

**Clackamas River Hydroelectric Project**  
**Flows and whitewater recreation:**  
**Updated information about Three Lynx and Bob's Hole boating**

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## **Introduction**

The Clackamas River drains more than 940 square miles of the Lower Willamette River watershed 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 No. 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 (Whittaker and Shelby, 2004b).
- Flows and whitewater recreation: Updated information about Three Lynx and Bob's Hole boating (this report, cite as Whittaker & Shelby, 2004c)

### **Study Objectives**

This report contains separate sections on Three Lynx low flow boating and Bob's Hole kayak playboating. Study objectives include:

#### **Three Lynx Low Flow Boating**

- Describe developments in summer low flow boating (particularly commercial rafting operations) on the Three Lynx segment since 2001.
- Review project effects on these boating opportunities, including issues associated with daytime flow augmentations.

#### **Bob's Hole Playboating**

- Compare users' current assessments of optimal flow ranges for kayak playboating at Bob's Hole with those discussed in the 2001 report.
- Review project effects on Bob's Hole playboating under alternative operating scenarios.

## **Methods**

### **Three Lynx Low Flow Boating**

Information on Three Lynx summer low flow boating was primarily developed from interviews with two outfitters, Ken Streeter and Pete Girodano. These outfitters have pioneered low flow commercial use since 2000, although other Clackamas outfitters have recently begun to offer similar trips.

Interviews were conducted in winter 2004, focusing on three topics: 1) descriptions of use (craft, number of people, access); 2) sensitivity to flow changes; and 3) acceptable and optimal flows for different reaches and craft. Reconnaissance on the reach during July 2002 and 2004 provided additional context for interpreting outfitter information.

Acceptable and optimal ranges were integrated with hydrology modeling information developed by PGE consultants (Carson, personal communication, 2004); the information provided mean daily flows under various operating scenarios over a 30 year period of record (October 1970 to September 2000). These data were used to estimate the number of days that low flow opportunities are available.

These models also provided hourly flow data in example wet, dry, and average years, which was used to illustrate the timing of existing flow fluctuations in the reach. These data provide a springboard for conceptual discussions about constraints on providing whitewater augmentations during the low flow season.

### **Bob's Hole**

Channel geomorphology in the Bob's Hole area is dynamic, and high flow events since 2001 appear to have slightly modified playboating features there. Interviews with avid playboaters in January 2004 and a review of information posted on the "playboating northwest" website were used to describe these changes, leading to slightly refined acceptable and optimal ranges.

Interviewees included:

- Keith Jensen (local kayaker, Alder Creek, and American Whitewater)
- Brian Fields (local kayaker)
- Bob Patterson (local kayaker)
- Kenny Pitta (local kayaker)
- Tim Shibahara (PGE fish biologist and local kayaker)

Using the new ranges, the percent of days with acceptable and optimal flows were compared using the operations models above and other operations information provided by PGE. The goal was to revisit issues (from 2001 report) regarding releases to enhance boating at Bob's Hole.

## Findings

### Three Lynx Low Flow Boating

As discussed in the preliminary report (Whittaker and Shelby, 2001), a lower flow “playful whitewater opportunity” exists on the Three Lynx Segment (see Figure 1). Distinct from “standard whitewater opportunities” that have larger waves and more powerful hydraulics, the “playful” opportunity was pioneered by outfitters interested in extending the commercial season later into the summer. At the time of the first report, outfitters had limited experience running low flow trips (a season or two, although some had run private low flow trips in previous years). In the past few years, outfitters have substantially grown this segment of use, honing logistics and becoming more attuned to appropriate choices of craft and reaches for different flow levels.

#### *Description of the opportunity*

In general, “full” low flow trips start from below the Three Lynx Powerhouse and end at Memaloose. However, shorter trips start at Mile 41 (upstream of Hole-in-the-Wall Rapid) or Fish Creek and may end at an informal take-out below Toilet Bowl Rapid. In all cases, low flow trips do not run the upper reach of the segment from Indian Henry/Sandstone Bridge, avoiding the substantial boatability problems in Powerhouse Rapids. As flows drop, the Mile 41 put-in avoids boatability problems and potential equipment damage in Roaring River Rapid.

