

Clackamas River Hydroelectric Project Regional Demand for Whitewater Kayaking

FINAL

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Executive Summary

Recreation planning requires accurate information about demand for existing and potential opportunities. During the relicensing process, it has been suggested that there may be opportunities to develop or enhance whitewater “playboating” in the basin, but it would be helpful to have specific information about demand for that activity. This report integrates a variety of information about kayaking and playboating demand, suggesting national and regional participation and trends.

Several sources of information were used to meet study objectives. These include national recreation participation studies, presentations about the “state of the industry” from a recent “whitewater symposium,” information about the growth of “whitewater parks,” boater responses to informal surveys on a national kayaking website, and specific regional information from interviews with boating leaders in the Portland area. Each of these sources has weaknesses, but taken together they help paint a coherent picture of current kayaking demand.

Findings

- Whitewater kayaking is a specialized activity that comprises a small proportion of use in comparison to some other outdoor recreation activities; just over 1% of the national population participates in whitewater kayaking. This is more than windsurfing, but comparable to rock climbing, snowshoeing, backcountry skiing, and scuba. It is less than sailing, downhill skiing, skateboarding, rafting, backpacking, and water skiing.
- Whitewater kayaking has grown substantially in recent years and appears to be among the fastest growing of the human-powered outdoor recreation activities. Whether this growth will be sustained depends on several factors.
- Although regional kayaking participation and trends are likely to follow national trends, there are some reasons to believe the potential for growth in Portland and the Northwest is higher than other parts of the country. Various sources suggest an “enthusiast” kayaker population in the Portland area between about 1,500 and 3,000.
- Kayaking use patterns and the characteristics of kayakers have implications for future participation and demand. Whitewater kayakers tend to be young, male, and unmarried, with high education levels and incomes (or potential income). More boaters have Class III (or lower) than Class IV/V skill levels, and playboating is the largest single specialized type of whitewater kayaking.
- Investment in human-built whitewater developments is another indicator of “demand” for whitewater boating in general and playboating in particular. Whitewater features, whitewater parks, or artificial rivers are being developed at an increasing rate in North America. With fewer than 10 in existence before the mid-1990s, nearly 30 are available today with at least 15 more proposed. Some have required substantial

public and private investment, indicating long term interest and confidence in the growth of the sport.

- Factors that influence trends in recreational activities such as kayaking include population growth, economy, availability of boatable rivers, free time, diffusion of new technologies and techniques, media and marketing image, instruction, indoor practice opportunities, outdoor practice opportunities, weather and equipment, and age and the participation cycle.
- These factors suggest that national and regional kayaking demand is growing rapidly, but some factors may slow this rate of growth. Whitewater kayaking will probably become more of a “mainstream” (rather than specialized) activity over time, but it is unlikely to match the historical growth curves of skiing/snowboarding. Overall, it is unlikely to exceed 3% participation over the next 20 to 30 years.
- Playboating, a freestyle form of kayaking with similarities to ocean surfing, appears to be the largest specialized type of whitewater kayaking and may be driving use increases. However, the majority of playboaters make downriver trips rather than “at-a-location” trips.

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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 Company (PGE), which is applying to the Federal Energy Regulatory Commission (FERC) for a license to continue to operate these facilities (FERC 2195).

Whitewater boaters are interested in the potential effects of power generation on recreation in the basin. Two previous reports (Whittaker & Shelby, 2001; 2003) addressed this topic, describing river recreation opportunities that occur in the basin, estimating the flow requirements for those opportunities, and examining how current flow regimes affect their availability and quality. This report provides additional information about a recreation issue that has developed since those reports: regional kayaking demand.

Study Overview and Objectives

Recreation planning requires accurate information about demand for existing and potential opportunities. An overview of recreation supply and demand for the Clackamas River Hydroelectric Project (Hall, 2003) documented general participation levels for multiple activities at the local, regional, and national scales, and compares those with specific facilities and opportunities currently available in the Clackamas drainage. This information is useful for identifying facility needs or other protection, enhancement, and mitigation measures for consideration in the license application.

During the relicensing process, it has been suggested that there may be opportunities to develop or enhance whitewater “playboating” in the basin, but it would be helpful to have specific information about demand for that activity. This report integrates a variety of information about kayaking and playboating demand, suggesting national and regional participation and trends. The objectives of the study include:

- Review and summarize existing national and regional information about whitewater demand, with a particular focus on kayak playboating demand.
- Develop a list of existing playboating locations in the Portland regional area and estimate use levels at each (if possible).
- Using multiple information sources, estimate playboating participation, trends, and likely future demand over the expected license period (30 to 50 years).

