

American Shad

Created: October 2020

Updated: October 2024

Prepared by Tami Wilkerson, Maggie Willis and Ben Maceda, Columbia Basin Fish & Wildlife Library.
Please contact librarystaff@critfc.org to request journal articles or print materials in this
bibliography.

Contents

Columbia River and Pacific Coast	1
Life History	5
Dam Passage	8

Columbia River and Pacific Coast

Hamman, M. G. 1981. Utilization of the Columbia River Estuary by American shad, *Alosa sapidissima* (Wilson). Master's thesis. Oregon State University, Corvallis, Oregon.
<http://hdl.handle.net/1957/10544>

Haro, A., and T. Castro-Santos. 2012. Passage of American shad: paradigms and realities. *Marine and Coastal Fisheries* 4(1):252-261.
<https://doi.org/10.1080/19425120.2012.675975>

Haskell, C. A. 2018. From salmon to shad: Shifting sources of marine-derived nutrients in the Columbia River Basin. *Ecology of Freshwater Fish* 27(1):310–322.
<https://doi.org/10.1111/eff.12348>

Haskell, C. A., D. A. Beauchamp, and S. M. Bollens. 2017. Trophic interactions and consumption rates of subyearling Chinook salmon and nonnative juvenile American shad in Columbia River reservoirs. *Transactions of the American Fisheries Society* 146(2):291-298.
<https://doi.org/10.1080/00028487.2016.1264997>

Haskell, C. A., K. F. Tiffan, and D. R. Rondorf. 2006. Food habits of juvenile American shad and dynamics of zooplankton in the lower Columbia River. *Northwest Science* 80(1):47-64.

Haskell, C. A., K. F. Tiffan, and D. W. Rondorf. 2013. The effects of juvenile American shad

planktivory on zooplankton production in Columbia River food webs. Transactions of the American Fisheries Society 142(3):606-620.

<https://doi.org/10.1080/00028487.2012.728164>

Hasselman, D. J., R. A. Hinrichsen, B. A. Shields, and C. C. Ebbesmeyer. 2012. The rapid establishment, dispersal, and increased abundance of invasive American shad in the Pacific Northwest. *Fisheries* 37(3):103-114.

<https://doi.org/10.1080/03632415.2012.659938>

Hasselman, D. J., R. A. Hinrichsen, B. A. Shields, and C. C. Ebbesmeyer. 2012. American shad of the Pacific coast: a harmful invasive species or benign introduction? *Fisheries* 37(3):115-122. <https://doi.org/10.1080/03632415.2012.659941>

Hasselman, D. J., P. Bentzen, S. R. Narum, and T. P. Quinn. 2018. Formation of population genetic structure following the introduction and establishment of non-native American shad (*Alosa sapidissima*) along the Pacific Coast of North America. *Biological Invasions* 20(11):3123–3143. <https://doi.org/10.1007/s10530-018-1763-7>

Hinrichsen, R. A., D. J. Hasselman, C. C. Ebbesmeyer, and B. A. Shields. 2013. The role of impoundments, temperature, and discharge on colonization of the Columbia River Basin, USA, by nonindigenous American shad. *Transactions of the American Fisheries Society* 142(4):887-900. <https://doi.org/10.1080/00028487.2013.788553>

Independent Scientific Advisory Board. 2021. American shad in the Columbia River: past, present, future. ISAB 2021-4.

https://www.nwcouncil.org/media/filer_public/88/b2/88b2dbc4-2bce-4ca2-9e69-d5d51306ea69/ISAB_2021-4_Shad_Report.pdf

Jepson, M. A., C. L. Williams, C. A. Peery, and M. I. Moser, 2003. Effects of the shad fishery on passage of adult Chinook salmon through the Oregon-shore fishway ladder at The Dalles Dam – 2002. Report to U.S. Army Corps of Engineers Portland and Walla Walla Districts. <https://docs.cbfwl.org/biblio40442.pdf>

Miller, D. R. 1994. Columbia River American shad: an overview. Northwest Fisheries Science Center, Seattle. <https://docs.cbfwl.org/biblio43062.pdf>

