P. Palkovacs. 2023. Role of maturation and mortality in portfolio effects and Climate Resilience. *Canadian Journal of Fisheries and Aquatic Sciences* 80(6):924-941. <https://doi.org/10.1139/cjfas-2022-0171>

Species: Chinook salmon

Location: Sacramento River, California

Other Keywords: Climate change impacts, climate change resilience

Clare, C. I., K. M. Nichols, F. P. Throver, E. A. Berntson, and M. C. Hale. 2023. Comparative genomics of rainbow trout (*Oncorhynchus mykiss*): Is the genetic architecture of migratory behavior conserved among populations? *Ecology and Evolution* 13(6). <https://doi.org/10.1002/ece3.10241>

Species: Rainbow trout

Location: Sashin Creek, Alaska and Little Sheep Creek, Oregon

Other Keywords: Genetic diversity, migration

Cogliati, K. M., D. L. Noakes, F. Khan, C. S. Sharpe, and C. B. Schreck. 2023. Producing wild fish phenotypes in hatchery-reared fish. *Environmental Biology of Fishes* 106(5):1113–1134. <http://dx.doi.org/10.1007/s10641-022-01279-9>

Species: Chinook salmon

Location: n/a

Other Keywords: hatchery fish production, phenotypic traits

Cogliati, K. M., M. M. Scanlan, K. E. Self, C. B. Schreck, and D. L. Noakes. 2023. Environmental conditions influence exploration, antipredation behavior, and fin condition in juvenile Chinook salmon (*Oncorhynchus tshawytscha*). *Environmental Biology of Fishes* 106(5):1021–1036. <https://doi.org/10.1007/s10641-022-01356-z>

Species: Chinook salmon

Location: n/a

Other Keywords: Hatchery fishes, responses to stimuli

Constable Jr., R.J. and E. Suring. 2023. Implications of metrics and methodology for juvenile salmonid monitoring in western Oregon streams. *Northwest Science* 96(1-2):63-79.

<https://doi.org/10.3955/046.096.0106>

Species: Coho salmon and steelhead

Location: Smith River basin, Oregon

Other Keywords: Population estimates, electrofishing, snorkeling

Copeland, K., B. Thomason, M. Harte, S. Zhang, D. Fennell, and D. Lewis. 2023. Rethinking 21st century fisheries management: posthuman multispecies livelihoods approach. *Marine Policy* 152.

<https://doi.org/10.1016/j.marpol.2023.105623>

Species: California sea lion

Location: Lower Columbia River

Other Keywords: Predator-prey dynamics, human-animal interactions

Cox, T. L., C. S. Guy, L. M. Holmquist, and M. A. Webb. 2023. Spawning locations of pallid sturgeon in the Missouri River corroborate the mechanism for recruitment failure. *Fishes* 8(5):243.

<https://doi.org/10.3390/fishes8050243>

Species: Pallid sturgeon

Location: Missouri River, Montana

Other Keywords: Reproduction, supplementation, recruitment failure

Crossman, J. A., J. Korman, J. G. McLellan, M. D. Howell, and A. L. Miller. 2023. Competition overwhelms environment and genetic effects on growth rates of endangered White Sturgeon from a conservation aquaculture program. *Canadian Journal of Fisheries and Aquatic Sciences*. 80(6): 958-977.

<https://doi.org/10.1139/cjfas-2022-0113>

Species: White sturgeon

Location: Columbia River

Other Keywords: Genetic diversity, physiological differences

Davis, M. J., J. Anthony, E. J. Ward, J. Firman, and C. Lorion. 2023. Coherence among Oregon Coast coho salmon populations highlights increasing relative importance of marine conditions for productivity. *Fisheries Oceanography* 32(3):293–310.

<https://doi.org/10.1111/fog.12630>

Species: Coho salmon

Location: Pacific Coast of Oregon

Other Keywords: Coherence, migration patterns

Dolan, T. E., E. P. Palkovacs, T. L. Rogers, and S. B. Munch. 2023. Age structure augments the predictive power of time series for fisheries and conservation. *Canadian Journal of Fisheries and Aquatic Sciences* 80(5):795–807. <https://doi.org/10.1139/cjfas-2022-0219>

Species: Chinook salmon, striped bass

Location: Klamath River (Chinook salmon), Connecticut (striped bass)

Other Keywords: Empirical dynamic modeling

Duffin, J., E. M. Yager, J. M. Buffington, R. Benjankar, C. Borden, and D. Tonina. 2023. Impact of flow regulation on stream morphology and habitat quality distribution. *Science of The Total Environment* 878:163016. <https://doi.org/10.1016/j.scitotenv.2023.163016>

