Evaluation of Adult Steelhead Downstream Passage Through the Sluiceway and Turbines at The Dalles Dam During Fall 2009, Winter 2009/2010, and Spring 2010

STUDY CODE: ADS-00-1 Evaluation of adult salmon fallback and steelhead kelt passage at Snake and Columbia River dams

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Issues and Goal

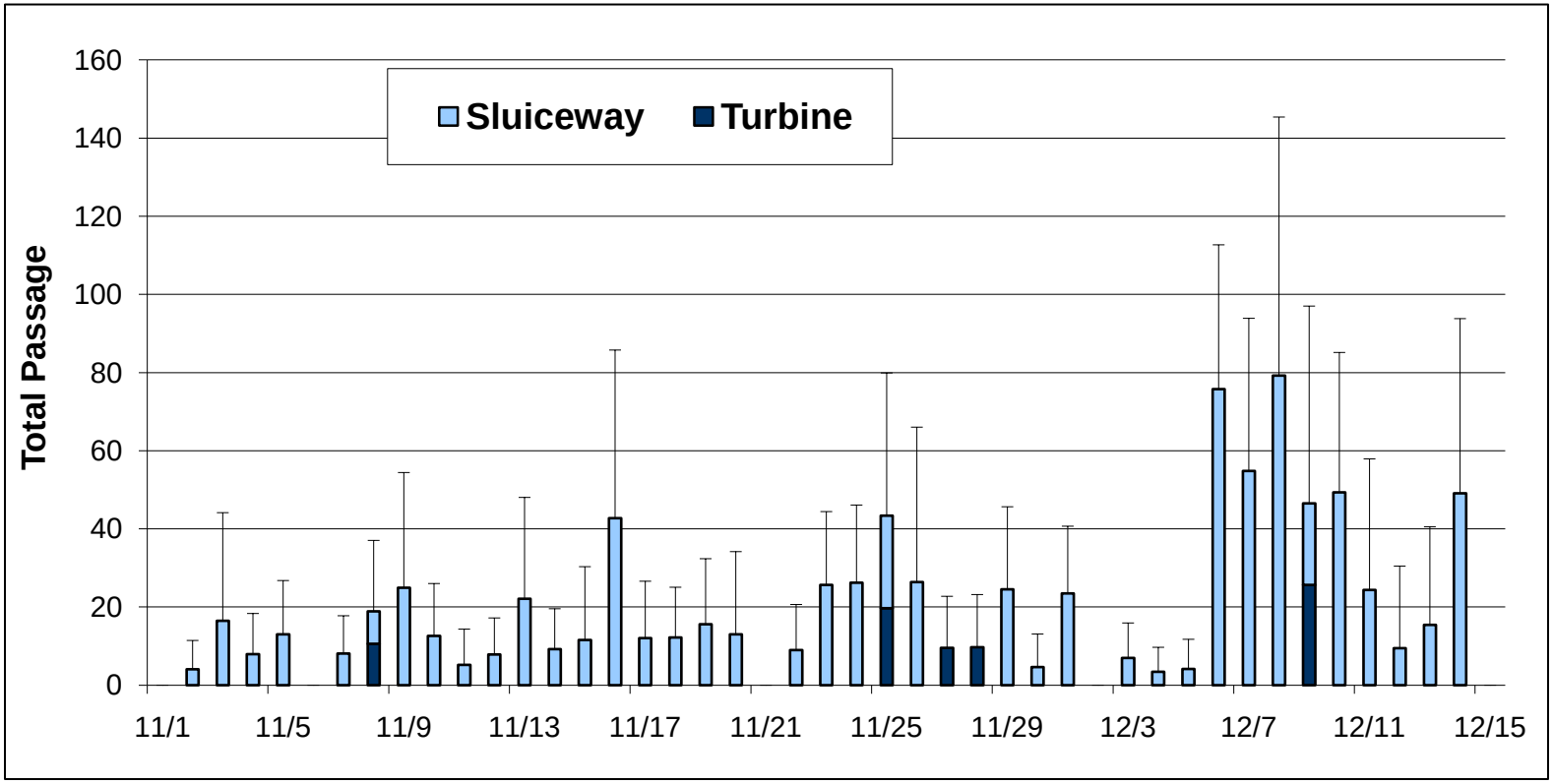
- There are two main issues regarding operation of The Dalles Dam (TDA) sluiceway for fish passage during late fall through early spring:
  - Fallback of overwintering summer steelhead
  - Downstream passage of kelt
- The goal of this study is to characterize adult steelhead passage rates, and spatial and temporal distributions at The Dalles Dam turbines and sluiceway to provide management with information to make decisions on sluiceway operations.

Objectives

- Estimate the numbers and distribution of adult steelhead and kelt-sized targets passing into the sluiceway and turbine units at TDA between November 1 and December 15, 2009 and March 1 and April 10, 2010.
- Estimate the numbers and distribution of adult steelhead and kelt-sized targets passing into turbine units between December 16, 2009 and February 28, 2010.
- We conducted a full powerhouse hydroacoustic study where a transducer was deployed at each turbine unit and paired transducers were deployed in each of the four operating sluice entrances (1-2, 1-3, 18-1, and 18-2).
  - Period 1: November 1 – December 15, 2009 for the fall/winter sluiceway and turbine study;
  - Period 2: December 16, 2009 – March 7, 2010 for the turbine only study;
  - Period 3: March 8 – April 10, 2010 for the spring sluiceway and turbine study. *Note: Oil spill cleanup at sluice outfall delayed the start of the study to March 8*

Results – Period 1: Sluiceway and Turbine Study

- 879 ±165 (95% CI) adult size targets passed the sluiceways and PH intakes from Nov 1 – Dec15, 2009. Daily average of 20 targets.
- 804 passed through the sluiceways (92%) and 75 passed through the PH.
- Run timing peaked in early December.



