Clackamas River Hydroelectric Project
Whitewater Kayaking on the Oak Grove Fork

DRAFT

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Executive Summary

The Oak Grove Fork is a creek-like segment about 16 miles long. Hydroelectric development associated with the Clackamas Project (PGE) and the Stone Creek Project (EWEB) make the Oak Grove Fork a "bypass segment," with most flow diverted into hydroelectric facilities. Only the five mile reach below Harriet Dam may offer interesting whitewater kayaking opportunities; the upper part of this reach drops about 185 feet per mile (with most of that gradient occurring in two falls), while the lower part of the reach drops between 50 and 120 feet per mile.

Information about boating was developed from two primary sources: 1) hydrology information from PGE, and 2) interviews with boaters who ran the river during an October 2001 flow release of 300 cfs. Eight boaters in two groups ran segments below Harriet Dam during the study release.

Findings

The reach below Harriet Dam is boatable in kayaks and inflatable kayaks at appropriate flows. The upper part of the run has several Class IV/V rapids and two falls, only one of which was boated during the study. The lower part of the run is less challenging, with continuous gradient Class II/III whitewater. The optimal flows for running both sections are probably between 300 and 600 cfs, although the lower section could probably be run at higher flows.

Based on hydrology modeling, flows in the boatable range occur relatively infrequently under current and proposed post-Project regimes, although they would have occurred frequently if unregulated. Augmented flows for boating may be possible during some times of the year, but these have implications for hydropower production, Timothy Lake levels, and aquatic and terrestrial resources in the reach.

If boatable flows were available more often, the Oak Grove Fork could provide accessible creek boating opportunities of some interest to regional boaters. The river is relatively close to a population center, the canyon scenery is high quality, a few rapids in the upper section are of interest to some higher skilled boaters, and the lower section provides opportunities for less skilled boaters to develop creek exploration skills.

However, the Oak Grove Fork also has limitations that would prevent it from becoming a popular whitewater run even if boatable flows were more frequently available. First, the run is relatively short, particularly the higher gradient upper section. Second, several mandatory log portages involve more effort than many boaters prefer, given the scarcity of distinctive rapids or falls. Third, the season when flows are available under an unregulated or augmented regime would probably coincide with good flows on other rivers with better whitewater or access.

This trip will probably appeal to a limited number of boaters, most of whom would see it as a novelty rather than a regular run. Given this, a few days of boatable flows each year

(which are available under all potential operating regimes) is likely to satisfy boater demand for the reach. Accurate flow information is particularly important so boaters can take advantage of boatable flows. If additional augmented flows are considered to enhance other resources (aside from current PGE and agency proposals), they would most benefit boaters if they coincided with warmer times of the year when other opportunities are less available.

Table of Contents

Introduction

The Clackamas River drains more than 940 square miles before joining the Willamette River near Portland. The Clackamas River Hydroelectric Project includes four hydroelectric developments in the basin, one on the Oak Grove Fork and three on the main stem Clackamas just east of Estacada, Oregon (about 25 miles southeast of Portland). The four developments are operated by Portland General Electric (PGE), which is applying to the Federal Energy Regulatory Commission (FERC) for a license to continue to operate these facilities (FERC 2195).

Recreation users, particularly whitewater boaters, are interested in the potential effects of power generation on recreation in the basin. Six separate reports (including this one) address these issues, including:

- Preliminary Flow Assessment for Recreation. (Whittaker & Shelby, 2001).
- Faraday Diversion Whitewater Boating Study (Shelby & Whittaker, 2004a).
- An Assessment of Potential Playboating Areas (Shelby & Whittaker, 2004b)
- Regional Demand for Whitewater Kayaking (Whittaker & Shelby, 2004a).
- Whitewater Kayaking on the Oak Grove Fork (this report, cite as Whittaker and Shelby, 2004b).
- Flows and whitewater recreation: Updated information about Three Lynx and Bob's Hole boating (Whittaker & Shelby, 2004c)