Monk, B. D. Weaver, C. Thompson, and F. Ossiander. 1989. Effects of flow and weir design on the passage behavior of American shad and salmonids in an experimental fish ladder. *North American Journal of Fisheries Management* 9(1):60-67. [https://doi.org/10.1577/1548-8675\(1989\)009<0060:EOFAWD>2.3.CO;2](https://doi.org/10.1577/1548-8675(1989)009<0060:EOFAWD>2.3.CO;2)

Mullen, R. E. 1974. A summary of American shad (*Aloaa sapidiaeima*) tagging studies on the coastal streams of Oregon, 1946-70. Fish Commission of Oregon, Coastal Rivers Investigation Information Report 74-3. <http://hdl.handle.net/1957/26363>

Noyes, C. J. 2013. The migration and dam passage behavior of adult Pacific lamprey (*Entosphenus tridentatus*) and American shad (*Alosa sapidissima*) in the Columbia River, in relation to population decline. Master's thesis. University of Idaho, Boise, Idaho.
<https://search.worldcat.org/title/861813753>

Oregon Department of Fish and Wildlife Columbia River Management. 1984-1987. Columbia River commercial shad fisheries.
<https://catalog.cbfwl.org/cgi-bin/koha/opac-detail.pl?biblionumber=47713>

Parks, N.B. 1987. The Pacific Northwest commercial fishery for American shad. Marine Fisheries Review 40(2):29-31.
<https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/MFR/mfr402/mfr4025.pdf>

Parsley, M. J., S. T. Sauter, and L. A. Wetzel. 2011. Impact of American shad in the Columbia River. Final Report to Bonneville Power Administration, Project 2007-275-00, Portland, Oregon. <https://www.cbfish.org/Document.mvc/Viewer/P121252>

Pearcy, W. G. and J. P. Fisher. 2011. Ocean distribution of the American shad (*Alosa sapidissima*) along the Pacific coast of North America. Fishery Bulletin 109(4):440–453.
<https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/2011/1094/1094pearcy.pdf>

Peery, C. A., T. C. Bjornn, K. R. Tolotti, and L. C. Stuehrenberg. 1999. Effects of a shad fishery on passage of adult Chinook salmon through the Oregon-shore fishway at The Dalles Dam, 1996. Idaho Cooperative Fish and Wildlife Research Unit Technical Report 98-4, Moscow, Idaho. <https://docs.cbfwl.org/biblio37697.pdf>

Petersen, J. H., R. A. Hinrichsen, D. M. Gadomski, D. H. Feil, and D. W. Rondorf. 2003. American shad in the Columbia River. Pages 141-155 in K. E. Limburg and J. R. Waldman, editors. Biodiversity, status, and conservation of the world's shads. American Fisheries Society, Symposium 35, Bethesda, Maryland.
<https://catalog.cbfwl.org/cgi-bin/koha/opac-detail.pl?biblionumber=46329>

Quinn, T. P., and D. J. Adams. 1996. Environmental changes affecting the migratory timing of American shad and sockeye salmon. Ecology 77(4):1151–1162.
<https://doi.org/10.2307/2265584>

Quinn, T. P., J. Epifanio, P. B. Moyle, S. Gregory, D. J. Hasselman, E. Merrill, K. Rose, T. F.

Turner, and T. C. Wainwright, T. C. 2024. Ecological interactions between non-native American shad and Pacific salmon: the Columbia River case study. *Reviews in Fisheries Science & Aquaculture* 32(3):435-449. <https://doi.org/10.1080/23308249.2024.2337434>

Quinn, T. P., L. A. Wetzel, D. J. Hasselman, and K. Larsen. 2024. Differences in life history patterns of American shad (*Alosa sapidissima*) populations between ancestral, Atlantic coast, and non-native Pacific coast rivers of North America. *Canadian Journal of Fisheries and Aquatic Sciences*. 81(7):862-878. <https://doi.org/10.1139/cjfas-2023-0286>

Rottiers, D. V., L. A. Redell, H. E. Boone, and S. Amaral. 1992. Differences in stocks of American shad from the Columbia and Delaware Rivers. *Transactions of the American Fisheries Society* 121(1):132-136.
[https://doi.org/10.1577/1548-8659\(1992\)121<0132:NDISOA>2.3.CO;2](https://doi.org/10.1577/1548-8659(1992)121<0132:NDISOA>2.3.CO;2)

