

Astoria Waterfront Bridge Replacement Project, Phase 2
References

- ABR. 2016. Protected-Species Monitoring at the Kodiak Ferry Terminal & Dock Improvements Project, Kodiak, Alaska, 2015–2016.
- Ahroon, W.A., R.P. Hamernik, and S.-F., Lei. 1996. The effects of reverberant blast waves on the auditory system. *Journal of the Acoustical Society of America* 100:2247-2257.
- American National Standards Institute (ANSI). 1986. Methods of measurement for impulse noise 3 (ANSI S12.7-1986). Acoustical Society of America, Woodbury, NY.
- ANSI. 1995. Bioacoustical Terminology (ANSI S3.20-1995). Acoustical Society of America, Woodbury, NY.
- ANSI, 2005. Measurement of sound pressure levels in air (ANSI S1.13-2005). Acoustical Society of America, Woodbury, NY.
- Archer, F.I., S.L. Mesnick, and A.C. Allen. 2010. Variation and predictors of vessel response behavior in a tropical dolphin community. NOAA Technical Memorandum NMFS-SWFSC-457, National Marine Fisheries Service, 60 p.
- Au, W.W.L. and M. Hastings. 2008. *Principles of Marine Bioacoustics*. Springer-Verlag, New York.
- Brown, R, S. Jefferies, D. Hatch., and B. Wright. 2015. *Field Report: 2015 Pinniped Research and Management Activities at Bonneville Dam*. October 30, 2015.
- Calambokidis, J., Barlow, J., Flynn, K., Dobson, E. and Steiger, G.H., 2017. Update on abundance, trends, and migrations of humpback whales along the US West Coast.
- Carlson, T.J., D.L. Woodruff, G.E. Johnson, N.P. Kohn, G.R. Ploskey, M.A. Weiland, et al. 2005. Hydroacoustic measurements during pile driving at the Hood Canal Bridge, September through November 2004. PNWD-3621, Prepared by Battelle Marine Sciences Laboratory for the Washington State Department of Transportation: 165.
- Carretta, J.V., K.A. Forney, E.M. Oleson, D.W. Weller, A.R. Lang, J. . Baker, M.M. Muto, B. Hanson, A.J. Orr, H. Huber, M.S. Lowry, J. Barlow, J.E. Moore, D. Lynch, L. Carswell, and R.L. Brownwell Jr. 2019. U.S. Pacific Marine Mammal Stock Assessments: 2018. NOAA Tech. Memo. NOAA-TM-NMFS-SWFSC-617. Nat. Mar. Fish. Serv., Southwest Fish. Sci. Center, La Jolla, CA. 382 p. Available online:
<https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region>

- Croll, D.A., C.W. Clark, J. Calambokidis, W.T. Ellison, and B.R. Tershy. 2001. Effect of anthropogenic low-frequency noise on the foraging ecology of Balaenoptera whales. *Animal Conservation* **4**(1):13-27.
- Ellison, W.T., B. Southall, C.W. Clark, and A.S. Frankel. 2012. A new context-based Approach to assess marine mammal behavioral responses to anthropogenic sounds. *Conservation Biology* **26**(1):21-28.
- Everitt, R.D., C.H. Fiscus, and R.L. DeLong. 1980. Northern Puget Sound marine mammals. Interagency Energy/Environment R&D Program Report EPA-600/7-80-139, Prepared by National Marine Fisheries Service for Environmental Protection Agency 150p.
- FHWA, 2011. FHWA Highway Noise Barrier Design Handbook. Available online at http://www.fhwa.dot.gov/environment/noise/noise_barriers/design_construction/design/.
- Finneran, J.J. 2015. Noise-induced hearing loss in marine mammals: A review of temporary threshold shift studies from 1996 to 2015. *Journal of the Acoustical Society of America* **138**:1702-1726.
- Finneran, J.J. and A.K. Jenkins. 2012. Criteria and thresholds for U.S. Navy acoustic and explosive effects analysis. Technical Report, Space and Naval Warfare Systems Center Pacific, U.S. Navy: 64.