The Oak Grove Fork is a tributary to the Clackamas River that traverses over 20 river miles to its confluence with the Clackamas at river mile (RM) 53.0. At the headwaters is Timothy Lake (RM 15.8), a primary storage reservoir (1,430 acres in size) for the Clackamas Hydroelectric Project (operated by PGE). One mile downstream is the Stone Creek Project (operated by the Eugene Water and Electric Board or EWEB). This project diverts water over five miles to the Stone Creek Powerhouse. Three miles downstream is Harriet Lake, another PGE storage reservoir, where up to 585 cfs is diverted to Frog Lake and eventually the Oak Grove Powerhouse on the Clackamas River (RM 48.0). With most of the flow diverted to the series of hydroelectric facilities (especially below Harriet Lake), the Oak Grove Fork is a "bypass segment." In addition to low flows, difficult access, challenging rapids, and portages have discouraged boating use.

As reported in the initial study report on flows and recreation (PGE, 2002), there are four possible boating runs on the segment:

- from Timothy Lake Dam to the Stone Creek Project Dam
- from Stone Creek Dam to the Stone Creek Powerhouse
- from the Stone Creek Powerhouse to Harriet Lake
- from Harriet Lake Dam to the confluence with the Clackamas

Of these, only the last reach appears to offer interesting whitewater kayaking opportunities (see map 1). This reach is about five miles long and drops an average of 185 feet per mile in the upper gorge (this is about a half-mile long and includes two falls), while dropping 50 to 120 feet per mile in the remaining miles.

As part of studies designed to assess Project effects on fish habitat, PGE released an estimated 300 cfs into the reach on October 24, 2001. Two groups of kayakers (8 total) took advantage of the opportunity and ran the reach successfully. Several members of this group were interviewed for a preliminary report by Environmental Resources Management, Inc. (2002). This report provides additional information about kayaking opportunities and contains additional interviews with four of the boaters.

Objectives

- Describe boating opportunities on the Oak Grove Fork below Harriet Lake.
- Interview boaters about flows and their effects on Oak Grove boating opportunities, including boaters who participated in the demonstration flows in October 2001.
- Estimate acceptable and optimal flow ranges.
- Describe project effects on Oak Grove boating opportunities, and estimate the availability of boating flows under alternative flow scenarios based on hydrology modeling.
- Compare Oak Grove boating opportunities with other regional options.

