

**References: United States Coast Guard Port Angeles Pier Maintenance and Bank Stabilization  
Proposed IHA (August 2023)**

- Ahroon, W.A., Hamernik, R.P., Lei, S.F., 1996. The effects of reverberant blast waves on the auditory system. *The Journal of the Acoustical Society of America* 100, 2247-2257.
- ANSI, 1986. *Methods of measurement for impulse noise*, Acoustical Society of America, Woodbury, NY.
- ANSI, 1995. *Bioacoustical terminology*, Acoustical Society of America, Woodbury, NY.
- ANSI, 2005. *Measurement of sound pressure levels in air*
- ANSI, 2013. *Performance and Calibration of Reference Sound Sources*, Acoustical Society of America, Woodbury, NY.
- Archer, F.I., Mesnick, S.L., Allen, A.C., 2010. Variation and predictors of vessel-response behavior in a tropical dolphin community.
- Au, W.W., Hastings, M.C., 2008. *Principles of Marine Bioacoustics*. Springer.
- Baird, R. W. (1994). Foraging behaviour and ecology of transient killer whales (*Orcinus orca*). Ph.D. Thesis, Simon Fraser University. Accessed July 2, 2023:  
[https://summit.sfu.ca/\\_flysystem/fedora/sfu\\_migrate/5048/b14873187.pdf](https://summit.sfu.ca/_flysystem/fedora/sfu_migrate/5048/b14873187.pdf)
- Barlow, J. 1988. Harbor porpoise (*Phocoena phocoena*) abundance estimation in California, Oregon and Washington: I. Ship surveys. *Fish. Bull.* 86:417-432.
- Barlow, J., C.W. Oliver, T.D. Jackson, and B.L. Taylor. 1988. Harbor porpoise, *Phocoena phocoena*, abundance estimation for California, Oregon, and Washington: II. Aerial surveys. *Fish. Bull.* 86:433-444.
- Beauchamp, G., Livoreil, B., 1997. The effect of group size on vigilance and feeding rate in spice finches (*Lonchura punctulata*). *Canadian Journal of Zoology* 75, 1526-1531.
- Bejder, L., Samuels, A., Whitehead, H., Finn, H., Allen, S., 2009. Impact assessment research: use and misuse of habituation, sensitisation and tolerance in describing wildlife responses to anthropogenic stimuli. *Marine Ecology Progress Series* 395, 177-185.
- Bejder, L., Samuels, A., Whitehead, H., Gales, N., 2006. Interpreting short-term behavioural responses to disturbance within a longitudinal perspective. *Animal behaviour* 72, 1149-1158.
- Bigg, M. A. 1969. The harbour seal in British Columbia. *Fish. Res. Bd. Can. Bull.* 172. 33 pp.

- Bigg, M. A. 1981. Harbour seal, *Phoca vitulina*, Linnaeus, 1758 and *Phoca largha*, Pallas, 1811. Pp. 1-27, In: Ridgway, S. H., and R. J. Harrison (eds.), *Handbook of Marine Mammals*. Vol. 2: Seals. Academic Press, New York. 359 pp.
- Blackwell, S., Lawson, J.W., Williams, M.T., 2004. Tolerance by ringed seals (*Phoca hispida*) to impact pipe-driving and construction sounds at an oil production island. *Journal of Acoustical Society of America* 115, 2346-2357.
- Blecha, F., 2000. Immune system response to stress, *The biology of animal stress: basic principles and implications for animal welfare.*, CABI Publishing Wallingford UK, pp. 111-121.
- Bowers, M.T., Friedlaender, A.S., Janik, V.M., Nowacek, D.P., Quick, N.J., Southall, B.L., Read, A.J., 2018. Selective reactions to different killer whale call categories in two delphinid species. *Journal of Experimental Biology* 221, jeb162479.
- Bowles, A.E., Smultea, M., Würsig, B., DeMaster, D.P., Palka, D., 1994. Relative abundance and behavior of marine mammals exposed to transmissions from the Heard Island Feasibility Test. *The Journal of the Acoustical Society of America* 96, 2469-2484.
- Bradshaw, C.J., Boutin, S., Hebert, D.M., 1998. Energetic implications of disturbance caused by petroleum exploration to woodland caribou. *Canadian Journal of Zoology* 76, 1319-1324.
- Branstetter, B.K., Trickey, J.S., Bakhtiari, K., Black, A., Aihara, H., Finneran, J.J., 2013. Auditory masking patterns in bottlenose dolphins (*Tursiops truncatus*) with natural, anthropogenic, and synthesized noise. *The Journal of the Acoustical Society of America* 133, 1811-1818.
- Burton, W.H., 1993. Effects of bucket dredging on water quality in the Delaware River and the potential for effects on fisheries resources.
- Burnham, R.E., Vagle, S., O'Neill, C., 2021. Spatiotemporal patterns in the natural and anthropogenic additions to the soundscape in parts of the Salish Sea, British Columbia, 2018–2020. *Marine Pollution Bulletin* 170, 112647.
- Calambokidis, J., Baird, R. W., & Olympia, W. (1994). Strait of Georgia, Puget Sound and the Juan de Fuca Strait and Potential Human Impacts. In *Symposium on the Marine Environment* (p. 283).
- Calambokidis, J., Flynn, K., Dobson, E., Huggins, J. L., & Perez, A. (2018). Return of the Giants of the Salish Sea: Increased occurrence of humpback and gray whales in inland waters. <https://cedar.wvu.edu/ssec/2018ssec/allsessions/593/>
- Calambokidis, J., J. Barlow, K. Flynn, E. Dobson, and G.H. Steiger. 2017. Update on abundance, trends, and migrations of humpback whales along the US West Coast. *International Whaling Commission Report SC/A17/NP/13*.