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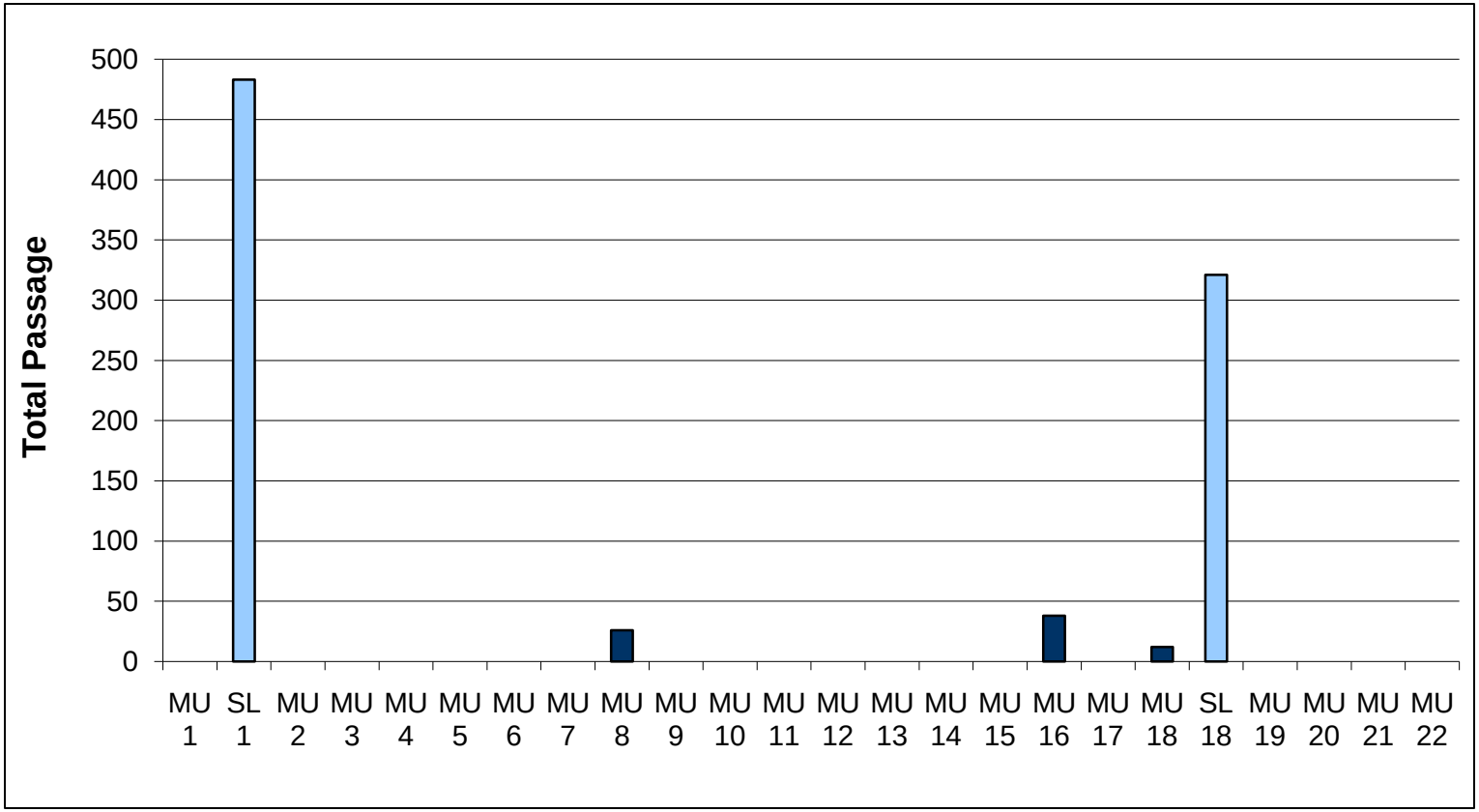
- Total passage was highest at SL 1 (482). SL 18 had the second highest number of fish passing (321). A small number passed through PH intakes 8, 16, and 18 (25, 38, 12 respectively).