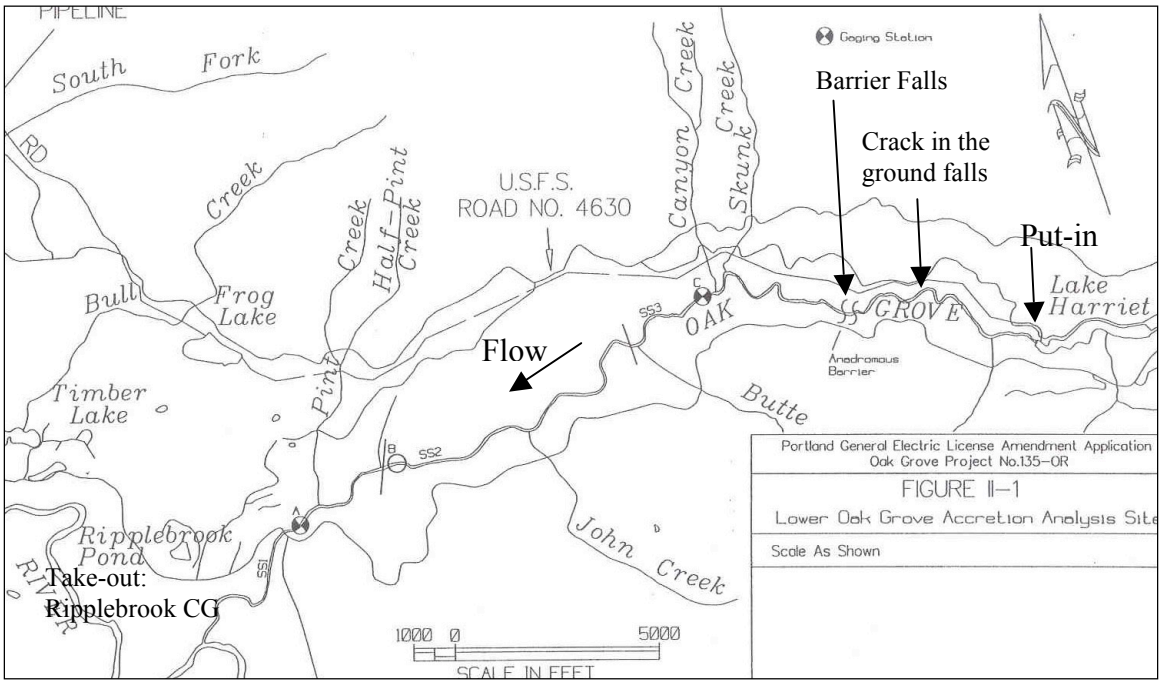

Figure 1. Map of Oak Grove Fork below Harriet Lake.

Methods

Information was developed from two sources: 1) hydrology data from PGE or its consultants; and 2) interviews with boaters who ran the river during the 2001 study releases.

Hydrology

Flows during the October 2001 releases were estimated by PGE based on a rating curve for the gates at Harriet Dam. There is no gage in the Oak Grove Fork and PGE did not conduct field measurements during releases.

Potential hydrology in the reach below Harriet Lake under various operating scenarios was based on a modeling effort conducted by PGE consultants (Carson, personal communication, 2004). This effort estimates flows under four potential scenarios: 1) "unregulated flows" (if there were no project); 2) current operations; 3) PGE's preferred future operations; and 4) an agency proposal for future operations. Modeling was based on existing USGS gage data from October 1970 to September 2000. Current operations are described below. Alternative scenarios and their effects on boating are discussed later in the report.

Under current operations, PGE generally diverts all water at Harriet Lake to the Oak Grove Powerhouse except when the hydraulic capacity of the Project (about 585 cfs) is exceeded. Typical "base flows" in the bypass reach are attributable to accretion and tributary input below the dam (usually less than 50 cfs by the end of the segment).

Occasional "spill" flows occur during most years, usually between November and June; these may occur even when Timothy Lake is not filled because of tributary input downstream. These spills can exceed 3,000 cfs (e.g., February 1996), but they are usually less than 1,000 cfs. Although some spills only last a few days, others may continue for several weeks. Modeling indicates that spills larger than 300 cfs occur less than 6% of the time, and in some years there are no spills.

October 2001 Flow Release

The purpose of the October 2001 flow releases was to evaluate fish habitat. Releases of 50, 120, and 300 cfs were provided during the study; only the 300 cfs release was evaluated for boating. Based on the assessment of that flow, evaluations of the two lower flows were unnecessary.

Two groups of kayakers ran the river during the 300 cfs flow release. Both groups were informally organized by boaters who heard about the study, although boaters in Group 2 were encouraged to observe the flows from on-land (they chose to boat the reach on their own).

Group 1:
Jason Rackley
Steve Stuckmeyer
Josh Knapp
Kevin Nickle
Galen Griffin
Pete Giordano

Group 2:
Sam Drevo
Jed Weingarden

All boaters were highly skilled Class V creek boaters. All paddled creek boats with blunted ends and higher displacements to minimize the risk of "pinning" in steep, boulder-constricted rapids.

Group 1 had previously scouted access and rapids during low flow periods and decided to put-in at the base of Harriet Dam, allowing access to the quarter-mile of rapids before "Crack in the Ground Falls." Group 2 put-in below "Crack Falls." Both groups took-out at Ripplebrook Campground, near the confluence with the Main Stem of the Clackamas.

Telephone interviews of four boaters (Rackley, Stuckmeyer, Giordano, and Drevo) and a PGE fisheries biologist who had extensively scouted the stream from land (Tim Shibahara) were conducted by ERM following the 2001 releases; a summary is provided in ERM (2001). Follow-up interviews with four boaters (Rackley, Giordano, Drevo, and Weingarden) and Shibahara were conducted for this report; these occurred in January-February, 2004. Both reports also refer to a run description and photos by Jason Rackley (www.kayaking.peak.org/public_html/rivers/oakgrove/oakgrove.html).

