BONNEVILLE POWER ADMINISTRATION

John Day Fish Passage and Screening;

Annual Report 2004 February 2005 DOE/BP-00005122-4

This Document should be cited as follows:

Allen, Steve, "John Day Fish Passage and Screening; ", 2004 Annual Report, Project No. 199306600, 29 electronic pages, (BPA Report DOE/BP-00005122-4)

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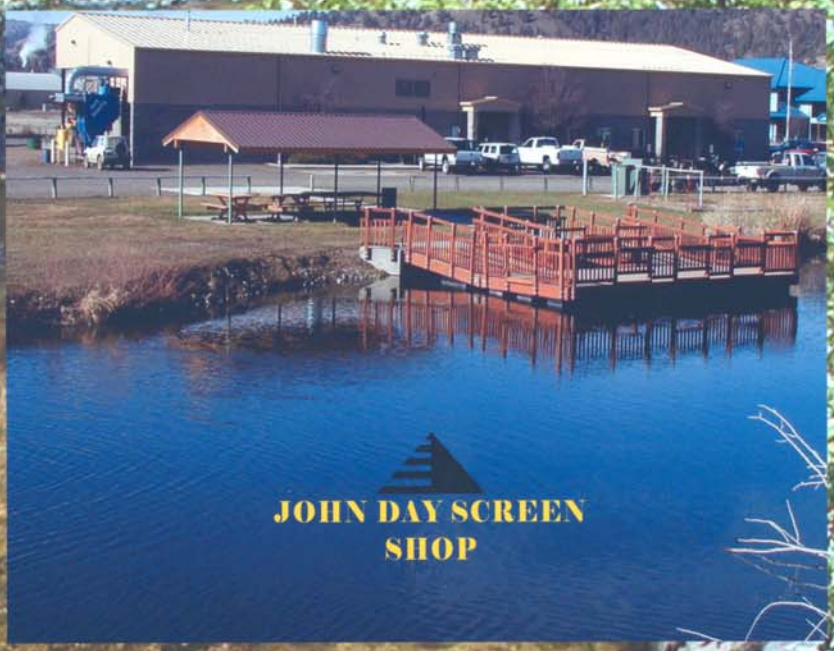
This report was funded by the Bonneville Power Administration (BPA), U.S. Department of Energy, as part of BPA's program to protect, mitigate, and enhance fish and wildlife affected by the development and operation of hydroelectric facilities on the Columbia River and its tributaries. The views in this report are the author's and do not necessarily represent the views of BPA.

JOHN DAY FISH SCREENING AND PASSAGE

BPA ANNUAL REPORT JAN. – DEC. 2004



Oregon Department of Fish and Wildlife
Annual Report-2004
Oregon Screens Project

Oregon Screens Project

BPA Project Number: 199306600

Contract Period: January 1, 2004 – December 31, 2004

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2004 Annual Report

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GOALS

The primary goal of the Oregon Screens Project was to implement 20 replacement screens projects in the John Day sub-basin and any projects identified in the Umatilla and Walla Walla sub-basins. A secondary goal is to complete a passage project, if one is identified, in any of the above sub-basins. Mid-Columbia ESU listed steelhead and USF&W listed bull trout inhabit these sub-basins and are present at most locations, along with a variety of resident fish species. We also provide assistance to our Enterprise Screen Shop, in the Grande Ronde/Imnaha sub-basins, if needed. All projects were designed and implemented under current National Marine Fisheries Service screening and passage criteria.

BACKGROUND

The John Day River sub-basin screening program began in 1952 under the Mitchell Act. Federal funds were allocated for the screening of fish from irrigation diversions. This was to protect wild runs of salmon and steelhead in the John Day River system. Recently the John Day program updated its database of operating screens. The number of screens that annually operate has lowered, due to changes in property ownership, water delivery methods and abandonment. Currently we have 322 operational fish screens, encompassing the three sub-basins. The John Day sub-basin has 279 operational screens and the Umatilla/Walla Walla sub-basins have 43 operational screens. Of the operational screens in the John Day, 171 meet current screening criteria and 108 do not. Of the screens operating that do not meet criteria, most operate poorly because of factors involving the deteriorating condition of the structure and components. All of the operational screens in the Umatilla/Walla Walla meet current criteria. Since 1997, 162 BPA replacement projects have been completed in the John Day and 7 in the Umatilla/Walla Walla sub-basins.

This project is necessary to ensure that replacement of fish screening devices and fishways meet current NMFS design criteria for the protection of all salmonid life stages. The mission of the fish passage program in Northeast Oregon is to protect and enhance fish populations by assisting private landowners, public landowners, irrigation districts, and others by maintaining fish screening devices and fishways. These facilities reduce or eliminate fish loss associated with irrigation withdrawals, and as a result ensure fish populations are maintained for enjoyment by present and future generations. Assistance is provided through state and federally funded programs and can range from simple technical advice to complete construction and maintenance of facilities.