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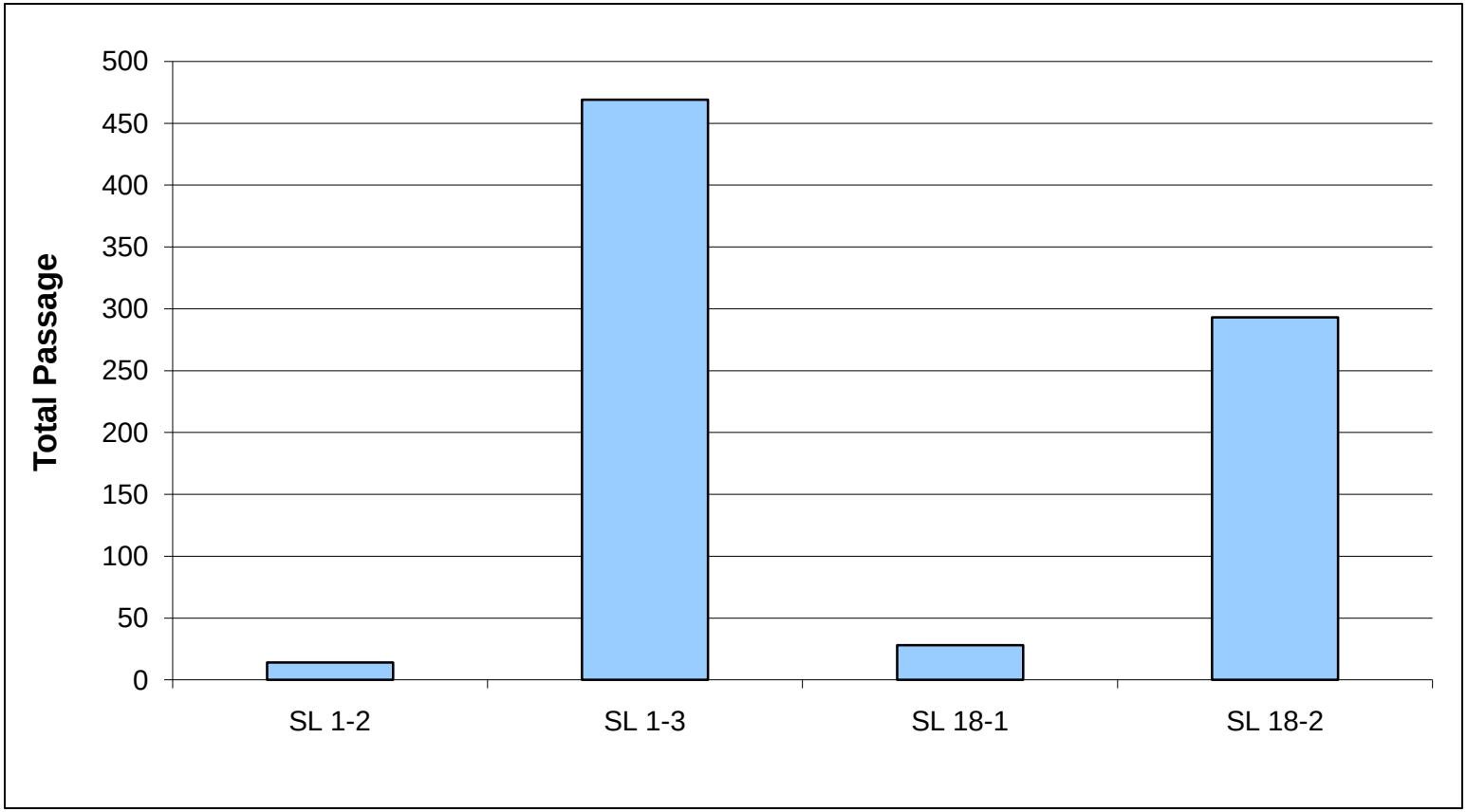
- For individual sluice entrances, Sluice 1-3 passed the highest number of fish (469 targets), followed by Sluice 18-2 (293). Fewer than 50 fish passed through Sluice 1-2, and 18-1.



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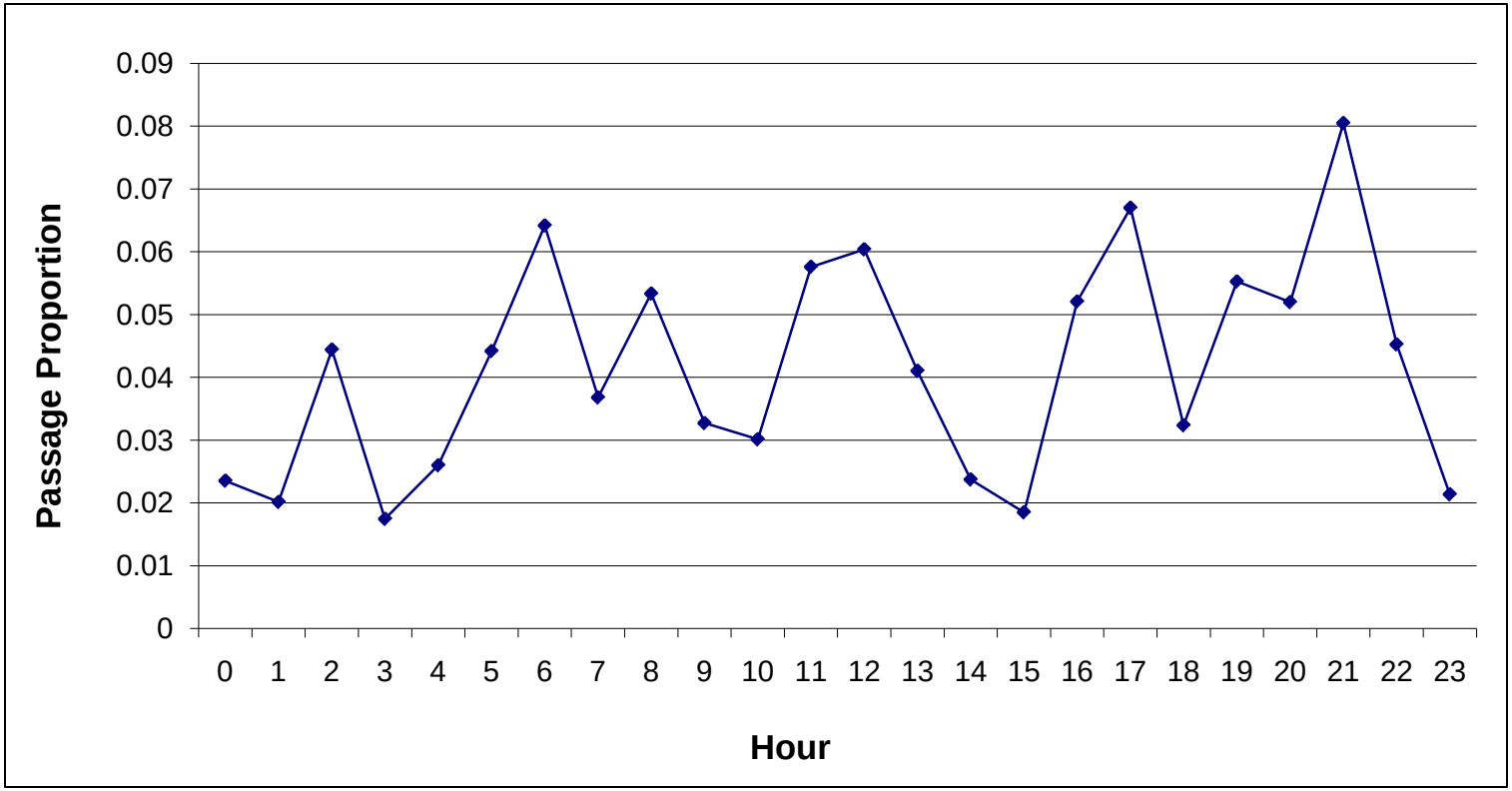
- Diel distribution was highly variable and indicate steelhead targets were passing the dam at all times of the day.