Findings

Description of the run at 300 cfs

Starting at the dam, the rapids begin immediately with a series of Class IV drops and one longer Class V boulder garden. At least one of the drops has undercut boulders (scouted by boaters at low flows), but these are avoidable at 300 cfs. Another drop led into a log across the river that was portaged. The longer Class V rapid was steep and constricted at the top, with a Class IV run-out. Most of these rapids are in quick succession with few recovery areas between them, although there were good eddies for scouting at 300 cfs.

Crack in the Ground Falls is about a quarter of a mile from the dam; it is a Class VI rapid that was not run by any boater at 300 cfs. One boater (Drevo) thought it may have been run in the past, while others (Giordano, Rackley, Weingarden) thought it might be runnable depending upon the location of logs and the flow. All boaters agreed this is a very difficult rapid that would remain Class V+ or VI, even with ideal flows and logs removed. At 300 cfs the falls is easy to recognize, has a good place to eddy-out for scouting or portaging, and has a relatively easy portage (there is a remnant mining road on river left). A "seal launch" put-in below the falls leads into Class III rapids.

Barrier Falls follows shortly downstream, a Class V rapid that was run by three boaters during the study (Drevo, Weingarden, and Knapp). This falls has 25-30 feet of total drop, with a chute dropping 5-10 feet before the main falls. Pre-trip scouting by boaters in Group 1 suggested there are few rock hazards or undercuts immediately below the main falls and one boater (Giordano) estimated that it would have a "boatable line" at most flows between 300 and 1,000 cfs. Falls of this size are regularly run by kayakers on other creeks in the region.

Downstream of Barrier Falls, the river offers continuous Class II/III but fewer distinctive rapids. This section also has numerous logs that required portages (about 5 to 6 at 300 cfs). In other places, kayakers had to push over logs or "limbo" under them. The logs were generally small diameter alders and boaters thought they might move during high flow events.

The Lower Oak Grove Fork has undergone extensive stream restoration work, including cabling of logs and placement of boulders for fish habitat. Although "habitat logs" can create some "mild" whitewater features that would not otherwise exist (Giordano), several boaters expressed concern that cabled logs or loose cable create potential hazards.

Boatability

The reach is boatable in kayaks at 300 cfs, although all four boaters thought this was near the "minimally acceptable" level. Several rapids were "rocky," and might have had "cleaner" or more route options at higher levels. The lower section of the run (downstream of Barrier Falls) had more boatability issues than the upper section, which has a more constricted channel.

Types of craft

Based on interviews, appropriate craft are hard shell "creek" kayaks, although inflatable kayaks might also be used. The reach is probably not appropriate for small rafts or catarafts given the technical, constricted rapids. Portaging rafts at the falls and log barriers would also be problematic.

Portages due to logs

Boaters recalled 5 to 8 total portages, most were below Barrier Falls and associated with logs across the channel rather than low flow conditions. Only one was due to difficulty of whitewater (Crack in the Ground Falls), although some boaters also portaged Barrier Falls. According to one boater (Giordano), slightly higher flows might allow passage over some of the logs.

Whitewater challenge

Different reaches of the segment offer different levels of whitewater challenge. The more difficult rapids are in the upper section between the dam and Barrier Falls, with several Class IV/V drops (including the two falls). The section below Barrier Falls was Class II/III.

Acceptable and optimal flows

At 300 cfs, the upper section of the run was not too "pushy" and had clear lines through most of the rapids. While additional water might provide more route options and cleaner lines (Girodano), these rapids might become substantially more powerful and difficult (Rackley). Stronger hydraulics at these flows might also become "sticky," and recovery time between rapids would decrease.

Specifying an upper bound for optimal flows in this upper reach is difficult because boaters only ran 300 cfs, but Giordano has scouted the river from on-land at flows higher than 1,000 cfs (estimated) and suggested those levels are unrunnable. Rackley also expressed concern about the difficulty of the upper section at flows substantially higher than 300 cfs. Overall, the upper section is probably best at flows lower than 600 cfs, although this limit is a "best guess." Note: Drevo and Weingarden did not run this upper section and did not assess it.