Species: Various salmonids

Location: Lemhi River, Idaho

Other Keywords: Streamflow, environmental flow management, sediment transport

Erickson, T. A., G. J. Schisler, and E. R. Fetherman. 2023. Poststocking survival and myxospore evaluation of whirling disease-resistant rainbow trout strains. *North American Journal of Fisheries Management* 43(2):586–599. <https://doi.org/10.1002/nafm.10878>

Species: Rainbow trout

Location: n/a

Other Keywords: Whirling disease, *Myxobolus cerebralis* resistance and survival rates

Hall, J., P. Roni, K. Ross, M. J. Camp, J. Nuckols, and C. Ruffing. 2023. Estimating juvenile salmon estuarine carrying capacities to support restoration planning and Evaluation. *Estuaries and Coasts* 46(4):1046–1066. <https://doi.org/10.1007/s12237-023-01185-y>

Species: Coho salmon, Chinook salmon

Location: Pacific Coast of Oregon

Other Keywords: habitat carrying capacity, recovery planning

Hallbert, T. B., and E. R. Keeley. 2023. Instream complexity increases habitat quality and growth for cutthroat trout in headwater streams. *Canadian Journal of Fisheries and Aquatic Sciences* 80(6): 992-1005. <https://doi.org/10.1139/cjfas-2022-0189>

Species: Cutthroat trout

Location: Idaho

Other Keywords: Fish habitat improvement

Hill, G. M., and S. A. Kolmes. 2023. A resilience history of the Columbia River basin and salmonid species: Regimes and policies. *Environments* 10(5):76. <https://doi.org/10.3390/environments10050076>

Species: Various salmonids

Location: Columbia River

Other Keywords: Recovery planning, history

Hopper, L. R., J. A. Glenn, E. MacConnell, J. R. Winton, and E. J. Emmenegger. 2023. Susceptibility of pallid sturgeon to viral hemorrhagic septicemia virus genotype IVb. *Journal of Aquatic Animal Health* 35(2):88–100. <https://doi.org/10.1002/aah.10181>

Species: Pallid sturgeon

Location: n/a

Other Keywords: Pathogenic susceptibility

Horn, R. L., and S. R. Narum. 2023. Genomic variation across Chinook salmon populations reveals effects of a duplication on migration alleles and supports fine scale structure. *Molecular Ecology* 32(11):2818–2834. <https://doi.org/10.1111/mec.16895>

Species: Chinook salmon
Location: Columbia River Basin
Other Keywords: Genetic diversity, phenotypic variation

Howard, K. G., and V. von Biela. 2023. Adult spawners: a critical period for subarctic Chinook salmon in a changing climate. *Global Change Biology* 29(7):1759–1773. <https://doi.org/10.1111/gcb.16610>

Species: Chinook salmon
Location: Yukon River
Other Keywords: Life history pathways, migration

James, S. E., B. Doherty, S. P. Cox, I. A. Pearsall, and B. Riddell. 2023. Size and timing of hatchery releases influence juvenile-to-adult survival rates of British Columbia Chinook (*Oncorhynchus tshawytscha*) and coho (*Oncorhynchus kisutch*) salmon. *Canadian Journal of Fisheries and Aquatic Sciences* 80(4):700–718. <https://doi.org/10.1139/cjfas-2022-0121>

Species: Chinook salmon
Location: British Columbia
Other Keywords: Hatchery releases, Bayesian modelling

Johnson, M. A., M. K. Jones, M. R. Falcy, J. Spangler, R. B. Couture, and D. L. Noakes. 2023. Can angler-assisted Broodstock collection programs improve harvest rates of hatchery-produced steelhead? *Environmental Biology of Fishes* 106(5):1079–1092. <https://doi.org/10.1007/s10641-023-01401-5>

Species: Steelhead
Location: Oregon
Other Keywords: Angling regulation, broodstocks, hatchery fish production

Kiffney, P. M., P. J. Lisi, M. Liermann, S. M. Naman, J. H. Anderson, M. H. Bond, G. R. Pess, M. E. Koehler, E. R. Buhle, T. W. Buehrens, R. S. Klett, J. M. Cram, and T. P. Quinn. 2023. Colonization of a temperate river by mobile fish following habitat reconnection. *Ecosphere* 14(2):e4336. <https://doi.org/10.1002/ecs2.4336>

Species: Various salmonids
Location: Cedar River, Washington
Other Keywords: Recolonization, habitat connectivity