LOCATION

The projects all occurred on private and public lands within the John Day, Umatilla, and Walla Walla sub-basins. The Oregon Department of Fish & Wildlife replaced 22 fish screening devices within the three sub-basins during the 2004 work period. These efforts reflect ODFW's continued commitment to protect anadromous and resident fish species inhabiting their migration, spawning and rearing areas. A detailed list of screen sites and their locations can be found in Table 1. The number of project sites and locations listed in Table 1 included more than 20 sites. The number of project sites is modified throughout the work period due to the following factors: landowner cooperation and project access condition that change due to weather, irrigation, crop rotations and harvest. The previous listed factors make it difficult to set priorities, but all of our projects protect listed species. We always have numerous project sites lined up so as to meet our commitment of 20 completed projects for the work period.

DELIVERABLES

Quarterly Progress Reports and an Annual Report of the project.

First Quarter Progress report was submitted for period 1/1/04 to 3/31/04. Second Quarter Progress report was submitted for period 4/01/04 to 6/30/04. Third Quarter Progress report was submitted for period 7/01/04 to 9/30/04. Fourth Quarter Progress report covered the period 10/01/04 to 12/31/04 and that information is covered in this annual report.

NEPA and ESA

The EIS checklist was completed and approved prior to project implementation and 2004 funding. We complied with all NEPA and ESA requirements.

2004 OVERVIEW OF ACTIVITIES

2004 John Day Program Personnel: (See Organizational Chart Table 6).

Administration
- (1) NMFS Principal Executive Manager A; (1) NMFS F&W Manager 2; (1) NMFS Office Coordinator; (1) BPA/OWEB Office Specialist 1

Carpenters
- (3) BPA Carpenters; (1) NMFS Carpenter; (3) OWEB Carpenters; (1) OWEB limited duration Carpenter;

Welders
- (1) BPA Welder; (3) BPA limited duration Welders; (1) NMFS limited duration Welder; (2) OWEB Welders;

Painter
- (1) BPA limited duration Painter;

Project Support
- (1) Natural Resource Specialist 1; (1) OWEB Engineering Technician 3; (1) OWEB Engineering Technician 2;

Screens O&M
- (3) NMFS F&W Tech 1's; (1) NMFS T/M Worker 2.

Summary of Work Completed:

- Landowner contacts were made to obtain permission for access, timing, and coordination of projects.
- Project planning that included contacts with appropriate agencies for water rights, priorities, NEPA compliance, permits, and design and layout consultation.
- Project preparation surveys to determine specific access routes, site location, system type, structure grades, and bypass routes, lengths and grades.
- Fabrication of 6 new structure forms and reassembly of 11 structure forms.
- Fabricated 5 prefab screen boxes.
- Fabricated all screen components for 22 screening systems.
- Operation and maintenance of 322 existing fish screening devices (see Table 3).
- Replacement of 22 outdated fish screening devices that totaled 27 screens (some were multiple screen systems).
- Construction crews poured 172.7 yards of concrete.
- Laid 1820 feet of bypass pipe.
- Installed 4 head gates.
- Screened a total of 52.9 CFS.

With the replacement of the 22 fish screening devices during 2004, we now have 214 screening devices that meet NMFS criteria, 171 in the John Day and 43 in the Umatilla/Walla Walla. Funding for these projects was attained from BPA, NMFS and OWEB.

*Note: Six additional projects were in various stages of construction and were not complete at the end of this report period.

Facility / Grounds Improvements, Maintenance, and Repairs:

- Winterizing of facility and grounds.
- Winterizing of vehicles and snow tires installed.
- Yearly scrap metal cleanup at our facility.
- Maintained lawn, shrubbery, storage, and parking areas.
- Completed routine, major and preventive maintenance on shop and field equipment, includes Motor Pool rental.
- Completed routine, major and preventive maintenance of facilities, includes utilities.
- An underground sprinkler system was installed.
- Requested a successful OSHA consultation for the facilities and grounds.

Meetings and Training:

- Internal monthly safety meetings and trainings were conducted
- Several employees attended OSHA and SAIF Training
- Several employees attended a SAIFer driving course
- Several employees attended CPR/First Aid refresher Training.
- Several employees attended Overhead Crane Training
- Several employees attended Mobil Crane Training

- Several employees attended Forklift Training
- Several employees attended a Qualified Person Trenching and Shoring Training
- Several employees attended ATV Safety Training
- Several employees attended the annual Screening and Passage Workshop in Medford
- Several employees attended Regional meeting in Pendleton, Oregon.