- Calambokidis, J., & Steiger, G. H. (1990). Sightings and movements of humpback whales in Puget Sound, Washington. *Northwestern Naturalist*, 71(2), 45-49.
- CALTRANS, 2015. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. , In: Molnar, M., Buehler, D., R. Oestman, J. Reyff, K. Pommerenck, B. Mitchell. (Ed.), CALTRANS Compendium, California Department of Transportation.
- CALTRANS, 2020. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish. , In: Molnar, M., Buehler, D., R. Oestman, J. Reyff, K. Pommerenck, B. Mitchell. (Ed.), CALTRANS Compendium, CALTRANS.
- Carretta, James V., Erin M. Oleson, Karin A. Forney, David W. Weller, Aimée R. Lang, Jason Baker, Anthony J. Orr, Brad Hanson, Jay Barlow, Jeffrey E. Moore, Megan Wallen, and Robert L. Brownell Jr. 2023. U.S. Pacific marine mammal stock assessments: 2022. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-684.  
<https://doi.org/10.25923/5ysf-gt95>
- Carlson, T., Woodruff, D., Johnson, G., Kohn, N., Ploskey, G., Weiland, M., Southard, J., Southard, S., 2005. Hydroacoustic measurements during pile driving at the Hood Canal Bridge, September through November 2004, Battelle Marine Sciences Laboratory Sequim, WA.
- Casper, B.M., Halvorsen, M.B., Carlson, T.J., Popper, A.N., 2017. Onset of barotrauma injuries related to number of pile driving strike exposures in hybrid striped bass. *The Journal of the Acoustical Society of America* 141, 4380-4387.
- Casper, B.M., Halvorsen, M.B., Matthews, F., Carlson, T.J., Popper, A.N., 2013. Recovery of barotrauma injuries resulting from exposure to pile driving sound in two sizes of hybrid striped bass. *PloS one* 8, e73844.
- Clark, C.W., Ellison, W.T., Southall, B.L., Hatch, L., Van Parijs, S.M., Frankel, A., Ponirakis, D., 2009. Acoustic masking in marine ecosystems: intuitions, analysis, and implication. *Marine Ecology Progress Series* 395, 201-222.
- Connor, R.C., Heithaus, M.R., 1996. Approach by great white shark elicits flight response in bottlenose dolphins. *Marine Mammal Science* 12, 602-606.
- Costa, D.P., Crocker, D.E., Gedamke, J., Webb, P.M., Houser, D.S., Blackwell, S.B., Waples, D., Hayes, S.A., Le Boeuf, B.J., 2003. The effect of a low-frequency sound source (acoustic thermometry of the ocean climate) on the diving behavior of juvenile northern elephant seals, *Mirounga angustirostris*. *The Journal of the Acoustical Society of America* 113, 1155-1165.
- Cott, P.A., Popper, A.N., Mann, D.A., Jorgenson, J.K., Hanna, B.W., 2012. Impacts of river-based air gun seismic activity on northern fishes, *The Effects of Noise on Aquatic Life*, Springer, pp. 367-369.

- Croll, D.A., Clark, C.W., Calambokidis, J., Ellison, W.T., Tershy, B.R., 2001. Effect of anthropogenic low-frequency noise on the foraging ecology of Balaenoptera whales. *Animal Conservation* 4, 13-27.
- Daan, S., Deerenberg, C., Dijkstra, C., 1996. Increased daily work precipitates natural death in the kestrel. *Journal of animal ecology*, 539-544.
- Dahlheim, M.E., A. Schulman-Janiger, N. Black, R. Ternullo, D. Ellifrit, and K.C. Balcomb. 2008. Eastern temperate North Pacific offshore killer whales (*Orcinus orca*): Occurrence, movements, and insights into feeding ecology. *Marine Mammal Science* 24(3): 719–729.
- DeLong, R. L., Melin, S. R., Harris, M. J., Gearin, P., Orr, A. J., Laake, J. L., & Oliver, J. (2017). Satellite tag tracking and behavioral monitoring of male California sea lions in the Pacific Northwest to assess haul-out behavior on Puget Sound Navy facilities and foraging behavior in marine Navy testing and training areas. Accessed August 23, 2023. [https://www.navymarinespeciesmonitoring.us/files/3215/9352/1624/DeLong\\_et\\_al\\_2017\\_Satellite\\_Tag\\_California\\_Sea\\_Lions\\_Pacific\\_Northwest.pdf](https://www.navymarinespeciesmonitoring.us/files/3215/9352/1624/DeLong_et_al_2017_Satellite_Tag_California_Sea_Lions_Pacific_Northwest.pdf)
- Di Iorio, L., Clark, C.W., 2010. Exposure to seismic survey alters blue whale acoustic communication. *Biology letters* 6, 51-54.
- Edgell, T.C., Demarchi, M.W., 2012. California and Steller sea lion use of a major winter haulout in the Salish Sea over 45 years. *Marine Ecology Progress Series* 467, 253-262.
- Ellison, W., Southall, B., Clark, C., Frankel, A., 2012. A new context-based approach to assess marine mammal behavioral responses to anthropogenic sounds. *Conservation Biology* 26, 21-28.
- England, G.R., Evans, D., Lautenbacher, C., Morrissey, S., Hogarth, W., 2001. Joint interim report Bahamas marine mammal stranding event of 15-16 March 2000. US Department of Commerce, US Secretary of the Navy.
- Erbe, C., 2008. Critical ratios of beluga whales (*Delphinapterus leucas*) and masked signal duration. *The Journal of the Acoustical Society of America* 124, 2216-2223.
- Erbe, C., Reichmuth, C., Cunningham, K., Lucke, K., Dooling, R., 2016. Communication masking in marine mammals: A review and research strategy. *Marine pollution bulletin* 103, 15-38.
- Erbe, C., Thomas, J.A., 2022. *Exploring Animal Behavior Through Sound: Volume 1: Methods*. Springer Nature.
- Escude, M.L.M., 2012. Concrete Pier Demolition. Underwater Sound Levels: SR 303 Manette Bridge Project, In: Transportation, W.S.D.o. (Ed.).
- Evenson, J.R., D. Anderson, B.L. Murphie, T.A. Cyra, and J. Calambokidis. 2016. Disappearance and return of harbor porpoise to Puget Sound: 20 year pattern revealed