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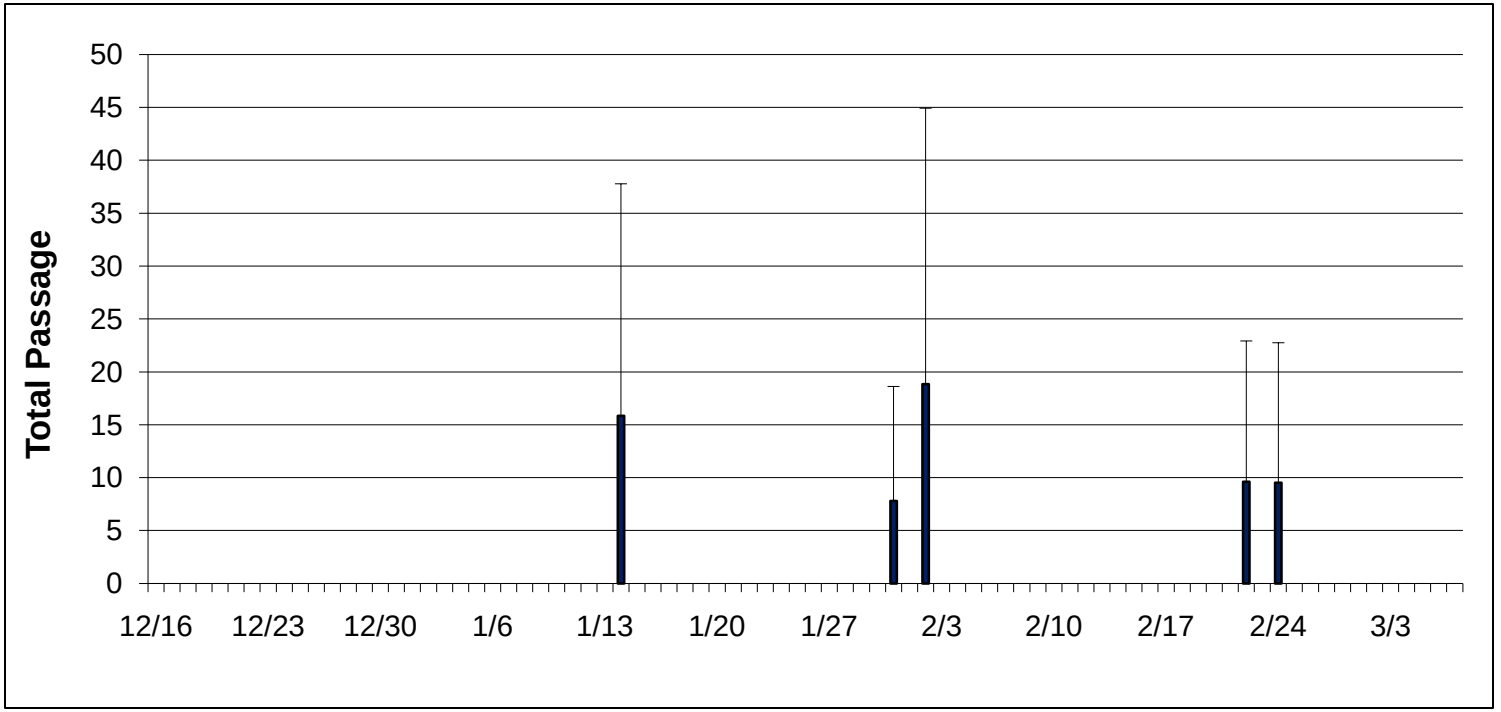
Results – Period 2: Turbine Study

- 62 ±40 (95% CI) adult size steelhead targets passed the PH intakes from Dec 16, 2009 – Mar 7, 2010.
- Fish passed the turbines on January 14 and 31 and February 2, 22, and 24.