2003 Division of Work Hours:

COST CENTER- PROJECT		DIVISION OF HOURS	TOTAL HOURS.
45310-355002-07	**Basin 6**	**Regular BPA**	**14,537**
		Holiday	**646**
		Vacation	**740.25**
		Sick Leave	**402.5**
		Comp. Time Accrued	**18**
		Comp. Time Leave	**20**
		Personal Business	**121.75**
		Governor's Leave	**72**
		Holiday FMLA	**8**
		Jury Duty	**43**

BPA Employees Other Screen Hours

40800-366000-05	**Basin 7**	**Regular**	**103**
45100-820000-08	**Basin 7**	**Regular**	**50**
53300-882002-08	**Basin 6**	**Regular**	**24**
		TOTAL HRS.	**16785.5**

Table 1 Identified Projects Sites for the John Day Basin- 2004

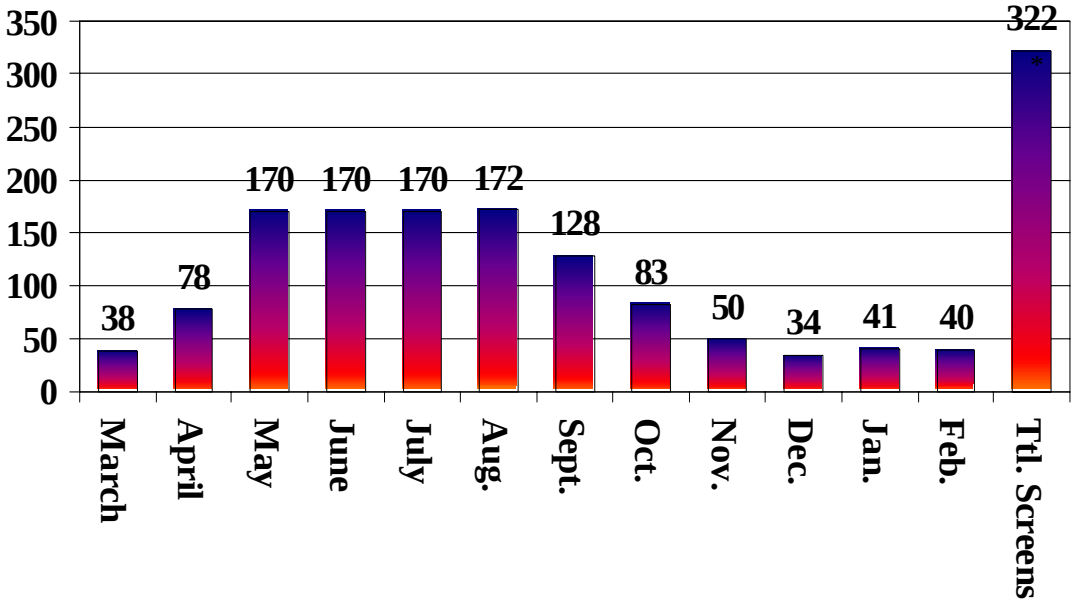
Screen Site	Latitude	Longitude	Stream	Trib.-to	Water User	Screen #	Project Status
1. Basin 6	44.6801069N	118.7645138W	M.F.JDR.- (8)	John Day R.	Holmes	6-121	Completed 4th Quarter FY 03
2. Basin 6	44.7325066N	118.8328848W	M.F. JDR.- (9)	John Day R.	Gibbs	6-126	Cancelled
3. Basin 6	44.383349N	118.7676442W	L IndianCr.(1)	John Day R.	Blagden	6-059	
4. Basin 6	44.2720041N	119.5545326W	Wind Cr. – (1)	S.F. J.D.R.	Phillips	6-207	Complete
5. Basin 6	44.3465856N	119.5522772W	S.F.J.D.R.–(4)	John Day R.	Betty Sigler	6-163	Complete
6. Basin 6	44.4357797N	119.5401083W	S.F.J.D.R.–(6)	John Day R.	Mary Fields	6-160	
7. Basin 6	44.4953100N	119.6188047W	Cottonwood Cr. (1)	N.F. J.D, R.	Murphy	6-264	Surveyed
8. Basin 6	44.7175639N	119.0607295W	Long Cr. – (1)	N.F. J.D. R.	Livingston	6-208	
9. Basin 6	44.7226712N	119.0822451W	Long Cr. – (2)	N.F. J.D. R.	Livingston	6-248	
10. Basin 6	44.4300115N	118.6254139W	J. D R. – (16)	Columbia R.	Mike Smith	6-028	
11. Basin 6	44.4238784N	118.6161192W	J.D. R. – (19)	Columbia R.	John Coomb	6-027	
12. Basin 6	44.3430945N	118.5821917W	RobertsCr.-(1)	John Day R.	Z, J & R	6-002	
13. Basin 6	44.4906167N	119.5685872W	J.D.R. – (63)	Columbia R.	Clausen	6-143	Complete
14. Basin 6	44.4914415N	119.5769292W	J.D. R. – (64)	Columbia R.	Clausen	6-144	Completed 4th Quarter FY03
15. Basin 6	44.4117888N	119.1352134W	J. D.R. – (49)	Columbia R.	Bowers	6-094	Complete
16. Basin 6	44.4171730N	119.0562721W	J.D.R. – (46)	Columbia R.	Randall	6-070	Surveyed-DSL
17. Basin 6	44.4200504N	118.8710239W	J.D.R. – (38)	Columbia R.	Carter	6-049	Complete
18. Basin 6	44.7633606N	119.5781430W	Rudio Cr – (2)	N.F. J.D. R.	Campbell	6-282	Complete
19. Basin 6	44.7722911N	119.5834381W	Rudio Cr – (3)	N.F. J.D. R.	Campbell	6-284	Complete
20. Basin 6	44.6188683N	120.3389749W	Bear Cr. – (2)	Bridge Cr.	Long	6-433	Completed 4th Quarter FY03