Klein, Z. B., M. C. Quist, and C. S. Guy. 2023. Suppression of invasive fish in the west: Synthesis and suggestions for improvement. *North American Journal of Fisheries Management* 43(2):369–383. <https://doi.org/10.1002/nafm.10827>

Species: n/a
Location: Western United States
Other Keywords: Invasive species management, introduced species

Koch, I. J., H. M. Nuetzel, and S. R. Narum. 2023. Epigenetic effects associated with Salmonid supplementation and domestication. *Environmental Biology of Fishes* 106(5):1093–1111. <https://doi.org/10.1007/s10641-022-01278-w>

Species: Various salmonids

Location: n/a

Other Keywords: hatchery and natural origin comparisons, genetic diversity

Koel, T. M., P. D. Doepke, D. J. MacDonald, N. A. Thomas, C. W. Vender, H. C. Glassic, A. S. Poole, C. S. Guy, and A. V. Zale. 2023. Aerial application of organic pellets eliminates lake trout recruitment from a primary spawning reef in Yellowstone Lake. *North American Journal of Fisheries Management* 43(2):505–516. <https://doi.org/10.1002/nafm.10872>

Species: Lake trout

Location: Yellowstone Lake, Wyoming

Other Keywords: Invasive species management

Leblanc, C. A., C. Schreck, B. K. Kristjánsson, S. Skúlason, and D. L. Noakes. 2023. Egg size–related traits during the first year of growth and smolting in hatchery and wild juveniles of Steelhead Trout *Oncorhynchus mykiss*. *Environmental Biology of Fishes* 106(5):1061–1078.

<http://dx.doi.org/10.1007/s10641-022-01377-8>

Species: Steelhead trout

Location: North Fork Alsea Hatchery, Oregon

Other Keywords: hatchery and natural origin comparisons, reproduction

Lo, B. P., V. L. Marlatt, X. Liao, S. Reger, C. Gallilee, A. R. S. Ross, and T. M. Brown. 2023. Acute toxicity of 6PPD-quinone to early life stage juvenile Chinook (*Oncorhynchus tshawytscha*) and coho (*Oncorhynchus kisutch*) salmon. *Environmental Toxicology and Chemistry* 42(4):815–822.

<https://doi.org/10.1002/etc.5568>

Species: Chinook salmon

Location: Chehalis River Hatchery (Agassiz, British Columbia)

Other Keywords: Pollution, tire runoff

Luis, S. M., and G. B. Pasternack. 2023. Local hydraulics influence habitat selection and swimming behavior in adult California Central Valley Chinook salmon at a large river confluence. *Fisheries Research* 261:106634. <https://doi.org/10.1016/j.fishres.2023.106634>

Species: Chinook salmon

Location: Feather and Yuba Rivers, California

Other Keywords: Streamflow, river confluence hydraulics

Malick, M. J., J. P. Losee, G. Marston, M. Agha, B. A. Berejikian, B. R. Beckman, and M. Cooper. 2023. Fecundity trends of Chinook salmon in the Pacific Northwest. *Fish and Fisheries* 24(3):454–465.

<https://doi.org/10.1111/faf.12738>

Species: Chinook salmon

Location: Washington state

Other Keywords: Reproductive success, fertility

Mattheiss, J. P., R. Breyta, G. Kurath, S. L. LaDeau, D. J. Páez, and P. F. B. Ferguson. 2023. Coproduction and modeling spatial contact networks prevent bias about infectious hematopoietic necrosis virus

transmission for Snake River basin salmonids. *Journal of Environmental Management* 334:117415. <https://doi.org/10.1016/j.jenvman.2023.117415>

Species: Various salmonids

Location: Snake River

Other Keywords: Pathogen transmission, Infectious hematopoietic necrosis virus (IHNV)

McLaren, J. S., R. W. Van Kirk, A. J. Mabaka, S. Brothers, and P. Budy. 2023. Drawdown, habitat, and kokanee populations in a western U.S. Reservoir. *North American Journal of Fisheries Management* 43(2):339–351. <https://doi.org/10.1002/nafm.10879>

Species: Kokanee salmon

Location: Island Park Reservoir on the Snake River

Other Keywords: Climate change impacts, Oxythermal measurements

Mordecai, G., A. L. Bass, R. Routledge, E. Di Cicco, A. Teffer, C. Deeg, A. W. Bateman, and K. M. Miller. 2023. Assessing the role of Piscine orthoreovirus in disease and the associated risk for wild Pacific Salmon. *BMC Biology* 21(1). <http://dx.doi.org/10.1186/s12915-023-01548-8>