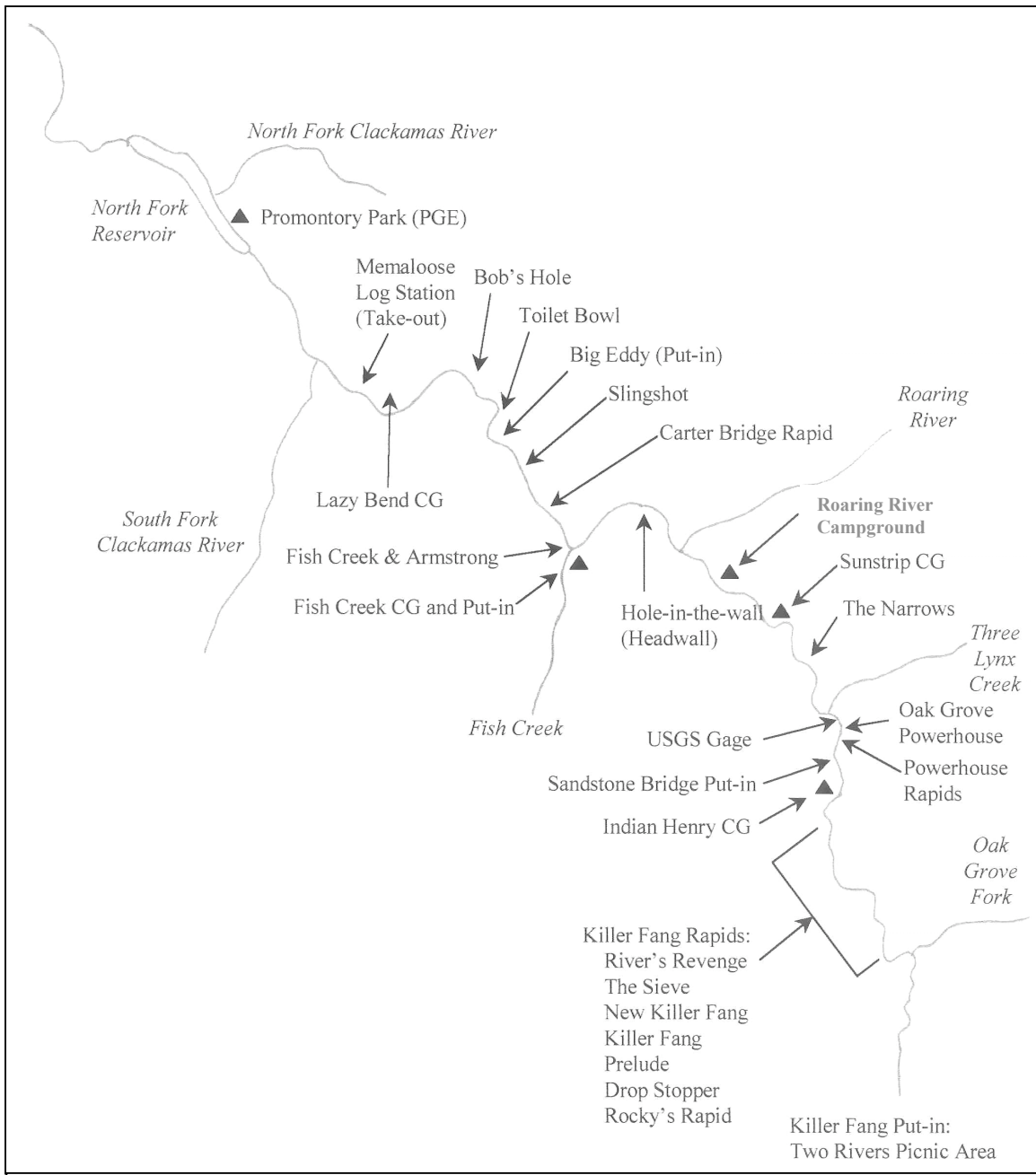
On low flow trips, most commercial outfitters use smaller rafts or carry less people, unless flows allow larger “standard” rafts (see below). Standard-sized commercial rafts on the Clackamas are 13 to 14 feet long and typically carry 5 to 7 passengers plus a guide; most are run as paddle boats. Smaller rafts are 11.5 to 12 feet long and typically carry 4 to 5 passengers plus a guide. Some commercial trips also put clients in inflatable kayaks at low flows.

Because the rate of travel is slower at lower flows, it takes a “full day” to run from below the powerhouse to Memaloose. In general, these trips put-in around 10:30 am and take-out about 4 pm. A “half day” option typically runs the reach of concentrated rapids between Hole-in-the-Wall and Toilet Bowl, which can be completed in an afternoon.

When low flows prevent outfitters from taking longer trips, a “full day” can be created by starting near Hole-in-the-Wall, running down to Toilet Bowl, then shuttling back to Fish Creek and re-running Fish Creek to Toilet Bowl. However, this “double run” is more logistically cumbersome, and one outfitter (Streeter) reports that many customers opt to take the half day trip instead because they “don’t see the point of paying more to run the same rapids twice.”