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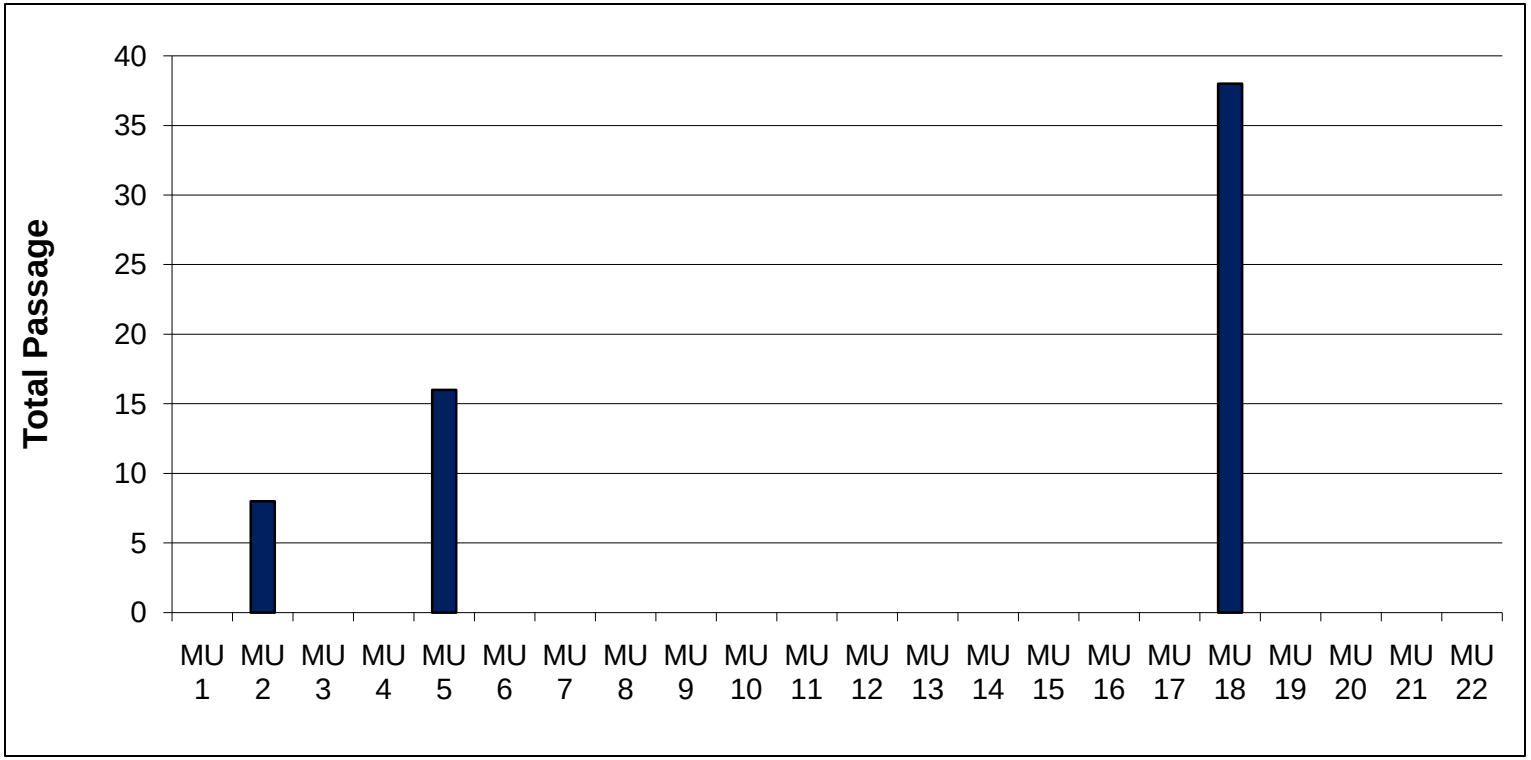
- Total fish passage was highest at Main Unit 18 (38 targets). Main Unit 5 passed the second highest number of fish (16) and Main Unit 2 passed 8 fish. *Note: Main Unit 8, which typically passes fish in the fall and spring, was offline for most of this study period.*