The lower section (below Barrier Falls) was rocky at 300 cfs, and additional water would probably provide more route options and fewer "hits" (unintended contact with rocks) without substantially raising the level of difficulty. None of the boaters thought higher flows (for example, 600 cfs) would increase the difficulty of lower section rapids beyond Class III or eliminate critical eddies above the log portages. Overall, the lower section is probably acceptable from 300 to 1,000 cfs, with optimal flows from 300 to 800 cfs. The upper ends of these ranges are less precise estimates than the lower ends.

Access

It is possible for boaters to put-in at the dam on the river right side. There is no formal trail and boaters had to "scramble" down a gully, but they did not need to use ropes or lower boats separately (which is occasionally done on other rivers). It is also possible to put-in at other locations along the reach (including just below Crack in the Ground Falls), although these also require scrambles down steep slopes. There is a good take-out at Ripplebrook Campground. Boaters could also continue downstream to commonly-used access areas on the Main Stem.

Comparing the Oak Grove Fork to other rivers

Based on interviews, the Oak Grove Fork does not offer exceptional whitewater boating, even for those interested in steeper, technical rivers with low flows (commonly known as "creek boating"). While it has good access and sufficient gradient to provide a quality "creeking" opportunity, it has relatively few distinctive rapids (all in the short upper section), only one runnable falls, several portages, and a less interesting lower section. This creates a slightly higher ratio of "effort" to "reward" than many high skilled (Class IV/V) creek boaters prefer.

The lower section has potential merit as a Class III creek kayaking opportunity, although it has several log hazards requiring portages. This section is generally not too difficult for moderately skilled boaters interested in developing their "creek exploration skills," although people without Class IV skills are probably less interested in these opportunities.

Boaters were asked to identify comparable rivers in the Portland region. Boaters noted that these segments are similar to Oak Grove Fork in some ways, but substantially different in others. No segment was identified as "very similar" to the Oak Grove Fork.

- Upper East Fork of the Lewis (the "Green Fork"); similar scenery.
- North Horn Creek near Bagby Hot Springs; has more difficult access and is slightly more challenging.
- June Creek section of the Collawash; has more interesting whitewater.
- Roaring River; has similar scenery, topography, and difficulty, but fewer logs.
- North Fork Clackamas; more difficult but has similar vegetation and log portages (although some of those have been recently removed).
- Several small rivers in the area have better runnable falls or more challenging Class IV/V water (e.g., White Salmon, Little White Salmon, Washougal, West Fork Hood River, Sandy River [McNeil to Lolo Pass Road], Quartzville Creek).

Project effects on boating

Potential hydrology below Harriet Lake under various operating scenarios was developed through a modeling effort conducted by PGE consultants (Carson, personal

communication, 2004). Table 1 summarizes that information for "unregulated flows" (if there were no Project) and three alternative operating scenarios.

Unregulated flows in the Oak Grove Fork would generally exceed 150 cfs, frequently range from 300 and 600 cfs, and infrequently range from 1,000 to 5,000 cfs. In contrast, alternative operating scenarios would produce relatively constant base flows between 0 and 180 cfs (depending upon the alternative) except during spills. Spills would generally be below 1,000 cfs and last from a few days to a few weeks, but they could be as high as 4,500 cfs.

Table 1. Summary of hydrology under four alternative operating scenarios in the Oak Grove Fork.

	Unregulated flows	Current operations	PGE preferred operations	Agency preferred operations
Target base release	Not relevant	0	50	180
Mean flow	524	56	100	201
Median flow	440	0	50	180
Minimum daily flow	146	0	50	127
Maximum daily flow	5,104	4,499	4,499	3,605
Interquartile range (25 to 75%)	335 to 628	0	50 to 70	180

Note: Information based on an analysis of modeled flows from Carson, 2004 using data from WY 1970-2000.

The hydrology scenarios affect the number of days of boatable flows. Table 2 summarizes the number of days per year of optimal flows for upper and lower sections (300 to 600 cfs), optimal flows for the lower section only (600 to 800 cfs), and acceptable but not optimal flows for the lower section (800 to 1,000 cfs).