- from winter aerial surveys. Technical Report. Washington Department of Fish and Wildlife, Wildlife Program and Cascadia Research Collective, Olympia, WA. 27 p.
- Fair, P.A., Becker, P.R., 2000. Review of stress in marine mammals. *Journal of Aquatic Ecosystem Stress and Recovery* 7, 335-354.
- Fay, R., 2009. Soundscapes and the sense of hearing of fishes. *Integrative Zoology* 4, 26-32.
- Fay, R.R., Popper, A.N., Webb, J.F., 2008. Introduction to fish bioacoustics. *Fish Bioacoustics: With 81 Illustrations*, 1-15.
- Fewtrell, J.L., McCauley, R.D., 2012. Impact of air gun noise on the behaviour of marine fish and squid. *Marine Pollution Bulletin* 64, 984-993.
- Finneran, J.J., 2015. Noise-induced hearing loss in marine mammals: A review of temporary threshold shift studies from 1996 to 2015. *The Journal of the Acoustical Society of America* 138, 1702-1726.
- Finneran, J.J., 2016. Auditory weighting functions and TTS/PTS exposure functions for marine mammals exposed to underwater noise, Space and Naval Warfare Systems Center Pacific San Diego United States.
- Finneran, J.J., Carder, D.A., Schlundt, C.E., Dear, R.L., 2010. Growth and recovery of temporary threshold shift at 3 kHz in bottlenose dolphins: Experimental data and mathematical models. *The Journal of the Acoustical Society of America* 127, 3256-3266.
- Finneran, J.J., Dear, R., Carder, D.A., Ridgway, S.H., 2003. Auditory and Behavioral Responses of California Sea Lions (*Zalophus californianus*) to Single Underwater Impulses From an Arc-Gap Transducer. *J. Acoust. Soc. Am.* 114, 1667-1677.
- Finneran, J.J., Schlundt, C.E., 2013. Effects of fatiguing tone frequency on temporary threshold shift in bottlenose dolphins (*Tursiops truncatus*). *The Journal of the Acoustical Society of America* 133, 1819-1826.
- Finneran, J.J., Schlundt, C.E., Carder, D.A., Clark, J.A., Young, J.A., Gaspin, J.B., Ridgway, S.H., 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. *J. Acoust. Soc. Am.* 108, 417-431.
- Finneran, J.J., Schlundt, C.E., Dear, R., Carder, D.A., Ridgway, S.H., 2002. Temporary Shift in Masked Hearing Thresholds in Odontocetes After Exposure to Single Underwater Impulses From a Seismic Watergun. *J. Acoust. Soc. Am.* 111, 2929-2940.
- Fisher, H. D. 1952. The status of the harbour seal in British Columbia, with particular reference to the Skeena River. *Fish. Res. Bd. Can. Bull.* 93. 58 pp.
- Foote, A.D., Osborne, R.W., Hoelzel, A.R., 2004. Whale-call response to masking boat noise. *Nature* 428, 910.

- Ford, J.K.B., and G.M. Ellis. 2006. Selective foraging by fish-eating killer whales *Orcinus orca* in British Columbia. *Marine Ecology Progress Series*, 316:185–199.
- Ford M.J., J. Hempelmann, M.B. Hanson, K.L. Ayres, R.W. Baird, C.K. Emmons, J.I. Lundin, G.S. Schorr, S.K. Wasser, L.K. Park. 2016. Estimation of a Killer Whale (*Orcinus orca*) Population's Diet Using Sequencing Analysis of DNA from Feces. *PLoS ONE* 11(1): e0144956.
- Ford, J.K.B., Stredulinsky, E.H., Ellis, G.M., Durban, J.W., Pilkington, J.F., 2014. Offshore Killer Whales in Canadian Pacific Waters: Distribution, Seasonality, Foraging Ecology, Population Status and Potential for Recovery. DFO Canadian Science Advisory Secretariat Research Document 2014/088. p. vii + 55.
- Ford, J.K., Reeves, R.R., 2008. Fight or flight: antipredator strategies of baleen whales. *Mammal Review* 38, 50-86.
- Frankel, A., Clark, C., 2000. Behavioral responses of humpback whales (*Megaptera novaeangliae*) to full-scale ATOC signals. *The Journal of the Acoustical Society of America* 108, 1930-1937.
- Fristrup, K.M., Hatch, L.T., Clark, C.W., 2003. Variation in humpback whale (*Megaptera novaeangliae*) song length in relation to low-frequency sound broadcasts. *The Journal of the Acoustical Society of America* 113, 3411-3424.
- Fritz, H., Guillemain, M., Durant, D., 2002. The cost of vigilance for intake rate in the mallard (*Anas platyrhynchos*): an approach through foraging experiments. *Ethology Ecology & Evolution* 14, 91-97.
- Gailey, G., Würsig, B., McDonald, T.L., 2007. Abundance, behavior, and movement patterns of western gray whales in relation to a 3-D seismic survey, Northeast Sakhalin Island, Russia. *Environmental Monitoring and Assessment* 134, 75-91.
- Gaskin, D. E. 1984. The harbour porpoise (*Phocoena phocoena* L.): regional populations, status, and information on direct and indirect catches. *Rep. int. Whal. Commn* 34:569\_586.
- Goldbogen, J.A., Friedlaender, A.S., Calambokidis, J., McKenna, M.F., Simon, M., Nowacek, D.P., 2013a. Integrative approaches to the study of baleen whale diving behavior, feeding performance, and foraging ecology. *BioScience* 63, 90-100.
- Goldbogen, J.A., Southall, B.L., DeRuiter, S.L., Calambokidis, J., Friedlaender, A.S., Hazen, E.L., Falcone, E.A., Schorr, G.S., Douglas, A., Moretti, D.J., 2013b. Blue whales respond to simulated mid-frequency military sonar. *Proceedings of the Royal Society B: Biological Sciences* 280, 20130657.
- Gomez, C., Lawson, J., Wright, A.J., Buren, A., Tollit, D., Lesage, V., 2016. A systematic review on the behavioural responses of wild marine mammals to noise: the disparity between science and policy. *Canadian Journal of Zoology* 94, 801-819.