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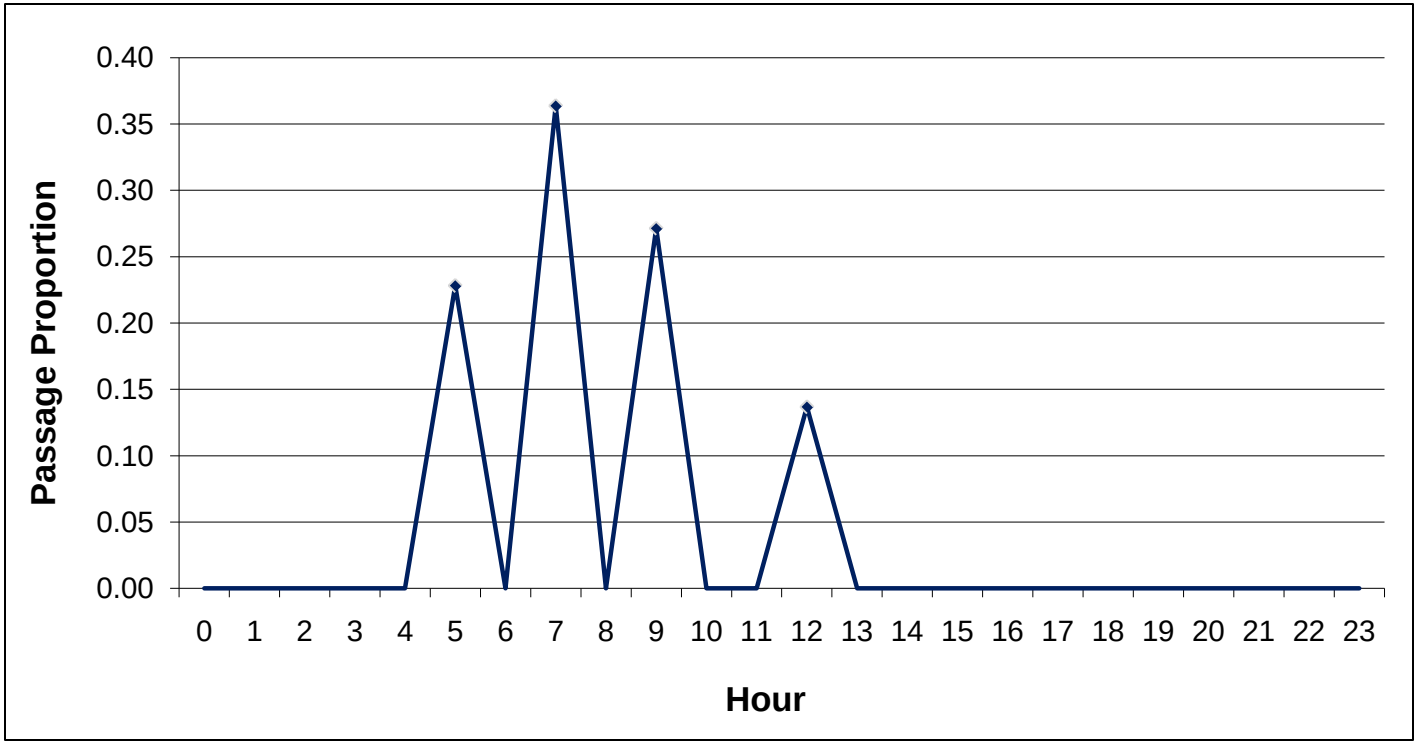
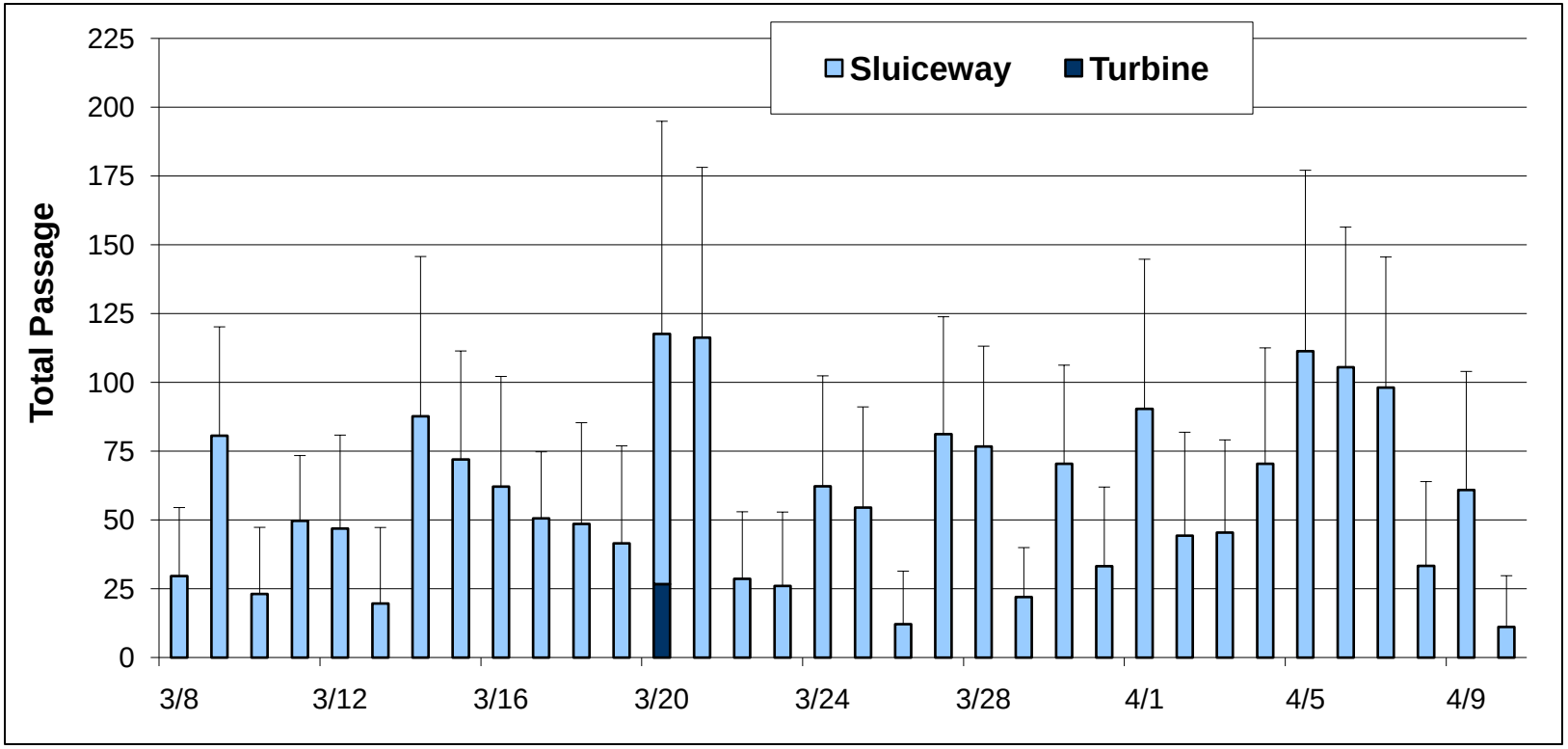
- Fish passage occurred during morning periods. Passage did not occur during afternoon or nighttime.



Results – Period 3: Sluiceway and Turbine Study

- 1,985 ±234 (95% CI) adult size targets passed the sluiceways and PH intakes from Mar 8 – Apr 10, 2010. Daily average of 58 targets.
- 1,958 passed through the sluiceways (99%) and 27 passed through the PH.
- Run timing peaked in mid March and again in early April.