Species: Pacific salmon, Piscine orthoreovirus

Location: n/a

Other Keywords: Virus prevalence, pathogen transmission

Moser, M. L., D. L. Erickson, S. Corbett, J. A. Barth, A. Erofeev, and S. D. Pierce. 2023. Detecting acoustically tagged green sturgeon in the Northeast Pacific Ocean. *Environmental Biology of Fishes* 106(5):883–893. <http://dx.doi.org/10.1007/s10641-022-01353-2>

Species: Green Sturgeon

Location: Pacific Coast of Oregon

Other Keywords: Fish tagging, fixed array monitoring, Slocum glider monitoring

Murphy, C. A., A. M. Pollock, S. L. Johnson, and I. Arismendi. 2023. Linked foraging and bioenergetics modeling may inform fish parasite infection dynamics. *Environmental Biology of Fishes* 106(6):1345–1356. <http://dx.doi.org/10.1007/s10641-023-01420-2>

Species: Various salmonids, *Salmincola californiensis*

Location: n/a

Other Keywords: Copepod infection, parasitic transmission

Nonis, A., S. G. Hinch, and N. C. Coops. 2023. Summer physical habitat associations and movement of sympatric juvenile rainbow trout (*Oncorhynchus mykiss*) and Dolly Varden Char (*Salvelinus malma*) in coastal streams of British Columbia. *Environmental Biology of Fishes* 106(6):1327–1343. <http://dx.doi.org/10.1007/s10641-023-01418-w>

Species: rainbow trout, Dolly Varden char

Location: Upper Nahmint River, British Columbia

Other Keywords: Fish tagging

Payton, Q., J. Fryer, T. Garrison, and A. F. Evans. 2023. Estimating cause-specific mortality and survival of juvenile fall Chinook Salmon: An investigation of avian predation across large spatial scales. *North American Journal of Fisheries Management* 43(2):569–585. <https://doi.org/10.1002/nafm.10871>

Species: Chinook salmon

Location: Columbia River

Other Keywords: Predator-prey dynamics, Bayesian modeling

Penaluna, B. E., R. Cronn, L. L. Hauck, K. A. Weitemier, and T. S. Garcia. 2023. Uncovering the hidden biodiversity of streams at the upper distribution limit of fish. *Journal of Biogeography* 50(6):1151–1162. <https://doi.org/10.1111/jbi.14605>

Species: Fishes, amphibians, crayfishes, bivalves, mammals, pathogens

Location: Trask River, Oregon

Other Keywords: Biodiversity, stream ecology

Quindazzi, M. J., L. P. Gaffney, E. Polard, N. Bohlender, W. Duguid, and F. Juanes. 2023. Otolith mineralogy affects otolith shape asymmetry: a comparison of hatchery and natural origin coho salmon (*Oncorhynchus kisutch*). *Journal of Fish Biology* 102(4):870–882. <https://doi.org/10.1111/jfb.15329>

Species: Coho salmon

Location: n/a

Other Keywords: Otolith mineralogy, fluctuating asymmetry

Reed, A. N., F. E. Rowland, J. A. Krajcik, and D. E. Tillitt. 2023. Thiamine supplementation improves survival and body condition of hatchery-reared steelhead (*Oncorhynchus mykiss*) in Oregon. *Veterinary Sciences* 10(2):156. <https://doi.org/10.3390/vetsci10020156>

Species: Steelhead

Location: Oregon

Other Keywords: Dietary supplementation, dietary regimes

Riepe, T. B., E. R. Fetherman, B. Neuschwanger, T. Davis, A. Perkins, and D. L. Winkelman. 2023. Vertical transmission of *Renibacterium salmoninarum* in cutthroat trout (*Oncorhynchus clarkii*). *Journal of Fish Diseases* 46(4):309–319. <https://doi.org/10.1111/jfd.13745>

Species: Cutthroat trout, *Renibacterium salmoninarum*

Location: n/a

Other Keywords: Pathogen transmission

Rosinski, C. L., J. Glaid, M. Hahn, and W. W. Fetzer. 2023. Natal origin differentiation using eye lens stable isotope analysis. *North American Journal of Fisheries Management* 43(2):547–555. <https://doi.org/10.1002/nafm.10875>

Species: Rainbow Trout

Location: North Platte River, Wyoming

Other Keywords: Reproductive success, hatchery-wild interactions

Sorel, M. H., A. R. Murdoch, R. W. Zabel, C. M. Kamphaus, E. R. Buhle, M. D. Scheuerell, and S. J. Converse. 2023. Effects of population density and environmental conditions on life-history prevalence in a migratory fish. *Ecology and Evolution* 13(5). <https://doi.org/10.1002/ece3.10087>

