USFWS (Oregon Fish and Wildlife Office and Columbia River Fish and Wildlife Conservation Office) combined comments on ODFW Rule 635, submitted on May 3, 2021 via the ODFW online public form.

Rule-Specific Line #	**Rationale for change**	**Suggested rule change.**
General	The format of the document (an outline with no indentation) provided with numbered lines was difficult to review, and took unnecessary time to track how bullets related to earlier bullets.	Recommend ODFW provide a formatted outline with line numbering for such reviews.
General/ Possibly 633-635?	Consider adding dewatering criteria in this rule. Dewatering streambeds are common when construction passage improvements or culvert replacements. Because larval lamprey live in sediments for 3-8 years, and can be numerous in suitable habitats, localized populations are impacted when drawdowns dewater and kills 100s to 1000s of larval lamprey of multiple age classes. Drawdowns should be 1-2 inches per hour increases survival of larval Entosphenus and Lampetra species. There are dewatering/salvage/e-fishing guidelines and information in Best Management Guidelines for Native Lampreys During In-water Work (Lamprey Technical Workgroup 2020: https://www.fws.gov/pacificlamprey/Documents/2020%20Lamprey%20BMG%20Final.pdf)	
General	To address screening for lamprey species, there are screening guidelines and information in *Appendix D* of the Best Management Guidelines for Native Lampreys During In-water Work (Lamprey Technical Workgroup 2020: https://www.fws.gov/pacificlamprey/Documents/2020%20Lamprey%20BMG%20Final.pdf) These guidelines could be applied based on the likely size of larval lamprey and appropriate screening size that would be encountered at a specific site, for fish passage and for when dewatering construction areas using pumps.	
144	Consider adding Peamouth Chub (*Mylocheilus caurinus*) as a migratory fish. This species has fluvial movement patterns (perhaps	**Insert** Peamouth Chub (*Mylocheilus caurinus*) as a migratory fish.

	adfluvial in some places) during its spawning period. It utilizes similar spawning habitat as steelhead.	
424-425	Here and throughout, where relevant, consider consistency with *NMFS (National Marine Fisheries Service). 2011. Anadromous Salmonid Passage Facility Design. NMFS, Northwest Region, Portland, Oregon, or the most up-to-date version of that document*. For example "***4.2.2.3 Attraction Flow:*** *Attraction flow from the fishway entrance should be between 5% and 10% of fish passage design high flow (see Section 3) for streams with mean annual stream flows exceeding 1000 cfs. For smaller streams, when feasible, use larger percentages (up to 100%) of streamflow. Generally speaking, the higher percentages of total river flow used for attraction into the fishway, the more effective the facility will be in providing upstream passage. Some situations may require more than 10% of the passage design high flow, if site features obscure approach routes to the passage facility."*	Recommend ODFW compare NMFS and ODFW criteria where relevant. To the extend that opposing criteria should be reduced or minimized. If opposing criteria, such as jump height are encountered, the metric most beneficial (smaller jump height) for example should be used. Overall this will reduce compliance issues for third parties.
426	Current rule revisions do not mention the need for laminar flow. Turbulence and non-laminar flows create confusing signals for migratory fish. Velocities within fishways and at entrances should be designed for laminar flow. Minimizing turbulent flows within fishways and creating entrances with laminar flow will increase passage success for a full suite of native fish including lamprey species, juvenile of salmonids and other native fish, native suckers, etc.	**Insert between Line 426 and 427:** Velocities in fishways and at entrances should be designed to be non-turbulent and laminar. Auxiliary water supply, if present, should not increase turbulence or confusing flows.
248-431	These appear to be criteria developed for trout and anadromous salmon, but do not state that, and do not recognize the multiple migratory fish species for which ODFW is proposing to manage and provide guidance on fish passage. For lamprey species, velocities of 5 and 8 feet per second could limit passage of Entosphenus (unless smooth continuous attachment surfaces are provided), and will limit passage of Lampetra species.	**Insert after line 431:** (D) Additional criteria may be required to provide passage for all migratory fish present at the location, including but not limited to Sections [Refer to species-specific portions]
432-434	A 6 inch jump does not recognize the multiple migratory fish species for which ODFW is proposing to manage and provide guidance on	**At the end of line 434**, add the following text:

	fish passage. USFWS's review focused primarily on Lampetra and Entosphenus, which are species that cannot jump. Many other native migratory fish also have limited jumping ability compared to adult salmonids. To the extent possible, modern nature-like fishways without jumps and stream simulation designs (with channel designed to 1.5 times active channel width) should be considered and noted as "preferred."	"; for areas where Entosphenus and Lampetra species require adult fish passage, there shall be no difference in the upstream and downstream water surface elevation (no rise)."
469-471	(2) (j) F The USFWS will be publishing Fish Passage Guideline in 2021 or 2022- the OARs should allow for the flexibility for ODFW to use this guideline document (not strict criteria). These guidelines will address passage for both bull trout and Pacific lamprey. In addition to that future document, there are two existing lamprey passage guideline documents for Entosphenus species- one Pacific lamprey passage in "standard"/salmonid fishways: *Practical Guidelines for Incorporating Adult Pacific Lamprey Passage at Fishways* (Lamprey Technical Workgroup 2017) And one for culvert passage: *Barriers to Adult Pacific Lamprey at Road Crossings: Guidelines for Evaluating and Providing Passage* (Lamprey Technical Workgroup 2020). We recommend that the OARs allow flexibility for ODFW to use these documents and, where appropriate, use or reference in ODFW's development of fish passage guidance documents.	
475-476	Denil fishways have not been evaluated for many native species including lampreys. At Warm Springs National Fish Hatchery, adult Pacific Lamprey were found dead below the denil ladder. Denil weirs should be avoided in areas where lampreys are present, or passage for other native, non-salmonid fish species.	**After line 476:** Suggest adding language :"Denil fishways are not appropriate for passage of lampreys and many other native, non-salmonid fish species. In areas where native fish species require passage, but that passage of that species has not been evaluated for denil fishways, denil fishways should not be used."
501	Stream simulation should be identified as the preferred option for fish passage. Given the wide range of fish species and various	Add the words "preferred alternative" after Stream Simulation Option:

	swimming abilities, stream simulation is the best alternative to provide passage for all fish species. It also best addresses riverine processes and other aquatic organisms, and provides the most ecological benefit short of structure removal.	(a) Stream Simulation Option (preferred alternative)
504-505	Stream simulation at 1.5 times active channel width is preferred over "equal to" active channel width. The larger span will likely ensure upstream passage for a larger number of migratory fish species, especially smaller species like western brook lamprey and Miller Lake lamprey.	**Line 504:** Suggest replacing "equal to active channel" with "1.5 times active channel"
508-509	Adult Pacific Lamprey migrate throughout the year and experience variable stream flow conditions. At velocities higher than the critical swimming speed (>0.86m/s) Pacific Lamprey use burst-and-attach swimming behavior (PLTW 2017). Given areas to attach and rest, lamprey can successfully navigate velocities <2.5m/s (8.2ft/s) (Keefer et al 2010). Oversized boulders provide attachment locations that allow lamprey to rest, which can be useful at higher flows throughout the year even when navigating relatively short structures. Oregon's other native lamprey are likely weaker swimmers than Pacific Lamprey, though their swimming abilities have not been explicitly studied. Oversized boulders would therefore be beneficially to the other native lamprey species at various velocities. Pacific Lamprey Technical Workgroup. 2017. Practical guidelines for incorporating adult Pacific lamprey passage at fishways. June 2017. White Paper. 47 pp + Appendix. Available online: https://www.fws.gov/pacificlamprey/mainpage.cfm Keffer, M.L., W.R. Daigle, C.A. Peery, H.T. Pennington, S.R. Lee, and M.L. Moser. 2010. Testing Adult Pacific Lamprey Performance at Structural Challenges in Fishways. North American Journal of Fisheries Management 30: 376-385.	Suggest changing **existing line 509** that to read: "Contains partially-buried, over-sized rock for all road-stream crossing structure"; Current language has over size rocks only in crossing over 40 feet in length.