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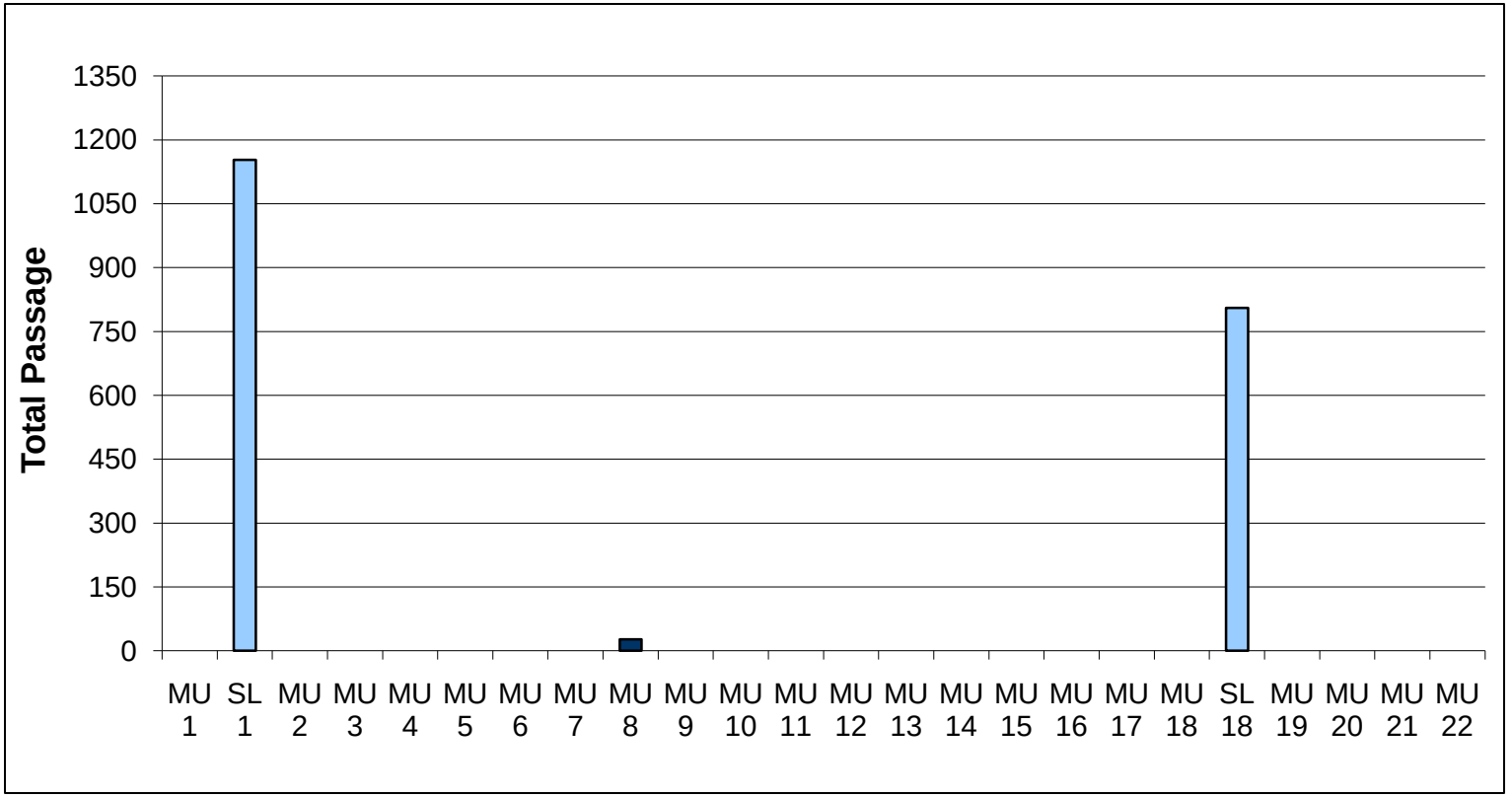
- Total passage was highest at SL 1 (1,153). SL 18 had the second highest number of fish passing (805). A small number passed through PH intake 8 (27).



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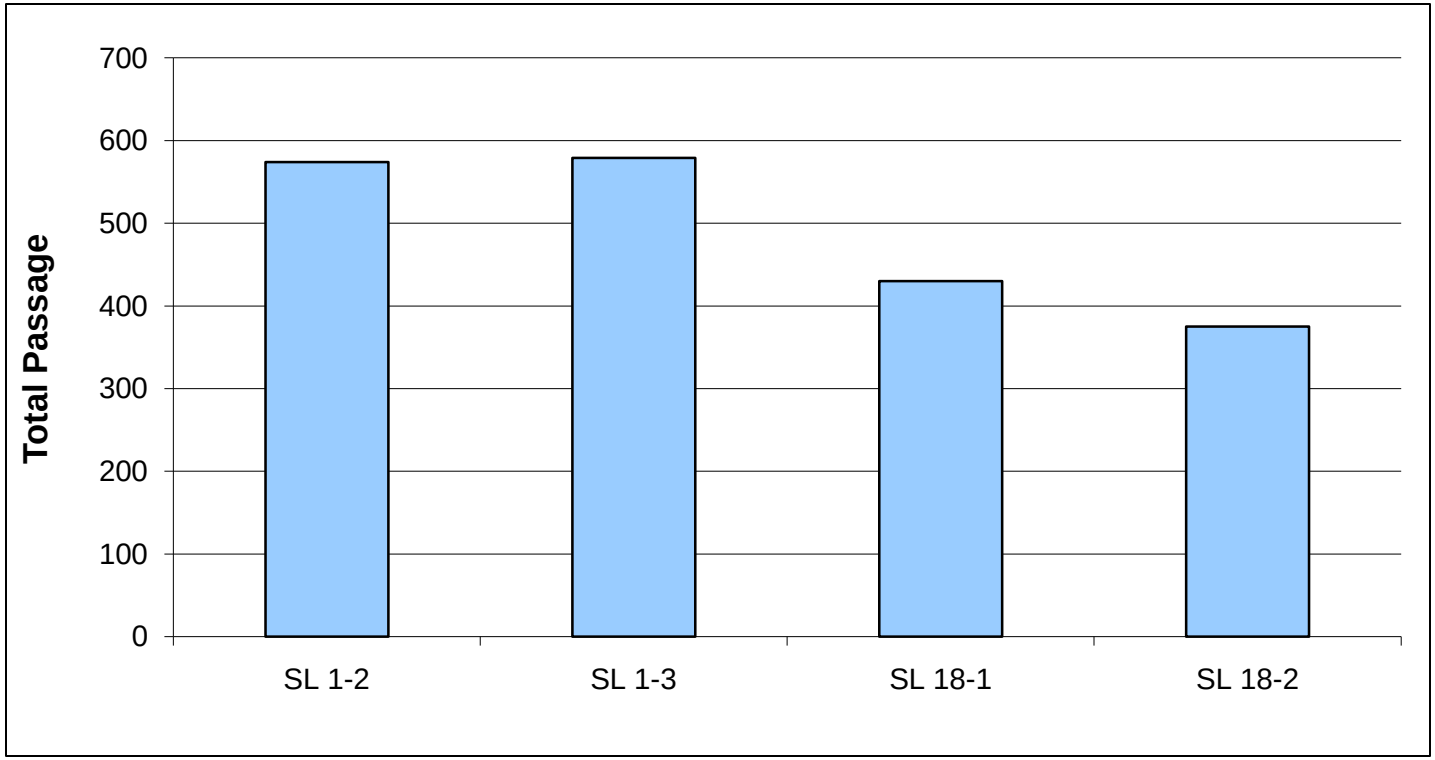
- For individual sluice entrances, SL 1-3 passed the highest number of fish (579 targets), followed by SL 1-2 (574). SL 18-1 passed 430 fish and SL 18-2 passed 375 fish.



