

House Bill 2485 Exhibits *Low Head Diversion Examples*



Irrigation diversion depicted above was replaced with a Low Head Diversion and an Engineered Riffle providing natural fish passage depicted to the right.



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House Bill 2485 Exhibits

*Example When the POD is
Fixed at A Single Location*



The irrigation diversion (above) is on a fish bearing tributary to the John Day River; the creek is used by spring Chinook salmon, redband trout, westslope cutthroat trout and ESA-listed summer steelhead. The diversion consisted of logs and plywood reinforced by poly-tarps.

Movement of the authorized POD in this case was restricted by a paved roadway; Grant SWCD engineers were limited in their design options and the resulting replacement structure (below) involved a significant check of the water level.

This situation represents how restrictions in the movement of PODs impacts engineering design options. The inability to take advantage of natural river changes in elevation and morphology limits designs to the installation of structures which significantly raise the water elevation. The impact of increasing the water elevation carries through to the fish passage; a more complex, artificial and expensive fish passage is needed to meet agency requirements.



Issues with the fish ladder in the photo above became apparent due to an agency condition at the time which required the fish passage be located opposite the headgate. This condition was later relaxed and Grant SWCD was able to retrofit the fish passage resulting in the current structure shown to the right.





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This irrigation diversion (above and right) is on a tributary to the Middle Fork John Day River; the creek habitat is used by spring Chinook salmon, redband trout, ESA-listed summer steelhead and ESA-listed bull trout. It consisted of large rock reinforced with boards, gravel, plastic sheeting throughout the season as flows dropped.

In this case, the Authorized POD was located upstream of the existing, so, we had more flexibility in the placement of the new irrigation structure.



The replacement structure (left) is a low head, engineered riffle diversion structure which utilizes a submerged inlet structure and headgate for improved flow control; a flow measuring device was also installed just downstream of an existing fish screen.

By utilizing pipe flow efficiency characteristics, elevation was gained by reducing the slope of the delivery pipe and moving the POD upstream. By doing this, designers were able to take advantage of an existing pool and riffle structure on a stable outside bend.

The replacement structure provides fish passage in the center of the stream during all flows and requires no in-stream operation by the irrigator. The low head structure provides a low energy fish passage which is very unlikely to erode and deteriorate over time meaning the likelihood of maintenance being required to provide fish passage is very low.