- Goold, J.C., 1996. Acoustic assessment of populations of common dolphin *Delphinus delphis* in conjunction with seismic surveying. *Journal of the Marine Biological Association of the United Kingdom* 76, 811-820.
- Green, G. A., J. J. Brueggeman, R. A. Grotefendt, C. E. Bowlby, M. L. Bonnell, and K. C. Balcomb, III. 1992. Cetacean distribution and abundance off Oregon and Washington, 1989-1990. Ch. 1 In: J. J. Brueggeman (ed.). *Oregon and Washington Marine Mammal and Seabird Surveys*. Minerals Management Service Contract Report 14-12-0001-30426 prepared for the Pacific OCS Region.
- Halvorsen, M.B., Casper, B.M., Woodley, C.M., Carlson, T.J., Popper, A.N., 2012a. Threshold for onset of injury in Chinook salmon from exposure to impulsive pile driving sounds. *PLoS One* 7, e38968.
- Halvorsen, M.B., Zeddies, D.G., Ellison, W.T., Chicoine, D.R., Popper, A.N., 2012b. Effects of mid-frequency active sonar on hearing in fish. *The Journal of the Acoustical Society of America* 131, 599-607.
- Hanson, M.B., R.W. Baird, J.K.B. Ford, J. Hempelmann-Halos, D. M. Van Doornik, J.R. Candy, C. K. Emmons, G. S. Schorr, B. Gisborne, K. L. Ayres, S. K. Wasser, K. C. Balcomb, K. Balcomb-Bartok, J. G. Sneva, and M. J. Ford. 2010. Species and stock identification of prey consumed by endangered “southern resident” killer whales in their summer range. *Endangered Species Research* 11:69–82.
- Hanson, M.B., C.K. Emmons, M.J. Ford, M. Everett, K. Parsons, L.K. Park, J. Hempelmann, D.M. Van Doornik, G.S. Schorr, J.K. Jacobsen, M.F. Sears, M.S. Sears, J.G. Sneva, R.W. Baird, L. Barre. 2021. Endangered predators and endangered prey: Seasonal diet of Southern Resident killer whales. *PLoS ONE* 16(3): e0247031.
- Harrington, F.H., Veitch, A.M., 1992. Calving success of woodland caribou exposed to low-level jet fighter overflights. *Arctic*, 213-218.
- Hastings, M.C., Popper, A.N., 2005. Effects of sound on fish, California Department of Transportation.
- Hatch, L.T., Clark, C.W., Van Parijs, S.M., Frankel, A.S., Ponirakis, D.W., 2012. Quantifying loss of acoustic communication space for right whales in and around a US National Marine Sanctuary. *Conservation Biology* 26, 983-994.
- Hemilä, S., Nummela, S., Berta, A., Reuter, T., 2006. High-frequency hearing in phocid and otariid pinnipeds: An interpretation based on inertial and cochlear constraints. *The Journal of the Acoustical Society of America* 120, 3463-3466.
- Henderson, D., Hu, B., Bielefeld, E., 2008. Patterns and mechanisms of noise-induced cochlear pathology. *Auditory trauma, protection, and repair*, 195-217.
- Holberton, R.L., Helmuth, B., Wingfield, J.C., 1996. The corticosterone stress response in gentoo and king penguins during the non-fasting period. *Condor*, 850-854.

- Holt, M.M., Noren, D.P., Veirs, V., Emmons, C.K., Veirs, S., 2009. Speaking up: Killer whales (*Orcinus orca*) increase their call amplitude in response to vessel noise. *The Journal of the Acoustical Society of America* 125, EL27-EL32.
- Hood, L.C., Boersma, P.D., Wingfield, J.C., 1998. The adrenocortical response to stress in incubating Magellanic penguins (*Spheniscus magellanicus*). *The Auk* 115, 76-84.
- Hotchkin, C., Parks, S., 2013. The Lombard effect and other noise-induced vocal modifications: insight from mammalian communication systems. *Biological Reviews* 88, 809-824.
- Houghton, J., R.W. Baird, C.K. Emmons, and M.B. Hanson. 2015. Changes in the Occurrence and Behavior of Mammal-Eating Killer Whales in Southern British Columbia and Washington State, 1987–2010. *Northwest Science*, 89(2), 154–169.
- ISO, 2017. 1996 - 2:2017 Acoustics - Description, measurement, and assessment of environmental noise - Part 2: Determination of sound pressure levels, International Organization for Standardization.
- Jefferies, S.J., P.J. Gearin, H.R. Huber, D.L. Saul, and D. A. Pruett. 2000. Atlas of Seal and Sea Lion Haulout Sites in Washington. Washington Department of Fish Wildlife. Wildlife Science Division. 600 Capitol Way North, Olympia WA pp. 150.
- Jefferson, T.A., Smultea, M.A., Ward, E.J., Berejikian, B., 2021. Estimating the stock size of harbor seals (*Phoca vitulina richardii*) in the inland waters of Washington State using line-transect methods. *PLoS One* 16, e0241254.
- Jefferson, T.A., Smultea, M.A., Ward, E.J., 2023. Distribution and Abundance of California (*Zalophus californianus*) and Steller (*Eumetopias jubatus*) Sea Lions in the Inshore Waters of Washington, 2013-2016. *Aquatic mammals* 49, 366-381.
- Jessop, T.S., Tucker, A.D., Limpus, C.J., Whittier, J.M., 2003. Interactions between ecology, demography, capture stress, and profiles of corticosterone and glucose in a free-living population of Australian freshwater crocodiles. *General and comparative endocrinology* 132, 161-170.
- Jorgenson, J.K., Gyselman, E.C., 2009. Hydroacoustic measurements of the behavioral response of arctic riverine fishes to seismic airguns. *The Journal of the Acoustical Society of America* 126, 1598-1606.
- Kastak, D., Mulsow, J., Ghaul, A., Reichmuth, C., 2008. Noise-induced permanent threshold shift in a harbor seal. *The Journal of the Acoustical Society of America* 123, 2986-2986.
- Kastak, D., Reichmuth, C., Holt, M.M., Mulsow, J., Southall, B.L., Schusterman, R.J., 2007. Onset, growth, and recovery of in-air temporary threshold shift in a California sea lion (*Zalophus californianus*). *The Journal of the Acoustical Society of America* 122, 2916-2924.