21. Basin 6	44.3804572N	119.1600214W	Riley Cr. – (1)	John Day R.	Marciel	6-250	Completed 4th Quarter FY03
22. Basin 6	44.3881406N	119.1589188W	Riley Cr. – (3)	John Day R.	Marciel	6-251	Complete
23. Basin 6	44.4067323N	119.1575942W	Riley Cr. – (5)	John Day R.	Porfily	6-252	Complete
24. Basin 6	44.4126184N	119.1560137W	Riley Cr. – (6)	John Day R.	Porfily	6-253	Complete
25. Basin 6	44.3364153N	118.9503681W	CanyonCr.-(9)	John Day R.	Chase	6-075	
26. Basin 6	44.4397179N	118.8093667W	J.D.R. – (33)	Columbia R.	Rudishauser	6-043	Complete
27. Basin 6	44.5117577N	119.0010284W	EFBeechCr(1)	Beech Cr.	Pierce	6-489	Surveyed
28. Basin 6	44.5121493N	119.0030991W	EFBeechCr(2)	Beech Cr.	Pierce	6-490	Complete
29. Basin 6	44.5141932N	119.0076264W	EFBeechCr(3)	Beech Cr.	Pierce	6-494	Complete
30. Basin 6	44.5095488N	120.1511349W	BridgeCr.– (1)	John Day R.	Domenighini	6-504	
31. Basin 6	44.5095381N	120.1510812W	BridgeCr.– (2)	John Day R.	Domenighini	6-505	
32. Basin 6	44.5201114N	120.1459419W	BridgeCr.– (3)	John Day R.	Domenighini	6-502	
33. Basin 6	44.5296012N	120.1452120W	BridgeCr.– (4)	John Day R.	Domenighini	6-503	
34. Basin 7	45.6566101N	118.9020575W	U.R.- (401)	Columbia R.	Forth	7-0029	Complete
35. Basin 6	44.4170039N	119.2160301W	J.D.R. – (52)	Columbia R.	Page	6-098	Surveyed-DSL
36. Basin 6	44.4178851N	119.1548194W	J.D.R. – (50)	Columbia R.	Brooks	6-095	Complete
37. Basin 6	44.4990167N	119.6122334W	Cottonwood Cr.– (2)	John Day R.	Mascall	6-270	Surveyed
38. Basin 6	44.4953100N	119.6188047W	Cottonwood Cr.– (1)	John Day R.	Mascall	6-264	Surveyed
39. Basin 6	44.4951866N	119.6182682W	Cottonwood Cr.– (3)	John Day R.	Mascall	6-265	Complete
40. Basin 6	44.2844072N	118.9610444W	Vance Cr.– (1)	Canyon Cr.	Davis	6-479	Complete
41. Basin 6	44.2856410N	118.9588664W	CanyonCr–(4)	John Day R	Taylor	6-197	Complete
42. Basin 6	44.3364153N	118.9503681W	Canyon Cr-(9)	John Day R.	Domenighini	6-075	Surveyed
43. Basin 6	44.4185108N	119.1855451W	John Day R. ()	Columbia R.	Silva	6-097	
44. Basin 6	44.4137894N	118.7722575W	Indian Cr. (8)	John Day R.	Holliday	6-061	Surveyed
45. Basin 6	44.4381316N	118.8188504W	John Day R. (34)	Columbia R.	Holliday	6-044	Surveyed
46. Basin 6	44.4347563N	118.846704W	John Day R. (36)	Columbia R.	Holliday	6-046	Surveyed
47. Basin 6	44.4274494N	119.2730624W	John Day R. (54)	Columbia R.	Chandler	6-102	Surveyed
48. Basin 6	44.3970078N	119.0404535W	Laycock Cr.(1)	Columbia R.	Weaver	6-008	Complete
49. Basin 6	44.6676558N	118.7157487W	Big Boulder Crk. (1)	N.F. J.D. R.	Zaitz/Callister	6-111	Complete