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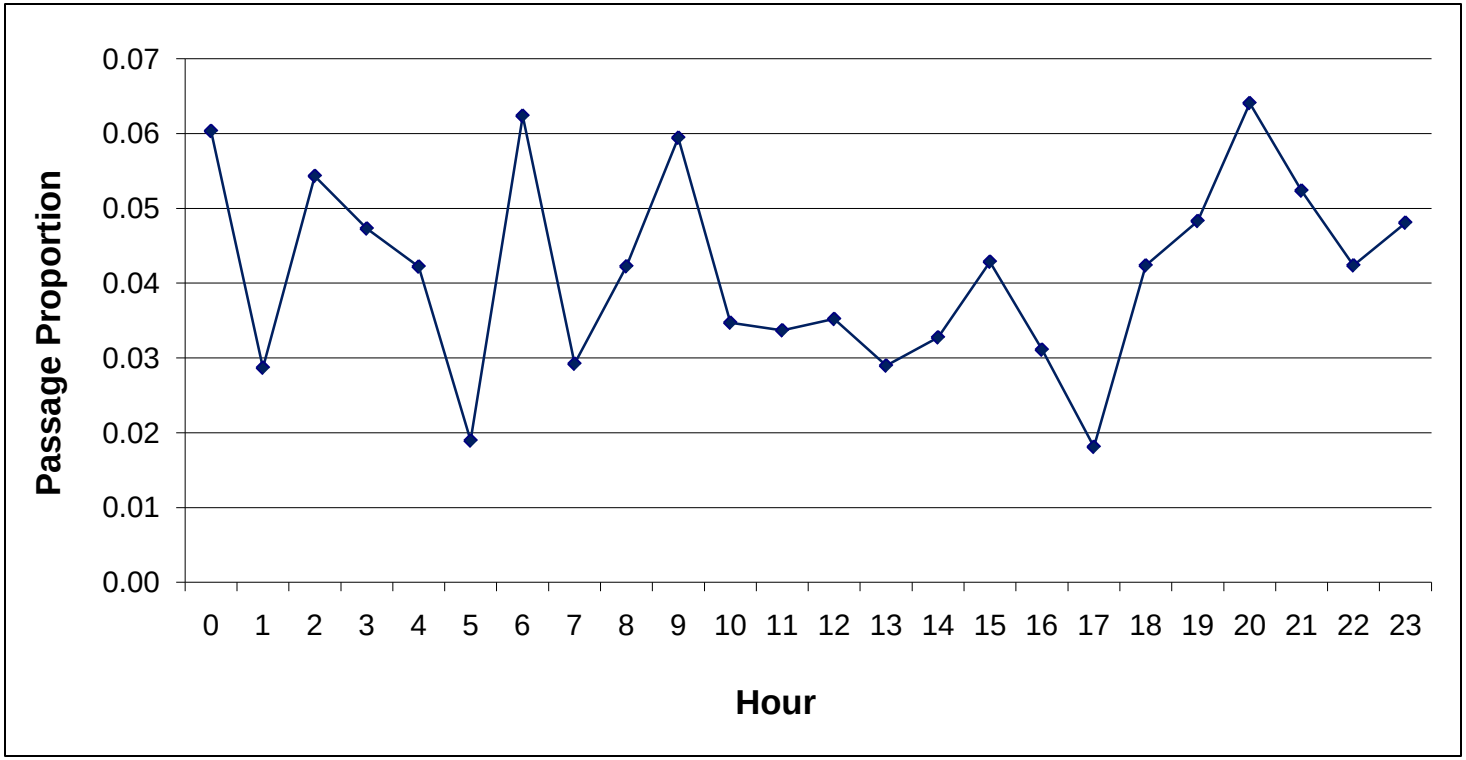

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Summary

- To summarize, 2,926 adult steelhead targets passed the dam during all three study periods combined (Nov 1, 2009 – April 10, 2010).

	Sluiceway	Turbine Units	Total
Period 1	804	75	879
Period 2 (Sluiceway closed)	0	62	62
Period 3	1958	27	1985
Total	2762	164	2926

- For the 2008-2009 study, 3,556 adult steelhead targets passed the dam during the two study periods combined (Nov 1 – Dec 15 2008 and March 1 – April 10, 2009).

	Sluiceway	Turbine Units	Total
Period 1	1704	86	1790
Period 2	1673	93	1766
Total	3377	179	3556