Slatick, E. 1975. Laboratory evaluation of a Denil-type steeppass fishway with various entrance and exit conditions for passage of adult salmonids and American shad. *Marine Fisheries Review* 37(9):17-26.
<https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/MFR/mfr379/mfr3783.pdf>

Slatick, E., and L. R. Basham. 1985. The effect of Denil fishway length on passage of some nonsalmonid fishes. *Marine Fisheries Review* 47(1):83-85.
<https://spo.nmfs.noaa.gov/sites/default/files/pdf-content/MFR/mfr471/mfr47113.pdf>

Stainbrook, C. E. 1982. Selected life history aspects of American shad (*Alosa sapidissima*) and predation on young-of-the-year shad in Lake Umatilla of the Columbia River. Master's thesis. Oregon State University, Corvallis, Oregon. <http://hdl.handle.net/1957/41994>

Talbot, G. B. 1953. Passage of shad at the Bonneville fishways. U.S. Fish and Wildlife Service, Special Scientific Report: Fisheries 94, Washington.
<https://spo.nmfs.noaa.gov/sites/default/files/legacy-pdfs/SSRF94.pdf>

Weaver, C. R. 1965. Observations on the swimming ability of adult American shad (*Alosa sapidissima*). *Transactions of the American Fisheries Society* 94(4):382-385.
[https://doi.org/10.1577/1548-8659\(1965\)94\[382:OOTSAO\]2.0.CO;2](https://doi.org/10.1577/1548-8659(1965)94[382:OOTSAO]2.0.CO;2)

Wendler, H. O. 1967. The American shad of the Columbia River with a recommendation for management of the fishery. Washington State Department of Fisheries, Olympia, Washington. <https://catalog.cbfwl.org/cgi-bin/koha/opac-detail.pl?biblionumber=41309>

Life History

Bentzen, P., G. C. Brown, and W. C. Leggett. 1989. Mitochondrial DNA polymorphism, population structure, and life history variation in American shad (*Alosa sapidissima*). Canadian Journal of Fisheries and Aquatic Sciences 46(8):1446-1454. <https://doi.org/10.1139/f89-184>

Carscadden, J. E., and W. C. Leggett. 1975. Life history variations in populations of American shad, *Alosa sapidissima* (Wilson), spawning in tributaries of the St John River, New Brunswick. Journal of Fish Biology 7(5):595-609. <https://doi.org/10.1111/j.1095-8649.1975.tb04633.x>

Chittenden, M. E. 1969. Life history and ecology of the American shad, *Alosa sapidissima*, in the Delaware River. Doctoral dissertation. Rutgers University, New Brunswick, New Jersey. <https://search.worldcat.org/title/5761850>

Conover, D. O. 1990. The relation between capacity for growth and length of growing season: evidence for and implications of countergradient variation. Transactions of the American Fisheries Society 119(3):416-430.
[https://doi.org/10.1577/1548-8659\(1990\)119<0416:TRBCFG>2.3.CO;2](https://doi.org/10.1577/1548-8659(1990)119<0416:TRBCFG>2.3.CO;2)

Crecco, V., T. Savoy, and L. Gunn. 1983. Daily mortality rates of larval and juvenile American shad (*Alosa sapidissima*) in the Connecticut River with changes in year-class strength. Canadian Journal of Fisheries and Aquatic Sciences. 40(10):1719-1728.
<https://doi.org/10.1139/f83-199>

Crecco, V., and T. Savoy. 1985. Effects of biotic and abiotic factors on growth and relative survival of young American shad, *Alosa sapidissima*, in the Connecticut River. Canadian Journal of Fisheries and Aquatic Sciences. 42(10):1640-1648. <https://doi.org/10.1139/f85-205>

Gilligan-Lunda, E. K., D. S. Stich, K. E. Mills, M. M. Bailey, and J. D. Zydlowski. 2021. Climate change may cause shifts in growth and instantaneous natural mortality of American shad throughout their native range. Transactions of the American Fisheries Society 150(3):407-421. <https://doi.org/10.1002/tafs.10299>

Glebe, B. D., and W. C. Leggett. 1981. Latitudinal differences in energy allocation and use during the freshwater migrations of American shad (*Alosa sapidissima*) and their life history consequences. Canadian Journal of Fisheries and Aquatic Sciences. 38(7):806-820.
<https://doi.org/10.1139/f81-109>