- Finneran, J.J., C.E. Schlundt, D.A. Carder, J.A. Clark, J.A. Young, J.B. Gaspin, and S.H. Ridgway. 2000. Auditory and behavioral responses of bottlenose dolphins (*Tursiops truncatus*) and a beluga whale (*Delphinapterus leucas*) to impulsive sounds resembling distant signatures of underwater explosions. *Journal of the Acoustical Society of America* **108**:417-431.
- Finneran, J.J., C.E. Schlundt, R. Dear, D.A. Carder, and S.H. Ridgway. 2002. Temporary shift in masked hearing thresholds in odontocetes after exposure to single underwater impulses from a seismic watgun. *Journal of the Acoustical Society of America* **111**:2929-2940.
- Hanan & Associates, 2014. *Final Incidental Harassment Authorization Monitoring Report*. Issued June 28, 2013 – June 27, 2014 to the City of San Diego for La Jolla California Children's Pool Construction and Harbor Seal Monitoring. 35 Pages.
- Harris, C.M. (ed.). 1998. Handbook of Acoustical Measurements and Noise Control. Acoustical Society of America, Woodbury, NY.
- Hastings, M.C. and A.N. Popper. 2005. Effects of Sound on Fish. California Department of Transportation Contract 43A0139, Task Order 1. http://www.dot.ca.gov/hq/env/bio/files/Effects_of_Sound_on_Fish23Aug05.pdf.
- HDR. 2012. Naval Base Kitsap at Bangor Test Pile Program, Bangor, Washington. Final Marine Mammal Monitoring Report. Prepared for Naval Facilities Engineering Northwest.

- Hemilä, S., S. Nummela, A. Berta, and T. Reuter. 2006. High-frequency hearing in phocid and otariid pinnipeds: An interpretation based on inertial and cochlear constraints (L). *Journal of the Acoustical Society of America* **120**(6):3463-3466.
- Henderson, D., B. Hu, and E. Bielefeld. 2008. Patterns and mechanisms of noise-induced cochlear pathology. pp. 195-217 In Schacht, J., A.N. Popper, and R.R Fay (Eds.) *Auditory Trauma, Protection, and Repair*. New York: Springer.
- ISO (International Organization for Standardization). 2003. Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures (ISO 1996-1:2003(E)). International Organization for Standardization, Geneva.
- Kastak, D., J. Mulsow, A. Ghouli, and C. Reichmuth. 2008. Noise-induced permanent threshold shift in a harbor seal: Abstract. *Journal of the Acoustical Society of America* **123**:2986.
- Kastelein, R.A., J. Schop, R. Gransier, and L. Hoek. 2014. Frequency of greatest temporary hearing threshold shift in harbor porpoise (*Phocoena phocoena*) depends on the noise level. *Journal of the Acoustical Society of America* **136**:1410-1418.
- Kastelein, R.A., P.W. Wensveen, and L. Hoek. 2009. Underwater hearing sensitivity of harbor seals (*Phoca vitulina*) for narrow noise bands between 0.2 and 80 kHz. *Journal of the Acoustical Society of America* **126**:476.
- Kryter, K.D., W.D. Ward, J.D. Miller, and D.H. Eldredge. 1966. Hazardous exposure to intermittent and steady-state noise. *Journal of the Acoustical Society of America* **39**:451-464.
- Laake, J.L., M.S. Lowry, R.L. DeLong, S.R. Melin, and J.V. Carretta. 2018. Population growth and status of California sea lions. *The Journal of Wildlife Management*. DOI: 10.1002/jwmg.21405.
- LCEP, 2016. Quick Facts: What is an estuary? Retrieved on September 14, 2016 at <http://www.estuarypartnership.org/learn/quick-facts>.