516-517	Open-bottomed and closed-bottom road-stream crossing structures shall have bed material under or within the structure that are mechanically placed during structure installation rather than allowed to naturally accumulate. If material from outside the stream will be brought in and placed within the culvert, these materials should be cleaned prior to being put into the culvert to eliminate the risk of accidentally introducing organisms (e.g., non-native or invasive) from outside of the stream.	Suggest inserting a new line after line **517** to indicate material brought in from outside the stream will be cleaned prior to placement under or within the road-stream crossing.
560	Adult Pacific lamprey can be collected in traps targeting other larger species. To reduce this potential, traps should be designed such that Pacific Lamprey can pass.	(6) Where relevant, traps targeting other species should be comprised of a material that allows adult Pacific lamprey to pass through with a spacing equal to or greater than 1.0 inches.
587-593	Pacific lamprey (*Entosphenus tridentata*) should be addressed separately from *Lampetra* spp. Adult Pacific lamprey are larger, have a unique ability to climb, are larger, and their passage and swimming abilities have been documented and evaluated to some degree. Critical swimming speed of adult Pacific lamprey (Mesa et al. 2003; Moser and Mesa 2009). Velocities in the range of 2.5 - 3.0 m/sec (8.2 - 9.8 fps) exceeds burst swimming abilities and substantially inhibits (e.g., likely blocks) lamprey passage (LTW 2017). Fishways designed with velocities in less than 2.8 fps will pass Pacific lamprey using critical and free-swimming locomotion. Pacific lamprey more readily move with free-swimming in velocities < 1.2 m/sec (3.9 fps), which exceeds, but is close to sustained swimming abilities. Denil and similar fishways have not been evaluated for Pacific lamprey and are not recommended for use for lamprey. They likely limit passage of other small-bodied native migratory fishes as well. Denil weirs should not be used until such time that passage efficiency trials have occurred for Pacific lampreys.	**Insert** a new section at **LINE 586 as follows** (modified from the Lampetra spp. Section). Suggest the following text: **(7) (c) Entosphenus species (Pacific lamprey):** **(A**) Stream simulation techniques are preferred (span = 1.5 active channel width); **(B)** Fishways and culverts shall not have overhanging surfaces (e.g. entrance floor to fishways and culverts shall be submerged); **(C)** Fishways shall have smooth rounded 4 to 6 inch radii surfaces over which Entosphenus species may pass to move upstream. This includes but is not limited to the fishway entrance, over or through weirs, slots and orifices, as well as culvert aprons. **(E**) Orifices are preferred when possible. If orifices (including entrances) are applicable,

	CITATIONS Mesa, M.G., J.M. Bayer, and J.G. Seelye. 2003. Swimming performance and physiological responses to exhaustive exercise in radio-tagged and untagged Pacific lampreys. Transactions of the American Fisheries Society 132:483–492. Pacific Lamprey Technical Workgroup. 2017. Practical guidelines for incorporating adult Pacific lamprey passage at fishways. June 2017. White Paper. 47 pp + Appendix. Available online: https://www.fws.gov/pacificlamprey/mainpage.cfm Moser, M.L., and M.G. Mesa. 2009. Passage considerations for lamprey. Pages 115-124 in: L.R. Brown, S.D. Chase, M.G. Mesa, R.J. Beamish and P.B. Moyle, editors. American Fisheries Society Symposium 72: Biology, Management and Conservation of Lampreys in North America. Bethesda, Maryland.	they shall be positioned flush to the fishway floor, and if possible, flush along one wall. **(F)** Fishways shall, in all locations have water velocities no greater than *2.8 feet per second and avoid turbulent flow to pass Entosphenus species. Fishway flows at the entrance and throughout the fishway should be non-turbulent and laminar flow. **(G)** Dams associated with fishways shall have smooth 4- 6 inch rounded surfaces which allow Entosphenus species to pass over. Dams with 90 degree corners or chamfers can limit passage for Entosphenus species. **(H)** In areas of high velocities (>2.5 feet per second), regular maintenance and repair of floors, walls and rounded surfaces is needed to ensure smooth, continuous attachment surfaces are available for burst and attach locomotion. **(I)** Passage for lamprey at tide gate entrances and exits is not studied; thus, new tide gates should be avoided. **(J)** Denil fishways should not be used for passage of lampreys. **(K)** Picketed leads, picket weirs, auxiliary water supply grating or any other grating shall have a spacing of less than 0.7 inches to preclude lamprey passage where applicable, or greater than 1.0 inch to allow passage through, where applicable.