Table 2 Completed Fish Screen Projects

Site #	Screen Size Degree/Bays	Drive	CFS	Structure	Concrete yds.	Bypass f	Headgate	Measure Device
24	2x18 @ 60 single	Gravity	.45	New	5.5	20	Prefab	
15	8x42 @ 60 dual	Gravity	14.4	New	29	80		
13	4x30 @ 60 single	Solar	1.39	Reassembled	11	100		
19	3x18 @60 single	Gravity	.81	Reassembled	5.5	100		
34	8x3x30 @ 60 dual	Solar	7	Reassembled	17	300		
	Subtotal 1st Quarter		**24.05**		**68**	**600**	**5 completed**	**projects**
5	5x24 @ 60 single	Gravity	.69	Pre-Fab	N/A	320		
18	4x24 @ 60 dual	Gravity	4.88	Reassembled	14.5	20		
22	4x24 @ 60 dual	Gravity	3.68	Reassembled	14	40		
23	3x18 @ 60 single	Gravity	.73	Reassembled	5	80		
26	5x24 @ 60 single	Gravity	1.88	New	10	140	Steel	
36	9x30 @ 60 single	Gravity	6	New	11.5	120	Concrete	
	Subtotal 2nd Quarter		**17.86**		**55**	**720**	**6 completed**	**projects**
4	4x18 @ 60 single	Gravity	.45	Pre-Fab	N/A	60		
17	8x24 @ 60 single	Gravity	2.51	Reassembled	11	60		
28	3x18 @ 90 single	Gravity	.94	Pre-Fab	.25	40		
29	3x18 @ 60 single	Gravity	.47	Reassembled	6	40		
39	3x18 @ 60 single	Gravity	1.33	New	6	80		
40	18x36 fixed plate wiper	Solar	.69	Pre-Fab	.25	20		
41	3x18 @ 90 single	Gravity	1.33	Reassembled	5	40		
48	3x18 @ 60 dual	Gravity	.76	New	9.5	40		
49	2x18 @ 60 single	Gravity	1.5	Reassembled	4.5	60		
	Subtotal 3rd Quarter		**9.98**		**42.5**	**440**	**9 completed**	**projects**
27	3x18 @ 60 single	Gravity	.47	Pre-Fab	.2	20		
7	3x18 @ 60 single	Gravity	.54	New	7	40	Concrete	
	Subtotal 4th Quarter		**1.01**		**7.2**	**60**	**2 completed**	**projects**
	Total 2004		**52.9**		**172.7**	**1820**	**22 complete**	**projects**

TABLE 3: Screens in Operation Fiscal Year 2004

TABLE 4. SCREENS IN OPERATION FY 2004



*322 screens operated and maintained. The most screens in operation at any one time was 172. This was due to weather conditions, water quantity, and agricultural crop harvesting.

TABLE 4: John Day Fish District Forty-five Year Steelhead Spawning Ground Summary