- Lerma, D. 2014. Naval Base Point Loma Fleet Logistics Center Fuel Pier Replacement Project: Acoustic, marine mammal, green sea turtle, and California least tern monitoring report. Prepared by Tierra Data Inc. for Naval Facilities Engineering Command Southwest, 250 p.
- Loughlin, T. R., D. J. Rugh, and C. H. Fiscus. 1984. Northern sea lion distribution and abundance: 1956-1980. *J. Wildl. Manage.* **48**:729-740.
- Lusseau, D. and L. Bejder. 2007. The long-term consequences of short-term responses to disturbance experiences from whale watching impact assessment. *International Journal of Comparative Psychology* **201**(2-3):228-236.

- Madsen, P.T., M. Johnson, P.J.O. Miller, N.A. Soto, J. Lynch, and P. Tyack. 2006. Quantitative measures of air-gun pulses recorded on sperm whales (*Physeter macrocephalus*) using acoustic tags during controlled exposure experiments. *Journal of the Acoustical Society of America* **120**(4):2366-2379.
- Miller, J.D. 1974. Effects of noise on people. *Journal of the Acoustical Society of America* **56**:729-764.
- Mitson, R.B (ed.). 1995. Underwater noise of research vessels: Review and recommendations. Cooperative Research Report No. 209, International Council for the Exploration of the Sea: 65.
- Muto, M.M, V. T. Helker, R.P. Angliss, P.L. Boveng, J.M. Breiwick, M.F. Cameron, P.J. Clapham, S.P. Dahle, M.E. Dahlheim, B.S. Fadely, M.C. Ferguson, L.W. Fritz, R.C. Hobbs, Y.V. Ivashchenko, A.S. Kennedy, J.M. London, S.A. Mizroch, R.R. Ream, E.L. Richmond, K.E.W. Sheldon, K.L. Sweeney, R.G. Towell, P.R. Wade, J.M. Waite, and A.N. Zerbini. 2019. Alaska Marine Mammal Stock Assessments, 2018. U.S. Dep. Commer., NOAA Tech. Memo. Available online: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region>
- National Marine Fisheries Service (NMFS). 2016. Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing: Underwater Acoustic Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Department of Commerce, NOAA. NOAA Technical Memorandum NMFS-OPR-55.
- NMFS 2018a. 2018 Revision to: Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0): Underwater Thresholds for Onset of Permanent and Temporary Threshold Shifts. U.S. Department of Commerce, NOAA. NOAA Technical Memorandum NMFS-OPR-59.
- National Research Council (NRC). 2005. Marine mammal populations and ocean noise: Determining when noise causes biologically significant effects. National Academy of Sciences: 142.
- Nedwell, J. and B. Edwards. 2002. Measurements of underwater noise in the Arun River during piling at County Wharf, Li
- NIOSH (National Institute for Occupational Safety and Health). 1998. Criteria for a recommended standard: Occupational noise exposure. United States Department of Health and Human Services, Cincinnati, OH.
- NMFS, 2008. Seal & Sea Lion Facts of the Columbia River & Adjacent Nearshore Marine Areas. March 2008. Accessed online December 29, 2015 at <http://web.pdx.edu/~zelickr/biology253/lecture-otes/notes/Dr.Cook.Lecture/CRPinniped-FS.pdf>

- NMFS, 2013. "The Eastern Population of Steller Sea Lions, Now Recovered, Is Off the Threatened Species List." *NOAA Fisheries*. Accessed online September 13, 2016 at http://www.nmfs.noaa.gov/stories/2013/10/10_23_13eastern_steller_sea_lion_delisting.html
- NOAA, 2016a Harbor Seal (*Phoca vitulina*) website, accessed September 14, 2016 at <http://www.fisheries.noaa.gov/pr/species/mammals/seals/harbor-seal.html>
- NOAA, 2016b. NOAA Technical Memorandum NMFS. U.S. Pacific Marine Mammal Stock Assessments, Steller Sea Lion (*Eumetopias jubatus*): Eastern U.S. Stock. Revised 12/30/2016.