Species: Chinook salmon

Location: Wenatchee River, Washington

Other Keywords: Life history pathways, migration

Spangenberg, D. K., A. E. Fuhrman, D. A. Larsen, and B. R. Beckman. 2023. A correlation between seasonally changing photoperiod, whole body lipid, and condition factor in juvenile spring Chinook salmon (*Oncorhynchus tshawytscha*). *PLOS ONE* 18(5). <https://doi.org/10.1371/journal.pone.0285380>

Species: Chinook salmon

Location: Northwest Fisheries Science Center (Seattle, Washington)

Other Keywords: lipid stores, energy storage, body composition

Timoshevskaya, N., K. Eşkut, V. A. Timoshevskiy, S. M. C. Robb, C. Holt, J. E. Hess, H. J. Parker, C. F. Baker, A. K. Miller, C. Saraceno, M. Yandell, R. Krumlauf, S. R. Narum, R. T. Lampman, N. J. Gemmell, J. Mountcastle, B. Haase, J. R. Balacco, G. Formenti, S. Pelan, Y. Sims, K. Howe, O. Fedrigo, E. D. Jarvis, and J. J. Smith. 2023. An improved germline genome assembly for the sea lamprey *Petromyzon Marinus* illuminates the evolution of germline-specific chromosomes. *Cell Reports* 42(3):112263.

<https://doi.org/10.1016/j.celrep.2023.112263>

Species: Sea lamprey

Location: n/a

Other Keywords: Genetics

Torres, L. G., S. M. Brander, J. I. Parker, E. M. Bloom, R. Norman, J. E. Van Brocklin, K. S. Lasdin, and L. Hildebrand. 2023. Zoop to poop: Assessment of microparticle loads in gray whale zooplankton prey and fecal matter reveal high daily consumption rates. *Frontiers in Marine Science* 10.

<https://doi.org/10.3389/fmars.2023.1201078>

Species: Gray whales

Location: Pacific Coast of Oregon

Other Keywords: Microplastics, pollution

Traynor, E. M., and C. T. Hasler. 2023. Elevated CO₂ levels did not induce species- or tissue-specific damage in young-of-year salmonids. *Journal of Aquatic Animal Health* 35(2):78–87.

<https://doi.org/10.1002/aah.10180>

Species: Various salmonids

Location: n/a

Other Keywords: Carbon dioxide exposure, climate change impacts

Turcotte, L. D., J. C. Bradshaw, M. P. Polinski, and S. C. Johnson. 2023. Piscine Orthoreovirus Genotype-1 (PRV-1) in wild pacific salmon of British Columbia, Canada: 2011–2020. *Fishes* 8(5):252.

<https://doi.org/10.3390/fishes8050252>

Species: Pacific salmon, Piscine orthoreovirus

Location: Pacific Coast of British Columbia

Other Keywords: Piscine Orthoreovirus prevalence, pathogen transmission

Valenzuela-Toro, A. M., D. P. Costa, R. Mehta, N. D. Pyenson, and P. L. Koch. 2023. Unexpected decadal density-dependent shifts in California sea lion size, morphology, and foraging niche. *Current Biology* 33(10). <https://doi.org/10.1016/j.cub.2023.04.026>

Species: California sea lion

Location: Pacific Coast of North America

Other Keywords: Population recovery, morphology

Whitesel, T. A., and C. T. Uh. 2023. Upper temperature limit of larval Pacific Lamprey *Entosphenus Tridentatus*: Implications for conservation in a warming climate. *Environmental Biology of Fishes* 106(5):837–852. <https://doi.org/10.1007/s10641-022-01372-z>

Species: Pacific lamprey

Location: Cedar Creek, Washington

Other Keywords: Water temperature, climate change impacts

Wilson, S. M., J. W. Moore, E. J. Ward, C. W. Kinsel, J. H. Anderson, T. W. Buehrens, C. N. Carr-Harris, P. C. Cochran, T. D. Davies, M. R. Downen, L. Godbout, P. J. Lisi, M. N. Litz, D. A. Patterson, D. T. Selbie, M. R. Sloat, E. J. Suring, I. A. Tattam, and G. J. Wyatt. 2023. Phenological shifts and mismatch with marine productivity vary among Pacific salmon species and populations. *Nature Ecology & Evolution* 7(6):852–861. <https://doi.org/10.1038/s41559-023-02057-1>

Species: Pacific salmon

Location: Western North America

Other Keywords: Climate change impacts, phenological changes