Table 2. Days per year in various flow ranges under four alternative operating scenarios in the Oak Grove Fork.

	Unregulated flows	Current operations	PGE preferred operations	Agency preferred operations
Unacceptable (< 300 cfs)	55	342	343	342
Optimal in both reaches (300 to 599 cfs)	208	15	14	15
Optimal in lower reach (600 to 799 cfs)	57	4	4	4
Acceptable in lower reach (800 to 1,000 cfs)	23	2	2	2
Unacceptable (> 1,000 cfs)	22	2	2	2

Note: Information based on an analysis of modeled flows from Carson, 2004 using data from WY 1970-2000.

With unregulated flows, optimal boating conditions for both sections would occur almost seven months per year (an average of 208 days), with nearly two more months (57 days) of optimal flows in the lower reach (although the upper section might not be boatable then). There would also be 23 days where the lower section might be acceptable but not optimal. There are only about two and half months (77 days) when the river would not be boatable, and optimal flows would generally be available in the summer and early fall when weather is better.

In contrast, all of the alternative operating scenarios produce fewer days of boating. In general, these scenarios produce about two weeks (14 to 15 days) of optimal flows for both sections, with a few additional days of optimal or acceptable flows in the lower reach only. These optimal flows generally occur between November and early June (most likely April and May) when weather is cooler. Differences between the scenarios are small, and even the agency-proposed 180 cfs base flow does not produce additional days of boatable flows.

The project may also have longer-term effects on boating because some channel characteristics and riparian vegetation may have changed in response to lower base flows and slightly lower peaks. Vegetation encroachment is a common issue on bypass reaches that can affect boating, but it is difficult to quantify or relate to specific flow regimes. Boaters on the Oak Grove Fork did not report vegetation growing in the channel, but several portages were due to logs that may be associated with flow or riparian changes.

Potential boating use levels

Participants reported that boating use levels would probably be low on Oak Grove Fork even if boatable flows were more frequently available. The run has a certain "novelty value," as evidenced by the interest when study flows were provided. However, the combination of a difficult but short upper section (that would discourage less skilled

boaters) and the longer Class II/III lower section (that would be relatively uninteresting for highly skilled boaters) is unlikely to attract much sustained use. This is particularly true if flows were only available in late winter or early spring when higher quality runs are available.

Conclusions

The Oak Grove Fork below Harriett Dam is boatable in kayaks and inflatable kayaks. The best flows for running both sections of the reach are likely to be between 300 and 600 cfs, although the lower section could probably be run at higher flows.

Flows in this boatable range occur infrequently under current and proposed Project regimes. Augmented flows for boating may be possible during some times of the year, but these may have implications for hydropower production, Timothy Lake levels, and aquatic and terrestrial resources in the reach.

If boatable flows were regularly available, the Oak Grove Fork might provide creek boating opportunities of some interest to regional boaters. The river is relatively close to a population center, the canyon scenery (particularly in the upper section) is high quality, a few rapids in the upper section and Barrier Falls are of interest to some highly skilled boaters, and the lower section provides opportunities for less skilled boaters to develop creek exploration skills.

However, the Oak Grove Fork has limitations that would prevent it from becoming a popular whitewater run if boatable flows were regularly available. First, the run is relatively short, particularly the higher gradient upper section. Second, several log portages involve more effort than many boaters prefer given the scarcity of distinctive rapids or falls. Third, planning trips on this tributary requires close attention to flows because the boatable range only occurs for short periods. Fourth, the season when flows are available coincides with good flows on other rivers with better whitewater or access.

This trip will probably appeal to a limited number of boaters, most of whom would see it as a novelty rather than a regular run. Given this, a few days of boatable flows each year (which are available under all potential operating regimes) is likely to satisfy boater demand for the reach. Accurate flow information is particularly important so boaters can take advantage of boatable flows. If augmented flows were considered to enhance other resources, the flows would benefit boaters more if they coincided with warmer times of the year when other opportunities are less available.

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