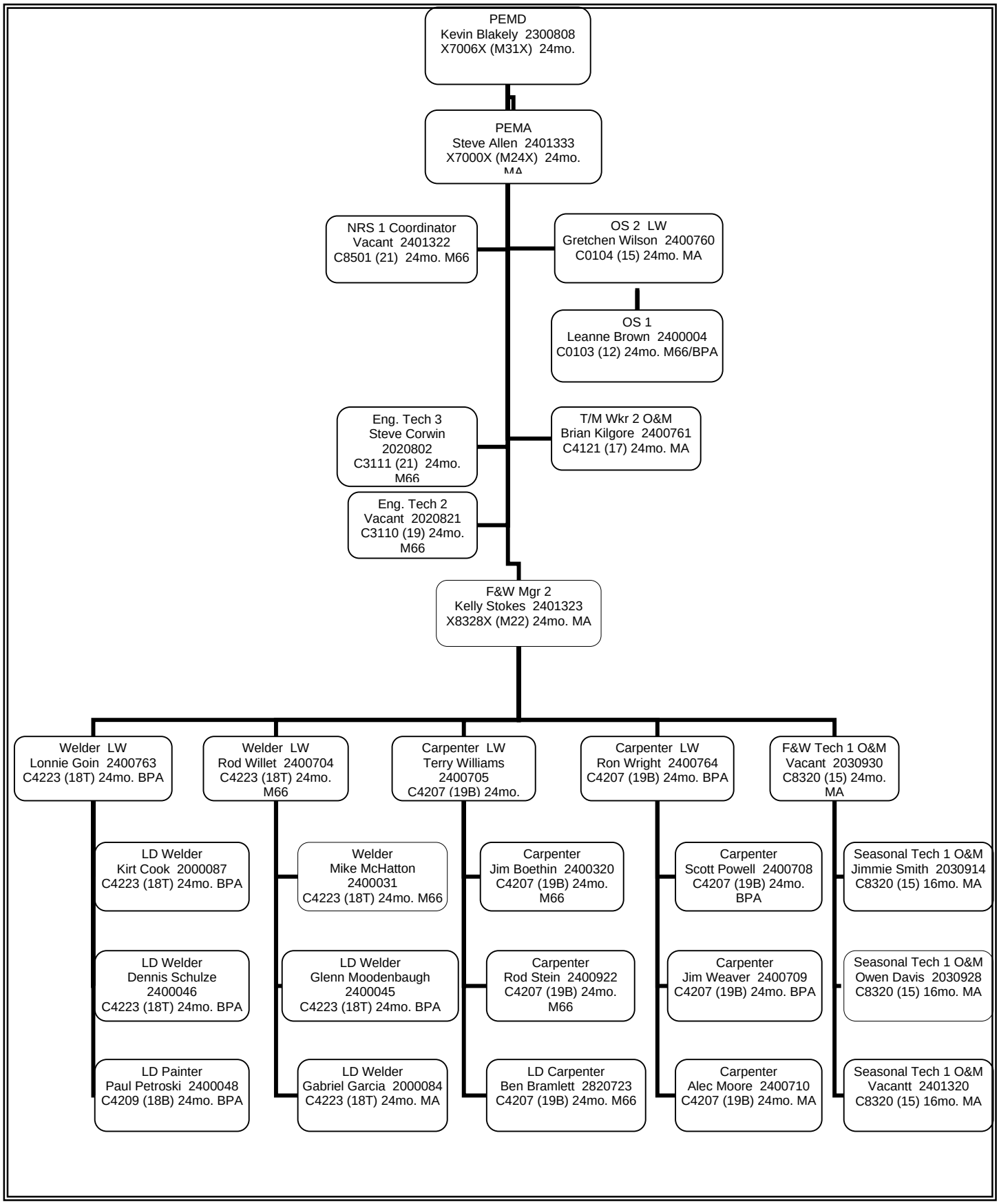
Year	Number of Streams Surveyed	Miles Surveyed	Live Steelhead	Redds	Redds Per Mile
1959	6	14.5	30	108	7.4
1960	10	22.0	60	194	8.8
1961	8	24.5	56	166	6.8
1962	10	26.5	56	184	6.9
1963	11	30.5	47	216	7.1
1964	13	43.5	51	266	6.1
1965	19	45.0	88	344	7.6
1966	23	69.0	141	1103	16.0
1967	25	78.0	61	905	11.6
1968	23	74.5	19	358	4.8
1969	27	91.5	76	806	8.8
1970	21	65.0	58	530	8.2
1971	8	22.5	18	181	8.0
1972	16	53.5	41	409	7.6
1973	25	76.4	22	402	5.3
1974	14	38.0	4	167	4.4
1975	14	34.0	21	302	8.9
1976	21	59.8	8	308	5.2
1977	30	75.5	69	535	7.1
1978	35	102.7	21	438	4.3
1979	29	78.7	4	81	1.0
1980	34	90.1	11	305	3.4
1981	33	86.1	12	319	3.7
1982	32	71.8	34	301	4.2
1983	31	89.3	39	438	4.9
1984	29	76.7	33	299	3.9
1985	39	120.3	88	1016	8.4
1986	43	120.6	129	1323	11.0
1987	61	154.3	82	1757	11.4
1988	46	128.0	111	1551	12.1
1989	35	106.5	42	340	3.2
1990	39	114.3	37	451	3.9
1991	29	91.9	8	225	2.4
1992	35	107.3	70	608	5.7
1993	24	68.0	14	166	2.4
1994	38	114.6	6	352	3.1
1995	34	104.1	8	135	1.3
1996	35	100.8	9	225	2.2
1997	33	96.5	15	165	1.7
1998	27	70.6	4	134	1.9
1999	28	79.6	20	169	2.1
2000	30	89.7	8	366	4.1
2001	29	85.7	75	433	5.1
2002	35	105.2	189	876	8.3
2003	33	100.1	28	467	4.7
2004	36	93.9	17	295	3.1
10-YR AVG	32	92.6	37.3	326.5	3.5