588-593	Passage of any Lampetra species has not been well studied; thus stream simulation design that provides a natural type channel provides the greatest potential for passage. Lampetra species are also smaller than Entosphenus spp., and likely have reduced swimming abilities than Entosphenus spp. Lamprey species cannot jump, and primarily swim low in the water column. Thus, overhanging surfaces (such as a perched culverts) or other features that require jumping to pass upstream are passage barriers for these species. To accommodate lamprey species behaviors and abilities, nature-like fishways and stream simulation techniques are the most likely to success in passage of these species (as well as many other smaller migratory fish species and amphibians). If fishways are constructed, lower orifices flush to the floor are preferred when orifices are present in fishways.	**Insert** the modified section below to replace the Lampetra spp. (**lines 588-593)**. Proposed section: **(7) (d)** Lampetra species (lampreys): **(A)** Stream simulation techniques are preferred (span = 1.5 active channel width); **(B)** Fishways shall not have overhanging surfaces (e.g. entrance floor to fishways and culverts shall be submerged); **(C)** Orifices are preferred when possible. If orifices (including entrances) are applicable, they shall be positioned flush to the fishway floor, and if possible, flush along one wall. The lack of orifices will likely prevent passage of smaller Lampetra species. **(D)** Denil and similar fishways have not been evaluated for Lampetra species and are not recommended for use for any species. To the extent possible, modern nature-like fishways without high velocities and turbulent flow should be considered for Lampetra species. **E)** Passage for lamprey at tide gate entrances and exits has not been studied; thus, installation and use of new tide gates should be avoided.
633-635	In addition to fish salvage that is completed prior to construction activity, freshwater mussels and crayfish should be salvaged too. Mussel relocation guidance:	Suggest changing existing line **633** to read "Prior to in-stream construction activities, all fish, native freshwater mussels, and crayfish shall be safely collected…"

	Blevins, E., L. McMullen, S. Jepsen, M. Blackburn, A. Code, and S.H. Black. 2017. Conserving the Gems of Our Waters: Best Management Practices for Protecting Native Western Freshwater Mussels During Aquatic and Riparian Restoration, Construction, and Land Management Projects and Activities. 108 pp. Portland, OR: Xerces Society for Invertebrate Conservation. Available at https://xerces.org/publications/guidelines/conserving-gems-of-our-waters	
633-635	Special efforts to salvage larval lamprey, which reside in the sediment year-round, should also be made. Larval lamprey often are not collected by standard e-fishing techniques and often emerge from the sediment hours to days after dewatering activities. Larval lamprey spp. Dewatering/salvage/e-fishing guidelines and information is available in in Best Management Guidelines for Native Lampreys During In-water Work (Lamprey Technical Workgroup 2020: https://www.fws.gov/pacificlamprey/Documents/2020%20Lamprey%20BMG%20Final.pdf)	Suggest adding to text in **633-635**: In suitable habitats, larval lamprey be will salvaged and rescued, using larval lamprey specific techniques.
633-635	Fish salvage will be completed by authorized personnel with a collection permit issued by the Department. A federal recovery permit is required to intentionally collect listed aquatic species. Even if there is a slim chance they could be encountered, possession of a federal recovery permit would authorize collection of listed species for rescue/salvage.	Suggest adding text to change existing lines **634-635** to "…permit issued by the Department, USFWS and NMFS, as appropriate."
633-635	Text states salvaged fish should be placed in the flowing stream but does not indicate where fish should be released relative to ongoing project impacts. Recommend fish are released outside of project area impacts to reduce or eliminate exposure to turbidity (suspended sediments) or other impacts due to construction.	Suggest adding text to change existing line **634** to "…placed in the flowing stream outside of the area of project impacts. …"