- Nowacek, D.P., M.P. Johnson, and P.L. Tyack. 2004. North Atlantic right whales (*Eubalaena glacialis*) ignore ships but respond to alerting stimuli. *Proceedings of the Royal Society of London B: Biological Sciences* 271(1536):227-231.
- OBEC Consulting Engineers. 2019. Astoria Waterfront Bridge Replacement Project Marine Mammal Monitoring Report Year 1 (2018-2019). Retrieved from <https://www.fisheries.noaa.gov/action/incidental-take-authorization-astoria-waterfront-bridge-replacement-astoria-oregon>
- ODFW, 2015. Marine Resources Website: Marine Mammal Species. Accessed December 29, 2015 online at www.dfw.state.or.us/MRP/mammals.species.asp.
- Oestman, R., D. Buehler, J. Reyff, and R. Rodkin. 2009. Technical guidance for assessment and mitigation of the hydroacoustic effects of pile driving on fish. Prepared by ICF Jones & Stokes and Illingworth & Rodkin, Inc. for the California Department of Transportation: 298.
- Pearson, W.H., J.R. Skalski, and C.I. Malme. 1992. Effects of sounds from a geophysical survey device on behavior of captive rockfish (*Sebastes* spp.). *Canadian Journal of Fisheries and Aquatic Sciences* 49:1343-1356.
- Popper, A.N., and M.C. Hastings. 2009. The effects of anthropogenic sources of sound on fishes. *Journal of Fish Biology* 75:455-489.
- Profita, 2015. Hungry Sea Lions Pile Into The Columbia River. EarthFix. March 26, 2015. Accessed online December 29, 2015 at <http://www.opb.org/news/article/hungry-sealions-pile-into-the-columbia-river/>.
- Reichmuth, C., A. Ghaul, J.M. Sillis, A. Rouse, and B.L. Southall. 2016. Low-frequency temporary threshold shift not observed in spotted or ringed seals exposed to single air gun impulses. *Journal of the Acoustical Society of America* 140:2648-2658.
- Reichmuth, C. and M.M. Holt. 2013. Comparative assessment of amphibious hearing in pinnipeds. *Journal of Comparative Physiology A: Neuroethology, Sensory, Neural and Behavioral Physiology* 199(6):491-507.

- Richardson, W.J., C.R. Greene, C.I. Malme, and D.H. Thomson. 1995. *Marine Mammals and Noise*. Academic Press, Inc., San Diego, CA.
- Schlundt, C.E., J.J. Finneran, D.A. Carder, and S.H. Ridgway. 2000. Temporary shift in masked hearing thresholds of bottlenose dolphins, *Tursiops truncatus*, and white whales, *Delphinapterus leucas*, after exposure to intense tones. *Journal of the Acoustical Society of America* **107** (6):3496-3508.
- Scholik, A.R. and H.Y. Yan. 2001. The effects of underwater noise on auditory sensitivity of fish. *Proceedings of the Institute of Acoustics* **23**(4):27.
- Scholik, A.R. and H.Y. Yan. 2002. The effects of noise on the auditory sensitivity of the bluegill sunfish, *Lepomis macrochirus*. *Comparative Biochemistry and Physiology - Part A: Molecular & Integrative Physiology* **133**(1):43-52.
- Schramm, Y., S.L. Mesnick, J. de la Rosa, D.M. Palacios, M.S. Lowry, D. Aurioles-Gamboa, H.M. Snell, and S. Escorza-Treviño. 2009. Phylogeography of California and Galapagos sea lions and population structure within the California sea lion. *Marine Biology* **156**:1375-1387.
- Skalski, J.R., W.H. Pearson, and C.I. Malme. 1992. Effects of sounds from a geophysical survey device on catch-per-unit-effort in a hook-and-line fishery for rockfish (*Sebastes* spp.). *Canadian Journal of Fisheries and Aquatic Sciences* **49**(7):1357-1365.