- Kastak, D., Schusterman, R.J., Southall, B.L., Reichmuth, C.J., 1999. Underwater temporary threshold shift induced by octave-band noise in three species of pinniped. *J. Acoust. Soc. Am.* 106, 1142-1148.
- Kastelein, R., De Haan, D., Vaughan, N., Staal, C., Schooneman, N., 2001. The influence of three acoustic alarms on the behaviour of harbour porpoises (*Phocoena phocoena*) in a floating pen. *Marine Environmental Research* 52, 351-371.
- Kastelein, R.A., Gransier, R., Schop, J., Hoek, L., 2015. Effects of exposure to intermittent and continuous 6–7 kHz sonar sweeps on harbor porpoise (*Phocoena phocoena*) hearing. *The Journal of the Acoustical Society of America* 137, 1623-1633.
- Kastelein, R.A., Helder-Hoek, L., Cornelisse, S., Huijser, L.A., Gransier, R., 2019a. Temporary hearing threshold shift in harbor porpoises (*Phocoena phocoena*) due to one-sixth-octave noise band at 32 kHz. *Aquatic Mammals* 45, 549-562.
- Kastelein, R.A., Helder-Hoek, L., Cornelisse, S., Huijser, L.A., Terhune, J.M., 2019b. Temporary hearing threshold shift in harbor seals (*Phoca vitulina*) due to a one-sixth-octave noise band centered at 16 kHz. *The Journal of the Acoustical Society of America* 146, 3113-3122.
- Kastelein, R.A., Helder-Hoek, L., Defillett, L.N., Acoleyen, L.V., Huijser, L.A., Terhune, J.M., 2022a. Temporary Hearing Threshold Shift in California Sea Lions (*Zalophus californianus*) Due to One-Sixth-Octave Noise Bands Centered at 0.6 and 1 kHz. *Aquatic Mammals* 48.
- Kastelein, R.A., Helder-Hoek, L., Defillett, L.N., Huijser, L.A., Terhune, J.M., Gransier, R., 2021. Temporary Hearing Threshold Shift in California Sea Lions (*Zalophus californianus*) Due to One-Sixth-Octave Noise Bands Centered at 2 and 4 kHz: Effect of Duty Cycle and Testing the Equal-Energy Hypothesis. *Aquatic Mammals* 47.
- Kastelein, R.A., Helder-Hoek, L., Defillett, L.N., Kuiphof, F., Huijser, L.A., Terhune, J.M., 2022b. Temporary Hearing Threshold Shift in California Sea Lions (*Zalophus californianus*) Due to One-Sixth-Octave Noise Bands Centered at 8 and 16 kHz: Effect of Duty Cycle and Testing the Equal-Energy Hypothesis. *Aquatic Mammals* 48.
- Kastelein, R.A., Helder-Hoek, L., Gransier, R., 2019c. Frequency of greatest temporary hearing threshold shift in harbor seals (*Phoca vitulina*) depends on fatiguing sound level. *The Journal of the Acoustical Society of America* 145, 1353-1362.
- Kastelein, R.A., Jennings, N.V., Verboom, W.C., de Haan, D., Schooneman, N.M., 2006. Differences in the response of a striped dolphin (*Stenella coeruleoalba*) and a harbour porpoise (*Phocoena phocoena*) to an acoustic alarm. *Marine Environmental Research* 61, 363-378.
- Kastelein, R.A., Schop, J., Gransier, R., Hoek, L., 2014. Frequency of greatest temporary hearing threshold shift in harbor porpoises (*Phocoena phocoena*) depends on the noise level. *The Journal of the Acoustical Society of America* 136, 1410-1418.

- Kastelein, R.A., Verboom, W.C., Muijsers, M., Jennings, N.V., van der Heul, S., 2005. The influence of acoustic emissions for underwater data transmission on the behavior of harbour porpoises (*Phocoena phocoena*) in a floating pen. *Marine Environmental Research* 59, 287-307.
- Kastelein, R.A., Wensveen, P., Hoek, L., Terhune, J.M., 2009. Underwater hearing sensitivity of harbor seals (*Phoca vitulina*) for narrow noise bands between 0.2 and 80 kHz. *The Journal of the Acoustical Society of America* 126, 476-483.
- Ketten, D.R., Simmons, J.A., Riquimaroux, H., Simmons, A.M., 2021. Functional analyses of peripheral auditory system adaptations for echolocation in air vs. water. *Frontiers in Ecology and Evolution* 9, 661216.
- Krausman, P.R., Harris, L.K., Blasch, C.L., Koenen, K.K., Francine, J., 2004. Effects of military operations on behavior and hearing of endangered Sonoran pronghorn. *Wildlife Monographs* 157, 1-41.
- Kryter, K.D., 2013. *The effects of noise on man*. Elsevier.
- Kryter, K.D., Ward, W.D., Miller, J.D., Eldredge, D.H., 1966. Hazardous exposure to intermittent and steady-state noise. *The Journal of the Acoustical Society of America* 39, 451-464.
- Lankford, S., Adams, T., Miller, R., Cech Jr, J., 2005. The cost of chronic stress: impacts of a nonhabituating stress response on metabolic variables and swimming performance in sturgeon. *Physiological and Biochemical Zoology* 78, 599-609.
- Le Boeuf, B.J., Crocker, D.E., Costa, D.P., Blackwell, S.B., Webb, P.M., and Houser, D.S. 2000. Foraging ecology of northern elephant seals. *Ecological monographs*, 70(3), 353-382.
- Loughlin, T. R., Rugh, D. J., & Fiscus, C. H. (1984). Northern sea lion distribution and abundance: 1956-80. *The Journal of wildlife management*, 729-740.
- Lusseau, D., Bejder, L., 2007. The long-term consequences of short-term responses to disturbance experiences from whalewatching impact assessment. *International Journal of Comparative Psychology* 20.
- Madsen, P.T., 2005. Marine mammals and noise: Problems with root mean square sound pressure levels for transients. *Journal of the Acoustical Society of America* 117, 3952-3957.
- Madsen, P.T., Johnson, M., Miller, P., Aguilar Soto, N., Lynch, J., Tyack, P., 2006. Quantitative measures of air-gun pulses recorded on sperm whales (*Physeter macrocephalus*) using acoustic tags during controlled exposure experiments. *The Journal of the Acoustical Society of America* 120, 2366-2379.
- Malme, C.I., Miles, P.R., Clark, C.W., Tyack, P., Bird, J.E., 1984. Investigations of the potential effects of underwater noise from petroleum-industry activities on migrating gray-whale