Outfitters are careful not to represent low flow trips as “splashy,” or “big-rapid” trips, although both noted that whitewater in the section between Fish Creek and Toilet Bowl rivals the Deschutes. They also let passengers know that boats may become grounded

during the trip, and they have even named one rapid “Parking Lot” (about three-quarters of a mile below Bob’s Hole) to reflect the likelihood of getting stuck.



**Figure 1.** Map of Three Lynx segment.

### *Sensitivity to flow levels*

Outfitters are very sensitive to flows, checking levels nearly daily (flows are readily available on several websites). As discussed above, flows affect the size of the rafts, the number of people in rafts, and the segments they run. Running rafts at lower flows also increases the likelihood and severity of equipment damage (holes in rafts, paddle damage) or potential for passenger injury. When asked to estimate their ability to detect changes in flow, both outfitters thought they could detect differences of 50 to 100 cfs when flows are low (under 1,000 cfs).

### *Acceptable and optimal flows*

The original report (Whittaker and Shelby, 2001) described “low flow boating opportunity.” Flows below 500 cfs were rated unacceptable, with steady improvement from 600 through 1,500 cfs. Marginal flows were about 700 cfs, with an optimal range from 1,200 to 1,500. Flows higher than 1,500 cfs were identified as providing a “standard” whitewater opportunity.

Based on discussions with low flow commercial outfitters, lower flows are better than represented in the original report, although outfitters adjust by using smaller boats and taking shorter trips. One outfitter (Giordano) suggests that flows as low as 480 cfs can provide a “short trip” in the Fish Creek to Toilet Bowl reach. However, both outfitters agree that more acceptable trips start about 550 cfs, a reasonable estimate of the marginal flow.

From 550 to 700 cfs even small increments of flow improve conditions substantially, and outfitters offer “medium length trips” from Hole in the Wall. Above 700 cfs, those trips continue to improve, and outfitters use the put-in just downstream of the powerhouse. This is probably the low end of the optimal range, recognizing that outfitters still must use smaller rafts with fewer people than they would prefer.

As flows exceed 800 to 900 cfs, some outfitters add more people or shift to larger boats, but it is not until 1,000 cfs that they use the Sandstone Bridge / Indian Henry put-ins and take larger rafts and full complements of passengers. The transition to standard trips is about 1,200 cfs, consistent with the first report.

In summary, revised thresholds for low flow boating suggest it is marginal about 550 cfs, and optimal from 700 to 1,200 cfs. Flow augmentation can improve quality anywhere in this range, but particularly from 550 to 700 cfs, where increases of even 50 cfs may make a difference.

### ***Project effects on low flow boating***

Hydrology modeling (Carson, personal communication) shows effects of current operations and flows on low flow boating opportunities.<sup>1</sup> Table 2 shows these differences for the entire year and the summer months (June through August).

About 40% of the days through the year (and 25% of the summer days) are under 1,200 cfs and thus provide “low flow” opportunities. Of these days, few are below the marginal flow of about 550 cfs. There are about three weeks in summer with flows between 550 and 700 cfs, and about another month between 700 and 1,000 cfs. These are the days that outfitters make some compromises in types of boats, number of people, or length of trip (compared to standard trips).

Current operations slightly enhance low flow boating opportunities over the entire year by providing an extra week of flows in the 700 to 1,000 cfs and 1,000 to 1,200 cfs ranges compared to an unregulated regime. However, those differences all occur outside the summer season, generally in the early fall when Timothy Lake is drawn down.

The numbers shown in Table 1 represent “average years.” Figure 2 shows variation for example wet, average, and dry years. Low flows are likely to occur even during wet years, and in dry years nearly two-thirds of the summer may have flows under 700 cfs.

**Table 1.** Average number of days that the Three Lynx Segment is within “low flow” ranges.

	All year		Summer (Jun-Aug)	
	Unregulated flows	Current operations	Unregulated flows	Current operations
Under 550 cfs (marginal for any trip)	9	5	2	2
550 to 699 cfs (medium length trips)	42	30	19	20
700 to 999 cfs (longer trips, start of optimal range)	73	81	36	36
1,000 to 1,200 cfs (low flow/standard transition)	22	29	10	10
Over 1,200 cfs (high end of optimal range)	219	220	24	23

<sup>1</sup> The “utility proposed” and “agency proposed” scenarios were also considered, but differences were so small that they were not discussed here. These scenarios primarily affect flows above the Three Lynx powerhouse in the Oak Grove Fork.