TABLE 5: Summary of Spring Chinook Salmon Spawning Density

Summary of Chinook Salmon spawning density, John Day District, 1959-2004.								
Redds per mile								
Year	Bull Run	Clear	Granite	Granite System	Mainstem	Middle Fork	North Fork	Total
1959	*	4.3	6.0	5.3	0.3	0.0	*	2.6
1960	*	16.3	10.0	12.5	0.7	3.2	*	7.5
1961	*	3.3	5.3	4.5	3.0	1.1	*	3.2
1962	2.0	49.7	44.2	44.3	12.2	2.8	*	22.2
1963	7.0	29.2	26.4	28.4	0.8	0.4	*	12.7
1964	10.0	49.7	34.8	38.3	1.3	3.6	7.8	17.8
1965	7.5	16.7	24.4	18.5	5.8	3.7	8.1	11.0
1966	0.3	43.5	31.0	28.4	9.3	6.5	10.3	16.8
1967	6.0	38.5	19.4	23.1	7.4	1.7	5.5	13.0
1968	6.4	60.5	50.2	44.3	0.7	0.4	8.8	14.4
1969	15.6	13.7	16.8	15.9	9.3	4.8	20.5	13.3
1970	26.4	18.7	33.6	26.9	8.3	7.6	16.8	14.1
1971	11.6	18.8	31.2	22.6	7.0	4.1	11.8	11.5
1972	24.4	39.5	43.5	38.2	3.9	5.1	10.5	14.2
1973	7.2	27.0	36.0	27.0	8.9	4.3	19.4	15.7
1974	7.6	8.0	25.5	15.9	2.5	8.1	7.2	8.2
1975	18.8	11.5	24.7	19.1	7.1	8.9	11.7	11.7
1976	9.2	7.0	20.2	13.5	4.6	6.6	6.2	7.5
1977	11.6	12.8	23.1	17.3	4.9	5.8	16.4	11.1
1978	12.4	6.3	19.8	13.8	4.5	10.7	5.9	8.3
1979	6.4	7.0	15.6	10.8	5.2	11.8	11.1	9.7
1980	1.2	7.0	8.5	6.5	1.2	5.8	4.3	4.3
1981	2.8	11.3	10.6	9.2	3.9	2.6	7.7	6.1
1982	5.2	10.8	12.0	10.2	3.8	6.2	5.5	6.4
1983	0.8	1.0	7.3	3.8	10.2	5.1	4.2	5.8
1984	3.2	2.0	5.8	4.0	5.6	6.7	3.5	4.4
1985	6.4	8.2	15.1	11.0	8.9	4.0	6.1	7.5
1986	2.4	11.5	20.2	13.6	12.2	6.3	14.3	11.9
1987	5.6	14.0	12.9	11.8	19.0	28.3	20.8	20.2
1988	1.2	11.0	12.5	9.7	6.3	20.1	13.6	12.4
1989	6.0	16.7	12.2	12.4	12.7	9.4	10.9	11.3
1990	2.4	2.7	11.1	6.5	9.5	3.9	14.3	9.2
1991	1.6	5.2	5.5	4.6	4.7	2.9	6.4	4.8
1992	0.0	11.7	16.5	11.5	10.9	9.0	18.8	13.2
1993	17.6	25.6	19.8	21.3	10.4	12.9	21.1	16.9
1994	0.0	4.0	14.5	8.0	13.0	7.8	11.2	10.2
1995	0.0	2.8	2.2	1.9	2.2	1.3	1.5	1.7
1996	3.6	9.5	14.7	10.7	17.5	11.3	16.2	14.2
1997	7.2	7.2	10.0	8.5	9.6	13.6	10.9	10.7
1998	0.4	2.8	8.4	5.1	8.3	6.6	6.0	6.5
1999	3.2	3.8	11.6	7.3	4.5	8.8	6.7	6.7
2000	4.8	20.0	28.0	20.1	25.9	29.7	26.5	25.6
2001	15.2	20.0	18.9	18.5	29.5	16.6	33.7	25.6
2002	12.5	13.5	20.7	16.6	36.9	25.8	28.5	27.3
2003	0.4	7.3	9.3	6.75	28.4	15.3	26.8	19.9
2004	2.7	10.0	7.2	6.75	20.2	14.7	33.4	20.4
Ave. 5 yr.	**7.1**	**14.2**	**16.8**	**13.7**	**28.2**	**20.4**	**29.8**	**23.8**
Ave. 10 yr.	**5.0**	**9.7**	**13.1**	**10.2**	**18.3**	**14.4**	**19.0**	**15.9**
*** No survey these years**								

TABLE 6: Organizational Chart

John Day Screening and Passage Program
January 2005



PROJECT PICTURE INFORMATION

Site#	Location	Screen type	Screen size	CFS
13	John Day River No. 63	Rotary Drum (Solar)	4'x30"	1.39
15	John Day River No. 49	Rotary Drum	8'x42" Dual	14.4
24	Riley Cr. No. 06	Rotary Drum	2'x18'	.445
34	Umatilla River	Rotary Drum (Solar)	8'x3'30" Dual	7.0
5	S.F. John Day River No. 03	Rotary Drum (Pre-fab)	5'x18"	.69
18	Rudio Cr. No. 02	Rotary Drum	4'x24" Dual	4.88
22	Riley Cr. No. 03	Rotary Drum	4'x24" Dual	3.68
23	Riley Cr. No. 05	Rotary Drum	3'x18"	.73
26	Indian Cr. No. 15	Rotary Drum	5'x24"	1.88
36	John Day River No. 50	Rotary Drum (Solar)	9'x30"	6.0
4	Wind Cr. No. 01	Rotary Drum (Pre-fab)	4'x18"	.45
17	John Day River No. 38	Rotary Drum	8'x24"	2.51
28	E.F. Beech Cr. No. 02	Rotary Drum (Pre-fab)	3'x18"	.94
29	E.F. Beech Cr. No. 03	Rotary Drum	3'x18"	.47
38	Cottonwood Cr. No. 01 (JDR)	Rotary Drum	3'x18"	1.33
40	Vance Cr. No. 01	Flat Plate Wiper (Pre-fab)	3'x18"	.69
41	Canyon Cr. No. 04	Rotary Drum	3'x18"	1.33
48	Laycock Cr. No. 01	Rotary Drum	3'x18" Dual	.76
49	Big Boulder Cr. No. 01	Rotary Drum	2'x18"	1.5
27	E.F. Beech Cr. No. 01	Rotary Drum (Pre-fab)	3'x18"	.47
7	Cottonwood Cr. No. 01 (NF)	Rotary Drum	4'x18"	.54
19	Rudio Cr. No. 03	Rotary Drum	3'x18"	.81
Reciprocating motion	Using electronic timers to produce reciprocating linear motion			
Drive System	New track drive for wiper screen cleaning brushes			
Belt Screen	Belt Screen angled at 45 degrees to flow with bypass (Under Construction)			
Facility improvements	Fishing Dock-----Underground sprinkler system			

SITE 13_BEFORE-JDR

SITE 13_AFTER-JDR

SITE 15_BEFORE-JDR

SITE 15_AFTER

SITE 24_BEFORE-RILEY CR.