behavior. Phase 2: January 1984 migration, United States, p. Medium: X; Size: Pages: 356.

- Martien, K.K., B.L. Taylor, F.I. Archer, K. Audley, J. Calambokidis, T. Cheeseman, J. De Weerd, A. Frisch Jordán, P. Martínez-Loustalot, C.D. Ortega-Ortiz, E.M. Patterson, N. Ransome, P. Ruvelas, J. Urbán Ramírez, and F. Villegas-Zurita. 2021. Evaluation of Mexico Distinct Population Segment of Humpback Whales as units under the Marine Mammal Protection Act. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-658. <https://doi.org/10.25923/nvw1-mz45>
- Miller, J.D., 1974. Effects of noise on people. *The Journal of the Acoustical Society of America* 56, 729-764.
- Miller, P.J., Biassoni, N., Samuels, A., Tyack, P.L., 2000. Whale songs lengthen in response to sonar. *Nature* 405, 903-903.
- Mitson, R.B., 1995. Underwater noise of research vessels: review and recommendations. ICES Cooperative Research Reports (CRR).
- Moberg, G.P., 1987. Influence of the adrenal axis upon the gonads. *Oxford reviews of reproductive biology* 9, 456-496.
- Moberg, G.P., 2000. Biological response to stress: Implications for animal welfare, in: Moberg, G.P., Mench, J.A. (Eds.), *The biology of animal stress: Basic principles and implications for animal welfare*, CABI, Wallingford, UK, pp. 1-21.
- Mooney, T.A., Nachtigall, P.E., Breese, M., Vlachos, S., Au, W.W., 2009. Predicting temporary threshold shifts in a bottlenose dolphin (*Tursiops truncatus*): The effects of noise level and duration. *The Journal of the Acoustical Society of America* 125, 1816-1826.
- Morton, A.B., Symonds, H.K., 2002. Displacement of *Orcinus orca* (L.) by high amplitude sound in British Columbia, Canada. *ICES Journal of Marine Science* 59, 71-80.
- Nachtigall, P.E., Supin, A.Y., Pacini, A.F., Kastelein, R.A., 2018. Four odontocete species change hearing levels when warned of impending loud sound. *Integrative zoology* 13, 160-165.
- Nedwell, J., Edwards, B., 2002. Measurements of underwater noise in the Arun River during piling at County Wharf, Littlehampton. Report by Subacoustech, Ltd. to David Wilson Homes Ltd.
- Ng, S.L., Leung, S., 2003. Behavioral response of Indo-Pacific humpback dolphin (*Sousa chinensis*) to vessel traffic. *Marine environmental research* 56, 555-567.
- NIOSH, 1998. Criteria for a recommended standard: Occupational noise exposure., United States Department of Health and Human Services, Cincinnati, OH.

- NMFS, 2012. Guidance Document: Data Collection Methods to Characterize Underwater Background Sound Relevant to Marine Mammals in Coastal Nearshore Waters and Rivers of Washington and Oregon.
- 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, US Department of Commerce Washington, DC, p. 178.
- NMFS, 2018. 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, National Oceanic and Atmospheric Administration, Silver Spring, MD.
- NMFS. 2019. Reviewing and designating stocks and issuing Stock Assessment Reports under the Marine Mammal Protection Act. National Marine Fisheries Service Procedure 02-204-03. Available at: <https://media.fisheries.noaa.gov/dam-migration/02-204-03.pdf>
- NMFS. 2022. Evaluation of MMPA Stock Designation for the Mexico Distinct Population Segment of humpback whales (*Megaptera novaeangliae*), currently a part of the California/Oregon/Washington and Central North Pacific (CNP) humpback whale stocks. National Marine Fisheries Service Memorandum for the Record: Management Considerations in Designating Demographically Independent Populations as Stocks under the Marine Mammal Protection Act
- NMFS. 2023. Guidelines for Preparing Stock Assessment Reports Pursuant to the Marine Mammal Protection Act. Protected Resources Policy Directive 02-204-01. <https://www.fisheries.noaa.gov/s3/2023-05/02-204-01-Final-GAMMS-IV-Revisions-clean-1-kdr.pdf>
- Northwest Environmental Consulting, LLC. 2018. P-993 TPS Port Angeles Forward Operating Location. Marine Mammal and Marbled Murrelet Monitoring Report. *Prepared for Orion Marine Group*. April 2018.
- Nowacek, D.P., Johnson, M., Tyack, P., 2004. North Atlantic right whales (*Eubalaena glacialis*) ignore ships but respond to alerting stimuli. *Proc. R. Soc. Lond. B* 271, 227-231.
- Nowacek, D.P., Thorne, L.H., Johnston, D.W., Tyack, P.L., 2007. Responses of cetaceans to anthropogenic noise. *Mammal Review* 37, 81-115.
- NRC, 2005. Marine mammal populations and ocean noise: determining when noise causes biologically significant effects. National Academies Press.
- Oestman, R., Buehler, D., Reyff, J., Rodkin, R., 2009. Technical guidance for assessment and mitigation of the hydroacoustic effects of pile driving on fish. Prepared for California Department of Transportation, CALTRANS Compendium, CALTRANS.
- Osborne, R., J. Calambokidis, and E. M. Dorsey. 1988. A Guide to Marine Mammals of Greater Puget Sound. Island Publishers, Anacortes, WA. 191 pp