Hoffman, J. C., and J. E. Olney. 2005. Cohort-specific growth and mortality of juvenile American shad in the Pamunkey River, Virginia. Transactions of the American Fisheries Society 134(1):1-18. <https://doi.org/10.1577/FT03-219.1>

Houde, E. D. 1997. Patterns and trends in larval-stage growth and mortality of teleost fish. *Journal of Fish Biology* 51(sA):52-83. <https://doi.org/10.1111/j.1095-8649.1997.tb06093.x>

Hyle, A. R., R. S. McBride, and J. E. Olney. 2014. Determinate versus indeterminate fecundity in American shad, an anadromous clupeid. *Transactions of the American Fisheries Society* 143(3): 618-633. <https://doi.org/10.1080/00028487.2013.862178>

Leach, S. D., and E. D. Houde. 1999. Effects of environmental factors on survival, growth, and production of American shad larvae. *Journal of Fish Biology* 54(4):767-786. <https://doi.org/10.1111/j.1095-8649.1999.tb02032.x>

Leggett, W. C., and J. E. Carscadden. 1978. Latitudinal variation in reproductive characteristics of American shad (*Alosa sapidissima*): Evidence for population specific life history strategies in fish. *Journal of the Fisheries Research Board of Canada*. 35(11):1469-1478. <https://doi.org/10.1139/f78-230>

Limburg, K. E. 1996. Growth and migration of 0-year American shad (*Alosa sapidissima*) in the Hudson River estuary: otolith microstructural analysis. *Canadian Journal of Fisheries and Aquatic Sciences* 53(1):220-238. <https://doi.org/10.1139/f95-160>

Limburg, K. E., K. A. Hattala, and A. Kahnle. 2003. American shad in its native range. Pages 125-140 in K. E. Limburg and J. R. Waldman, editors. *Biodiversity, status, and conservation of the world's shads*. American Fisheries Society, Symposium 35, Bethesda, Maryland. <https://catalog.cbfwl.org/cgi-bin/koha/opac-detail.pl?biblionumber=46329>

Lipsky, C. A., R. Saunders, and J. R. Stevens. 2016. Evidence of successful spawning and other life-history aspects of *alosa sapidissima* (American shad) in the Penobscot River and estuary. *Northeastern Naturalist* 23(3):367-377. <https://doi.org/10.1656/045.023.0305>

Maki, K. L., J. M. Hoenig, and J. E. Olney. 2001. Estimating proportion mature at age when immature fish are unavailable for study, with application to American shad in the York River, Virginia. *North American Journal of Fisheries Management* 21(4):703-716. [https://doi.org/10.1577/1548-8675\(2001\)021<0703:EPMAAW>2.0.CO;2](https://doi.org/10.1577/1548-8675(2001)021<0703:EPMAAW>2.0.CO;2)

Maki, K. L., J. M. Hoenig, and J. E. Olney. 2002. Interpreting maturation data for American shad in the presence of fishing mortality: A look at historical data from the York River, Virginia. *North American Journal of Fisheries Management* 22(4):1209-1217. [https://doi.org/10.1577/1548-8675\(2002\)022<1209:IMDFAS>2.0.CO;2](https://doi.org/10.1577/1548-8675(2002)022<1209:IMDFAS>2.0.CO;2)

McBride, R. S., R. Ferreri, E. K. Towle, J. M. Boucher, and G. Basilone. 2016. Yolked oocyte dynamics support agreement between determinate- and indeterminate-method estimates of annual fecundity for a northeastern United States population of American shad. PLoS ONE 11(10):e0164203. <https://doi.org/10.1371/journal.pone.0164203>

Nack, C. C., D. P. Swaney, and K. E. Limburg. 2019. Historical and projected changes in spawning phenologies of American shad and striped bass in the Hudson River Estuary. Marine and Coastal Fisheries 11(3):271-284. <https://doi.org/10.1002/mcf2.10076>

O'Donnell, M. J., and B. H. Letcher. 2008. Size and age distributions of juvenile Connecticut River American shad above Hadley Falls: influence on outmigration representation and timing. River Research and Applications 24(7):929-940. <https://doi.org/10.1002/rra.1111>