- Southall, B.L., A.E. Bowles, W.T. Ellison, J.J. Finneran, R.L. Gentry, C.R. Greene, et al. 2007. Marine mammal noise exposure criteria: initial scientific recommendations. *Aquatic Mammals* **33**(4):411-521.
- Technical Guidance, 2018 NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0)
<https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance>
- The Greenbusch Group, Inc. Pier 62 Project Draft Acoustic Monitoring Season 1 (2017/2018) Report. Retrieved from <https://www.fisheries.noaa.gov/action/incidental-take-authorization-pier-62-restoration-seattle-waterfront-elliott-bay>.
- Thorson, P. and J.A. Reyff. 2006. San Francisco-Oakland Bay Bridge East Span Seismic Safety Project: marine mammal and acoustic monitoring for the marine foundations at piers E2 and T1, January-September 2006. Prepared by SRS Technologies and Illingworth & Rodkin, Inc. for the California Department of Transportation: 51.
- R&M Consultants, Inc. 2016. Memorandum, Pile Installation/Removal Activities for the Biorca Island Dock Replacement, R&M Consultants, Inc., Vanguard Drive, Anchorage Alaska. December 9, 2016. 19 p.

- Urick, R.J. 1983. Principles of Underwater Sound. Peninsula Publishing, Los Altos, CA.
- Ward, W.D. 1960. Recovery from high values of temporary threshold shift. *Journal of the Acoustical Society of America* **32**:497-500.
- Ward, W.D. 1997. Effects of high-intensity sound. Pages 1497-1507 in M.J. Crocker, ed. Encyclopedia of acoustics, Volume III. John Wiley & Sons, New York.
- Ward, W.D., A. Glorig, and D.L. Sklar. 1958. Dependence of temporary threshold shift at 4 kc on intensity and time. *Journal of the Acoustical Society of America* **30**:944-954.
- Ward, W.D., A. Glorig, and D.L. Sklar. 1959. Temporary threshold shift from octave-band noise: Application to damage-risk criteria. *Journal of the Acoustical Society of America* **31**:522-528.
- Wartzok, D., A.N. Popper, J. Gordon, and J. Merrill. 2003. Factors affecting the responses of marine mammals to acoustic disturbance. *Marine Technology Society Journal* **37** (4):6-15.
- Wartzok D., A.N. Popper, J. Gordon J., and J. Merrill. 2004. Factors affecting the responses of marine mammals to acoustic disturbance. *Marine Technology Society Journal* **37**:6-15.
- Wartzok, D., and D.R. Ketten. 1999. Marine mammal sensory systems. pp 117-175 In J.E. Reynolds II & S.A. Rommel (Eds.), Biology of marine mammals. Washington, DC: Smithsonian Institution Press.
- Washington Department of Fish and Wildlife (WDFW). 2014. Steven Jeffries. Marine Mammal Investigations. Lakewood, WA (Excel data and narrative via email 10/6/2014).
- Weilgart, L.S. 2007. A brief review of known effects of noise on marine mammals. *International Journal of Comparative Psychology* **201** (2-3):159-168.
- Wright, Bryan E., Mathew Tennis J., and Robin Brown F. "Movements of Male California Sea Lions Captured in the Columbia River." Northwest Science 84.1 (2010): 60-72. Accessed online September 12, 2016 at https://www.researchgate.net/profile/Bryan_Wright2/publication/228658288_Movements_of_Male_California_Sea_Lions_Captured_in_the_Columbia_River/links/5464dcb60cf25b85d17d2083.pdf.
- WSDOT, 2016. Pile Diameter and Noise Levels. Accessed September 14, 2016 at <https://www.wsdot.com/sites/default/files/2017/12/12/ENV-FW-ImpactPileNoise.pdf>.
- Yazvenko, S.B., T.L. McDonald, S.A. Blokhin, S.R. Johnson, H.R. Melton, M.W. Newcomer, et al. 2007. Feeding of western gray whales during a seismic survey near Sakhalin Island, Russia. *Environmental Monitoring and Assessment* **134** (1-3):93-106.