- Parks, S.E., Clark, C.W., Tyack, P.L., 2007. Short-and long-term changes in right whale calling behavior: The potential effects of noise on acoustic communication. *The Journal of the Acoustical Society of America* 122, 3725-3731.
- Patry, K. 2022. Whale Watching in Washington. *Accessed online at:* [myportangeles.com/whalewatching-in-washington.html](http://myportangeles.com/whalewatching-in-washington.html). *Accessed on* June 2, 2022.
- Paxton, A.B., Taylor, J.C., Nowacek, D.P., Dale, J., Cole, E., Voss, C.M., Peterson, C.H., 2017. Seismic survey noise disrupted fish use of a temperate reef. *Marine Policy* 78, 68-73.
- Pearson, W.H., Skalski, J.R., Malme, C.I., 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.
- Peña, H., Handegard, N.O., Ona, E., 2013. Feeding herring schools do not react to seismic air gun surveys. *ICES Journal of Marine Science* 70, 1174-1180.
- Popper, A.N., Hastings, M., 2009. The effects of anthropogenic sources of sound on fishes. *Journal of fish biology* 75, 455-489.
- Popper, A.N., Hawkins, A.D., Fay, R.R., Mann, D.A., Bartol, S., Carlson, T.J., Coombs, S., Ellison, W.T., Gentry, R.L., Halvorsen, M.B., 2014. Effects of Sound Exposure. ASA S3/SC1. 4 TR-2014 Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI, 17-21.
- Purser, J., Radford, A.N., 2011. Acoustic noise induces attention shifts and reduces foraging performance in three-spined sticklebacks (*Gasterosteus aculeatus*). *PloS one* 6, e17478.
- Reichmuth, C., Ghoul, A., Sills, J.M., Rouse, A., Southall, B.L., 2016. Low-frequency temporary threshold shift not observed in spotted or ringed seals exposed to single air gun impulses. *The Journal of the Acoustical Society of America* 140, 2646-2658.
- Reichmuth, C., Holt, M.M., Mulsow, J., Sills, J.M., Southall, B.L., 2013. Comparative assessment of amphibious hearing in pinnipeds. *Journal of Comparative Physiology A* 199, 491-507.
- Reichmuth, C., Sills, J.M., Mulsow, J., Ghoul, A., 2019. Long-term evidence of noise-induced permanent threshold shift in a harbor seal (*Phoca vitulina*). *The Journal of the Acoustical Society of America* 146, 2552-2561.
- Richardson, W.J., Greene Jr, C.R., Malme, C.I., Thomson, D.H., 1995. *Marine Mammals and Noise*. Academic press.
- Ridgway, S., Carder, D., Finneran, J., Keogh, M., Kamolnick, T., Todd, M., Goldblatt, A., 2006. Dolphin continuous auditory vigilance for five days. *Journal of Experimental Biology* 209, 3621-3628.

- Ridgway, S., Carder, D., Smith, R., Kamoinick, T., Schlundt, C., Elsberry, W., 1997. Behavioural Responses and Temporary Shift in Masked Hearing Threshold of Bottlenose Dolphins, *Tursiops truncatus*, to 1-second Tones of 141 to 201 DB Re 1 Mu Pa.
- Rolland, R.M., Parks, S.E., Hunt, K.E., Castellote, M., Corkeron, P.J., Nowacek, D.P., Wasser, S.K., Kraus, S.D., 2012. Evidence that ship noise increases stress in right whales. *Proceedings of the Royal Society B: Biological Sciences* 279, 2363-2368.
- Romano, T., Keogh, M., Danil, K., 2002a. Investigation of the effects of repeated chase and encirclement on the immune system of spotted dolphins (*Stenella attenuata*) in the Eastern Tropical Pacific, In: Service, N.M.F. (Ed.), National Oceanic and Atmospheric Administration.
- Romano, T., Keogh, M., Kelly, C., Feng, P., Berk, L., Schlundt, C., Carder, D., Finneran, J., 2004. Anthropogenic sound and marine mammal health: measures of the nervous and immune systems before and after intense sound exposure. *Canadian Journal of Fisheries and Aquatic Sciences* 61, 1124-1134.
- Romano, T.A., Olschowka, J., Felten, S., Quaranta, V., Ridgway, S., Felten, D., 2002b. Immune response, stress, and environment: Implications for cetaceans. *Cell and Molecular Biology of Marine Mammals*; CJ Pfeiffer, ed. Krieger Publishing Co., Inc.
- Santulli, A., Modica, A., Messina, C., Ceffa, L., Curatolo, A., Rivas, G., Fabi, G., D'Amelio, V., 1999. Biochemical responses of European sea bass (*Dicentrarchus labrax* L.) to the stress induced by off shore experimental seismic prospecting. *Marine Pollution Bulletin* 38, 1105-1114.
- Scheffer, V. B., and J. W. Slipp. 1944. The harbor seal in Washington State. *Amer. Midl. Nat.* 32:373-416
- Schlundt, C.E., Finneran, J.J., Carder, D.A., Ridgway, S.H., 2000. Temporary shift in masked hearing thresholds of bottlenose dolphins, *Tursiops truncatus*, and white whales, *Delphinapterus leucas*, after exposure to intense tones. *The Journal of the Acoustical Society of America* 107, 3496-3508.
- Scholik, A.R., Yan, H.Y., 2001. The effects of underwater noise on auditory sensitivity of fish. *Proceedings of the Institute of Acoustics* 23, 27-36.
- Scholik, A.R., Yan, H.Y., 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, 43-52.
- Selye, H., 1950. Stress and the general adaptation syndrome. *British medical journal* 1, 1383.
- Sills, J.M., Ruscher, B., Nichols, R., Southall, B.L., Reichmuth, C., 2020. Evaluating temporary threshold shift onset levels for impulsive noise in seals. *The Journal of the Acoustical Society of America* 148, 2973-2986.