Olney, J. E., S. C. Denny, and J. M. Hoenig. 2001. Criteria for determining maturity stage in female American shad, *Alosa sapidissima*, and a proposed reproductive cycle. Bulletin Francais de la Peche et de la Pisciculture 362-63:881-901.
<https://doi.org/10.1051/kmae:2001025>

Olney, J. E., and R. S. McBride. 2003. Intraspecific variation in batch fecundity of american shad: revisiting the paradigm of reciprocal latitudinal trends in reproductive traits. Pages 185-192 in K. E. Limburg and J. R. Waldman, editors. Biodiversity, status, and conservation of the world's shads. American Fisheries Society, Symposium 35, Bethesda, Maryland.
<https://catalog.cbfwl.org/cgi-bin/koha/opac-detail.pl?biblionumber=46329>

Poulet, C., G. Lassalle, A. Jordaan, K. E. L. C. C. Nack, J. A. Nye, A. O'Malley, B. O'Malley-Barber, D. S. Stich, J. R. Waldman, J. Zydlowski, and P. Lambert. 2023. Effect of straying, reproductive strategies, and ocean distribution on the structure of American shad populations. Ecosphere 14(12):e4712. <https://doi.org/10.1002/ecs2.4712>

Riley, K. L., S. M. Binion, and A. S. Overton. 2012. Estimating the food requirements and prey size spectra of larval American shad. Marine and Coastal Fisheries 4(1):228-238.
<https://doi.org/10.1080/19425120.2012.675979>

Savoy, T. F., V. A. Crecco, and B. C. Marcy, Jr. 2004. American shad early life history and recruitment in the Connecticut River: A 40-year summary. Pages 407-417 in P. M. Jacobson, D. A. Dixon, W. C. Leggett, B. C. Marcy, Jr., and R. R. Massengill, editors The Connecticut River ecological study (1965-1973) revisited: Ecology of the Lower Connecticut River 1973-2003. American Fisheries Society, Bethesda, Maryland.
<https://search.worldcat.org/title/58449270>

Shardo, J. D. 1995. Comparative embryology of teleostean fishes. I. Development and staging of the American shad, *Alosa sapidissima* (Wilson, 1811). Journal of Morphology 225(2):125-167.
<https://doi.org/10.1002/jmor.1052250202>

Tuckey, T. D., and J. E. Olney. 2010. Maturity schedules of female American shad vary at small spatial scales in Chesapeake Bay. North American Journal of Fisheries Management 30(4):1020-1031. <https://doi.org/10.1577/M09-178.1>

Walburg, C. H. 1957. Observations on the food and growth of juvenile American had, *Alosa sapidissima*. Transactions of the American Fisheries Society 86(1):302-306.
[https://doi.org/10.1577/1548-8659\(1956\)86\[302:OOTFAG\]2.0.CO;2](https://doi.org/10.1577/1548-8659(1956)86[302:OOTFAG]2.0.CO;2)

Weiss-Glanz, L. S., J. G. Stanley, and J. R. Moring. 1986. Species profiles: Life histories and environmental requirements of coastal fishes and invertebrates (North Atlantic): American shad. U.S. Fish and Wildlife Service Biological Report 82(11.59).
https://www.arlis.org/docs/vol1/AK_Heritage/FWS/BIOLRPT/82/BIOLRPT-82-11.59.pdf

Dam Passage

Aunins, A. W., B. L. Brown, M. Balazik, and G. C. Garman. 2013. Migratory movements of American shad in the James River fall zone, Virginia. North American Journal of Fisheries Management, 33(3): 569-575. <https://doi.org/10.1080/02755947.2013.768564>

Bailey, M. M., J. J. Isely, and W. C. Bridges, Jr. 2004. Movement and population size of American shad near a low-head lock and dam. Transactions of the American Fisheries Society 133(2):300-308. <https://doi.org/10.1577/03-025>

Barry, T., and B. Kynard. 1986. Attraction of adult American shad to fish lifts at Holyoke Dam, Connecticut River. North American Journal of Fisheries Management 6(2): 233-241.
[https://doi.org/10.1577/1548-8659\(1986\)6<233:AOAAT>2.0.CO;2](https://doi.org/10.1577/1548-8659(1986)6<233:AOAAT>2.0.CO;2)