SITE 24_AFTER

SITE 34_BEFORE-UMATILLA R

SITE 34_AFTER

SITE 5_BEFORE-S.F. JDR

SITE 5_AFTER

SITE 18_BEFORE-RUDIO CR.

SITE 18_AFTER

SITE 22_BEFORE-RILEY CR.

SITE 22_AFTER

SITE 23_BEFORE-RILEY CR.

SITE 23_AFTER

SITE 26_BEFORE-INDIAN CR.

SITE 26_AFTER

SITE 36_BEFORE-JDR

SITE 36_AFTER

SITE 4_BEFORE-WIND CR.

SITE 4_AFTER

SITE 17_BEFORE-JDR

SITE 17_AFTER

SITE 28_BEFORE-EF BEECH CR.

SITE 28_AFTER

SITE 29_BEFORE-EF BEECH CR.

SITE 29_AFTER

SITE 38_BEFORE-COTTONWOOD CR.

SITE 38_AFTER

SITE 40_BEFORE-VANCE CR.

SITE 40_AFTER

SITE 41_BEFORE-CANYON CR.

SITE 41_AFTER

SITE 48_BEFORE-LAYCOCK CR.

SITE 48_AFTER

SITE 49_BEFORE-BIG BOULDER

SITE 49_AFTER

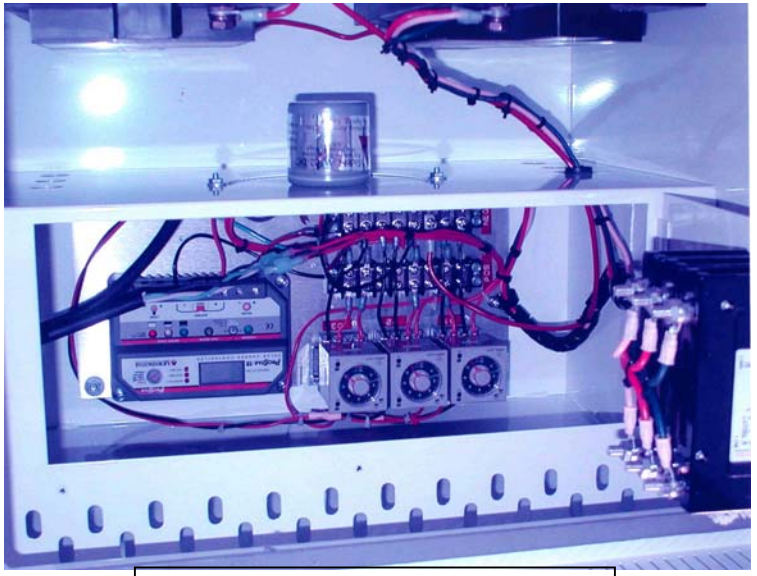
SITE 27_BEFORE-EF BEECH CR.

SITE 27_AFTER

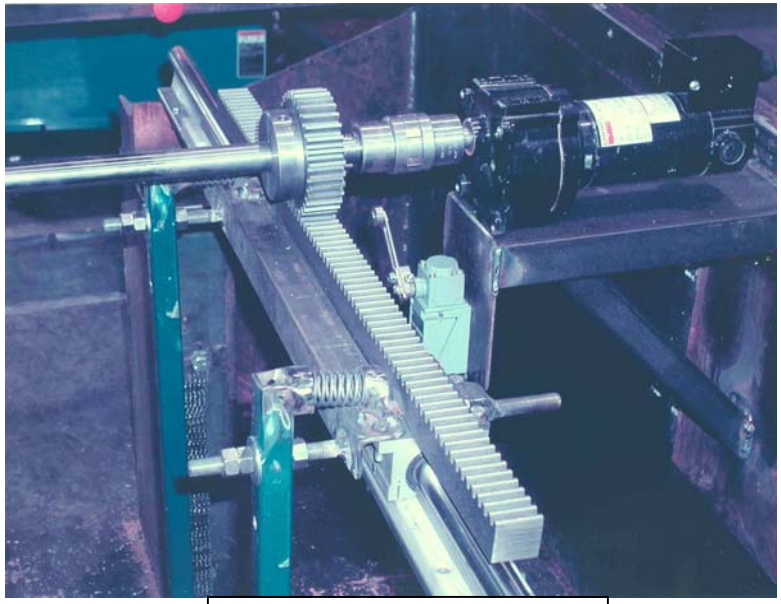
SITE 7_BEFORE-COTTONWOOD

SITE 7_UNDER CONS.

SITE 19_BEFORE-RUDIO CR.



RECIPROCATING MOTION



DRIVE SYSTEM

BELT SCREEN

FACILITY IMPROVEMENTS