- Skalski, J.R., Pearson, W.H., Malme, C.I., 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, 1357-1365.
- Smultea, M. A., T. A. Jefferson, S. Courbis, G. Campbell, and J. Hopkins. 2015. Marine mammal aerial surveys conducted in the inland Puget Sound waters of Washington, summer 2013-spring 2015. Draft Final Report. Prepared for Commander, U.S. Pacific Fleet. Submitted to Naval Facilities Engineering Command Pacific, Pearl Harbor, Hawaii under Contract No. N62470-10-D-3011, Task Order JP04 issued to HDR, Inc., San Diego, CA. 09 October 2015
- Southall, B.L., Bowles, A.E., Ellison, W.T., Finneran, J.J., Gentry, R.L., Greene, C.R., Kastak, D., Ketten, D.R., Miller, J.H., Nachtigall, P.E., Richardson, W.J., Thomas, J.A., Tyack, P.L., 2007. Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations. Aquatic Mammals 33, 411-521.
- Southall, B.L., Finneran, J.J., Reichmuth, C., Nachtigall, P.E., Ketten, D.R., Bowles, A.E., Ellison, W.T., Nowacek, D.P., Tyack, P.L., 2019. Marine mammal noise exposure criteria: Updated scientific recommendations for residual hearing effects. Aquatic Mammals 45, 125-232.
- Stewart, B. S., B. J. Le Boeuf, P. K. Yochem, H. R. Huber, R. L. DeLong, R. J. Jameson, W. Sydeman, and S. G. Allen. 1994. History and present status of the northern elephant seal population. In: B. J. Le Boeuf and R. M. Laws (eds.) Elephant Seals. Univ. Calif. Press, Los Angeles.
- Stone, G.S., Cavagnaro, L., Hutt, A., Kraus, S., Baldwin, K., Brown, J., 2000. Reactions of Hector's dolphins to acoustic gillnet pingers. Published client report on contract 3071, 29.
- Taylor B.L., K.K. Martien, F.I. Archer, K. Audley, J. Calambokidis, T. Cheeseman, J. De Weerd, A. Frisch Jordán, P. Martínez-Loustalot, C.D. Ortega-Ortiz, E.M. Patterson, N. Ransome, P. Ruvelas, J. Urbán Ramírez. 2021. Evaluation of Humpback Whales Wintering in Central America and Southern Mexico as a Demographically Independent Population. NOAA Technical Memorandum, NOAA-NMFS-SWFSC-655.
- Teilmann, J., Tougaard, J., Miller, L.A., Kirketerp, T., Hansen, K., Brando, S., 2006. Reactions of captive harbor porpoises (*Phocoena phocoena*) to pinger-like sounds. Marine Mammal Science 22, 240-260.
- Thorson, P., Reyff, J., 2006. San Francisco-Oakland Bay bridge east span seismic safety project marine mammals 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.
- Tyack, P.L., 2008. Implications for marine mammals of large-scale changes in the marine acoustic environment. Journal of Mammalogy 89, 549-558.

- U.S. Navy. 2019. U.S. Navy Marine Species Density Database Phase III for the Northwest Training and Testing Study Area. NAVFAC Pacific Technical Report. Naval Facilities Engineering Command Pacific, Pearl Harbor, HI. 262 pp.
- Urick, R.J., 1983. Principles of underwater sound. 3rd ed. McGraw-Hill, New York, NY.
- Wade, P. R. 2021. Estimates of abundance and migratory destination for North Pacific humpback whales in both summer feeding areas and winter mating and calving areas. International Whaling Commission Report SC/68c/IA/03.
- Ward, W., 1997. Effects of high intensity sound, Pp, 1497-1507 in Encyclopedia of Acoustics, MJ Crocker, ed, New York: J. Wiley and Sons, Inc.
- Ward, W.D., 1960. Recovery from high values of temporary threshold shift. The Journal of the Acoustical Society of America 32, 497-500.
- Ward, W.D., Glorig, A., Sklar, D., 1958. Dependence of temporary threshold shift at 4 kc on intensity and time. The Journal of the Acoustical Society of America 30, 944-954.
- Ward, W.D., Glorig, A., Sklar, D.L., 1959. Temporary threshold shift from octave-band noise: applications to damage-risk criteria. The Journal of the Acoustical Society of America 31, 522-528.
- Wardle, C., Carter, T., Urquhart, G., Johnstone, A., Ziolkowski, A., Hampson, G., Mackie, D., 2001. Effects of seismic air guns on marine fish. Continental shelf research 21, 1005-1027.
- Wartzok, D., Ketten, D.R., 1999. Marine mammal sensory systems. Biology of marine mammals 1, 117-175.
- Wartzok, D., Poppper, A., Gordon, J., Merrill, J., 2004. Factors affecting the responses of marine mammals to acoustic disturbance. Marine Technology Society Journal 37.
- Weilgart, L.S., 2007. The impacts of anthropogenic ocean noise on cetaceans and implications for management. Canadian journal of zoology 85, 1091-1116.
- Yazvenko, S., McDonald, T., Blokhin, S., Johnson, S., Melton, H., Newcomer, M., Nielson, R., Wainwright, P., 2007. Feeding of western gray whales during a seismic survey near Sakhalin Island, Russia. Environmental Monitoring and Assessment 134, 93-106.
- Young, N. C., Brower, A. A., Muto, M. M., Freed, J. C., Angliss, R. P., Friday, N. A., Boveng, P. L., Brost, B. M., Cameron, M. F., Crance, J. L., Dahle, S. P., Fadely, B. S., Ferguson, M. C., Goetz, K. T., London, Oleson, E. M., J. M., Ream, R. R., Richmond, E. L., Sheldon, K. E. W., Sweeney, K. L., Towell, R. G., Wade, P. R., Waite, J. M., and Zerbini, A. N. 2023. Alaska marine mammal stock assessments, 2022. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-AFSC-474, 316 p.



Zelick, R., Mann, D.A., Popper, A.N., 1999. Acoustic communication in fishes and frogs, Comparative hearing: Fish and amphibians, Springer-Verlag, New York, NY, pp. 363-411.