Bell, C. E., and B. Kynard. 1985. Mortality of adult American shad passing through a 17-megawatt Kaplan turbine at a low-head hydroelectric dam. North American Journal of Fisheries Management, 5(1):33-38.
[https://doi.org/10.1577/1548-8659\(1985\)5<33:MOAASP>2.0.CO;2](https://doi.org/10.1577/1548-8659(1985)5<33:MOAASP>2.0.CO;2)

Castro-Santos, T., and A. Haro. 2015. Survival and behavioral effects of exposure to a hydrokinetic turbine on juvenile Atlantic salmon and adult American shad. Estuaries and Coasts 38(Suppl 1):203-214. <https://doi.org/10.1007/s12237-013-9680-6>

Caumartin, J., R. Verdon, D. Desrochers, A. Guindon, F. Lafleur, and F. Guay. 2020. Response of out-migrating adult American shad guided by spill and ultrasound as they approach Rivière-des-Prairies Hydroelectric Generating Station (Québec, Canada). North American Journal of Fisheries Management 40(3):773-788. <https://doi.org/10.1002/nafm.10445>

Collins, G. B. 1951. A fishway that shad ascend. U.S. Fish and Wildlife Service, Special Scientific Report: Fisheries 65, Washington. <https://spo.nmfs.noaa.gov/sites/default/files/legacy-pdfs/SSRF65.pdf>

Dubois, R. B., and S. P. Gloss. 1993. Mortality of juvenile American shad and striped bass passed through Ossberger crossflow turbines at a small-scale hydroelectric site. North American Journal of Fisheries Management 13(1):178-185.

[https://doi.org/10.1577/1548-8675\(1993\)013<0178:MOJASA>2.3.CO;2](https://doi.org/10.1577/1548-8675(1993)013<0178:MOJASA>2.3.CO;2)

Hard, A., and B. Kynard. 1997. Video evaluation of passage efficiency of American shad and sea lamprey in a modified Ice Harbor fishway. North American Journal of Fisheries Management 17(4):981-987. [https://doi.org/10.1577/1548-8675\(1997\)017<0981:VEOPEO>2.3.CO;2](https://doi.org/10.1577/1548-8675(1997)017<0981:VEOPEO>2.3.CO;2)

Haro, A., and T. Castro-Santos. 2012. Passage of American shad: Paradigms and realities. Marine and Coastal Fisheries 4(1):252-261. <https://doi.org/10.1080/19425120.2012.675975>

Haro, A., T. Castro-Santos, J. Noreika, and M. Odeh. 2004. Swimming performance of upstream migrant fishes in open-channel flow: A new approach to predicting passage through velocity barriers. Canadian Journal of Fisheries and Aquatic Sciences. 61(9):1590-1601. <https://doi.org/10.1139/f04-093>

Haro, A., M. Odeh, T. Castro-Santos, and J. Noreika. 1999. Effect of slope and headpond on passage of American shad and blueback herring through simple Denil and deepened Alaska steeppass fishways. North American Journal of Fisheries Management, 19(1):51-58. [https://doi.org/10.1577/1548-8675\(1999\)019<0051:EOSAHO>2.0.CO;2](https://doi.org/10.1577/1548-8675(1999)019<0051:EOSAHO>2.0.CO;2)

Haro, A., M. Odeh, J. Noreika, and T. Castro-Santos. 1998. Effect of water acceleration on downstream migratory behavior and passage of Atlantic salmon smolts and juvenile American shad at surface bypasses. Transactions of the American Fisheries Society 127(1):118-127. [https://doi.org/10.1577/1548-8659\(1998\)127<0118:EOWAOD>2.0.CO;2](https://doi.org/10.1577/1548-8659(1998)127<0118:EOWAOD>2.0.CO;2)

Heisey, P.G., D. Mathur, J. L. Fulmer, and E. Kotkas. 2008. Turbine passage survival of late running adult American shad and its potential effect on population restoration. Pages 141-152 in S. V. Amaral, D. Mathur, and E. P. Taft, editors. Advances in fisheries bioengineering.