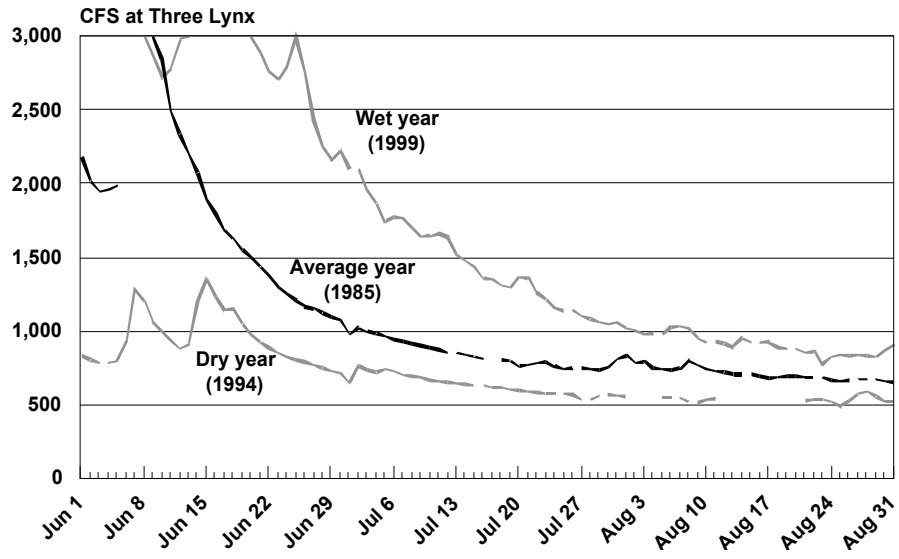


Figure 2. Mean daily flows in summer in illustrative wet, average, and dry years.

Daily fluctuations sometimes occur at Three Lynx Powerhouse during low flow periods. Without describing the intricacies of current operations, the size and timing of these fluctuations are apparently related to 1) rate of refill at Frog Lake (the forebay for Three Lynx powerhouse) and 2) operational goals that emphasize the ability to generate emergency power if needed during the middle of the day (Carson, personal communication). Under these constraints, fluctuating flows are small (usually less than 200 cfs per day) during most of the low flow period, but they diminish boating quality because the lowest flows occur in the middle of the day. PGE is working on hydrology models that will help specify how many days this occurs during low flow times.

## Bob's Hole Changes

As discussed in the preliminary report (Whittaker and Shelby, 2001), Bob's Hole refers to a single rapid with a series of waves and holes popular with hard shell kayakers for playboating (see Figure 1). The configurations at Bob's Hole are dynamic, and changed substantially in two 1996 floods. In recent years, high flow events have begun to return some features lost in 1996. This section of the report revises acceptable and optimal flows based on the current situation, and discusses the number of days when the area provides playboating opportunities.

Acceptable and optimal flows for Bob's Hole are given in Table 2; ranges include those from the initial report and based on 2004 interviews. The table also distinguishes between flows for Bob's Hole and associated waves, and Joe Bob's Hole (the primary feature that was lost in 1996). In general, acceptable and optimal flows have broadened slightly at Bobs Hole, while Joe Bob's Hole has essentially "reappeared."

**Table 2.** Acceptable and optimal flows (and number of days per year) for Bob's Hole area playboating features.

	Acceptable range	Number of days	Optimal range	Number of days
<b>Bob's Hole</b>				
2001 preliminary flow assessment report	1,600 to 2,700	92	1,900 to 2,300	31
2004 interviews	1,400 to 2,800	121	1,700 to 2,500	72
<b>Joe Bob's Hole</b>				
2001 preliminary flow assessment report	Not available 1996 to 1997; 1998 to 2001			
2004 interviews	2,700 to 4,300	50	3,200 to 4,000	24
Bob's Hole and Joe Bob's Hole together		171	96	

Table 2 also shows the number of days the playboating features are within acceptable and optimal ranges. Based on modeling of current operations over a 30 year period of record, Bob's Hole by itself is acceptable for about 121 days a year, with optimal flows about 72 days a year. This is an increase from the estimates in the initial report due to the narrower ranges and shorter period of record in that report.

Taking Bob's Hole and Joe Bob's Hole together, acceptable playboating in the area is available almost 6 months or 171 days per year, while optimal flows are available about 96 days per year. This is an even greater increase from the initial report because Joe Bob's Hole was not available in 2001.

In light of these substantial increases in the availability of Bob's Hole playboating features, the relative value of manipulated playboating flows is diminished – particularly on the high end of the range when Joe Bob's Hole provides good opportunities. Given current operating goals and peaking limitations (see Three Lynx section above), manipulating flows to provide optimal Bob's Hole playboating on a regular basis is more problematic than implied in the 2001 report.

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