American Fisheries Society, Symposium 61, Bethesda, Maryland.
<https://catalog.cbfwl.org/cgi-bin/koha/opac-detail.pl?biblionumber=31894>

Kahnle, A., and K. Hattala. 2012. Relative sensitivity of New England American shad to fishing, discard mortality, and dam passage failure or mortality. *Marine and Coastal Fisheries* 4(1):294-301. <https://doi.org/10.1080/19425120.2012.675981>

Kynard, B., and C. Buerkett. 1997. Passage and behavior of adult American shad in an experimental louver bypass system. *North American Journal of Fisheries Management* 17(3):734-742. [https://doi.org/10.1577/1548-8675\(1997\)017<0734:PABOAA>2.3.CO;2](https://doi.org/10.1577/1548-8675(1997)017<0734:PABOAA>2.3.CO;2)

Kynard, B. and J. O'Leary. 1993. Evaluation of a bypass system for spent American shad at Holyoke Dam, Massachusetts. *North American Journal of Fisheries Management*, 13(4):782-789. [https://doi.org/10.1577/1548-8675\(1993\)013<0782:EOABSF>2.3.CO;2](https://doi.org/10.1577/1548-8675(1993)013<0782:EOABSF>2.3.CO;2)

Mathur, D., P. G. Heisey, and D. A. Robinson. 1994. Notes: Turbine-passage mortality of juvenile American shad at a low-head hydroelectric dam. *Transactions of the American Fisheries Society* 123(1):108-111.
[https://doi.org/10.1577/1548-8659\(1994\)123<0108:NTPMOJ>2.3.CO;2](https://doi.org/10.1577/1548-8659(1994)123<0108:NTPMOJ>2.3.CO;2)

Monk, B., D. Weaver, C. Thompson, and F. Ossiander. 1989. Effects of flow and weir design on the passage behavior of American shad and salmonids in an experimental fish ladder. *North American Journal of Fisheries Management* 9(1):60-67. [https://doi.org/10.1577/1548-8675\(1989\)009<0060:EOFAWD>2.3.CO;2](https://doi.org/10.1577/1548-8675(1989)009<0060:EOFAWD>2.3.CO;2)

Moser, M. L., A. M. Darazsdi, and J. R. Hall. 2000. Improving passage efficiency of adult American shad at low-elevation dams with navigation locks. *North American Journal of Fisheries Management* 20(2):376-385. [https://doi.org/10.1577/1548-8675\(2000\)020<0376:IPEOAA>2.3.CO;2](https://doi.org/10.1577/1548-8675(2000)020<0376:IPEOAA>2.3.CO;2)

Mulligan, K. B., A. Haro, B. Towler, B. Sojkowski, and J. Noreika. 2019. Fishway entrance gate experiments with adult American shad. *Water Resources Research* 55(12):10839-10855. <https://doi.org/10.1029/2018WR024400>

Raabe, J. K., J. E. Hightower, T. A. Ellis, and J. J. Facendola. 2019. Evaluation of fish passage at a nature-like rock ramp fishway on a large coastal river. *Transactions of the American Fisheries Society*. 148(4):798-816. <https://doi.org/10.1002/tafs.10173>

Reading, H. H. 1982. Passage of juvenile chinook salmon, *Oncorhynchus tshawytscha*, and American shad, *Alosa sapidissima*, through various trashrake bar spacings. *Interagency*

Ecological Study Program for the Sacramento-San Joaquin Estuary Technical Report 5.
<https://catalog.cbfwl.org/cgi-bin/koha/opac-detail.pl?biblionumber=35844>

Smith, J. A., and J. E. Hightower. 2012. Effect of low-head lock-and-dam structures on migration and spawning of American shad and striped bass in the Cape Fear River, North Carolina. Transactions of the American Fisheries Society 141(2):402-413.
<https://doi.org/10.1080/00028487.2012.667043>

Sprankle, K. 2005. Interdam movements and passage attraction of American shad in the lower Merrimack River main stem. North American Journal of Fisheries Management, 25(4):1456-1466. <https://doi.org/10.1577/M04-049.1>

Stich, D. S., T. F. Sheehan, and J. D. Zydlowski. 2019. A dam passage performance standard model for American shad. Canadian Journal of Fisheries and Aquatic Sciences 76(5):762-779.
<https://doi.org/10.1139/cjfas-2018-0008>

Weaver, D. M., M. Brown, and J. D. Zydlowski. 2019. Observations of American shad *Alosa sapidissima* approaching and using a vertical slot fishway at the head-of-tide Brunswick Dam on the Androscoggin River, Maine. North American Journal of Fisheries Management 39(5): 989-998. <https://doi.org/10.1002/nafm.10330>