Methods

Several sources of information were used to meet study objectives. *National recreation participation studies* helped frame general kayaking participation and trends. Information from a recent “whitewater symposium” of kayak instructors, industry retailers, and other whitewater community leaders provided more specific information about factors that influence participation and trends.

Boater responses to informal surveys on a national kayaking website (“Boatertalk”) were a second source. This message board has a national focus, respondents were self-selected, and questions were developed informally, but responses help characterize use patterns within the kayaking community (particularly among playboaters).

Specific regional information came from *interviews with boating leaders* in the Portland area (e.g., boating shop managers, instructors, a slalom organizer/racer, and kayaking website managers; see list in Appendix A). These boaters recognize the challenges of estimating regional kayaking participation levels, trends, and factors that influence them, but most had strong opinions and anecdotal evidence to support their ideas. While many interviewees have a personal or financial stake in the development of playboating features and increased participation, the similarity of responses suggests a confluence of opinion about current and potential kayaking demand.

Growth of whitewater playboating parks was a final important source. An exhaustive list of parks and their characteristics was outside the scope of this study, but we assembled a list of parks in Appendix B that helps characterize the range of facilities, investment, and use levels, each with implications for demand. Websites and reports about specific whitewater parks were primary sources.

Although no single source appears definitive and all have some weaknesses (we have identified these as results are presented), integrating information paints a fairly consistent picture. Nonetheless, characterizing demand for a specific activity at a specific site can be challenging and difficulties increase for regional and future demand.

Recreation participation in specific activity categories is not always stable or predictable, and new activities develop over time. For example, in 1960 about 2% of the general population were downhill skiers, while in 2000 about 9% were skiers and another 4% were snowboarders (an activity that emerged in the late 1980s). In 1960, few would have predicted these increases or the growth in associated facilities, particularly based on past use. The open question is whether whitewater kayaking will develop like downhill skiing or remain at current participation levels.

Findings

Current kayaking participation rates

Summary: *Whitewater kayaking is a specialized recreation activity that comprises a small proportion of use in comparison to some other outdoor recreation activities. About 1 to 2% of the national population participates in whitewater kayaking (although over 3 to 5% engage in all forms of kayaking, including “recreational” (sit-on-top) and touring/sea kayaking). This is more than windsurfing, but comparable to rock climbing, snowshoeing, backcountry skiing, and scuba. It is slightly lower than sailing, downhill skiing, skateboarding, rafting, backpacking, and water skiing. Support for this general assertion comes from two primary sources (below).*

National Survey on Recreation and the Environment (NSRE)

This periodic national study (currently conducted through the US Forest Service and the University of Tennessee at Knoxville) is the most comprehensive assessment of national participation and trends. It has been occurring in five to ten year increments since 1960 (using a variety of methodologies in different years), attempting to provide comparability across iterations. Results from the most recent survey (1999-2000) are available in several documents, with small variations depending upon how data were weighted or organized.

The latest NSRE used a phone survey methodology with sample sizes of about 5,000 households (1999-2000 effort). The 1999-2000 sample appears sufficient for most purposes, but for activities with participation rates less than 5%, sample sizes are small for estimating other characteristics. The study focuses on the recreation activities of adults 16 years and older (about 216 million people fit in this category in 2000).

The survey asked about roughly 50 different activities in 1999-2000, including kayaking. However, it did not distinguish whitewater kayaking from recreational (sit-on-top or non-spray skirt river kayaks) or touring (sea kayak) kayaking (see OIA study below). Although the survey distinguishes regional participation and trends, the northwest is combined with all western states, so data are less useful for regional assessments.

The survey distinguishes between participants (people who engage in an activity at least once per year) and enthusiasts (those who do so more often). However, the study uses varying criteria for deciding who is an enthusiast, which makes comparisons between activities difficult. For example, 5 days per year qualifies as an enthusiast for kayaking, but it takes 3 for rock climbing, 4 for rafting, 6 for downhill skiing, 15 for freshwater fishing, 30 for biking, and 112 for walking.

Figure 1 shows participation for selected land-based and water-based activities from the 1999-2000 survey. Kayaking participation (all forms taken together) is relatively low compared to many other activities, even water-based activities.

The NSRE also reports that about 20% of kayakers (all forms) are enthusiasts (5 or more days per year), and they account for about 80% of the user days for that activity. The mean number of days per participant per year was about 7, which compares to about 31 for surfing, 9 for coldwater fishing, and 6 for windsurfing.

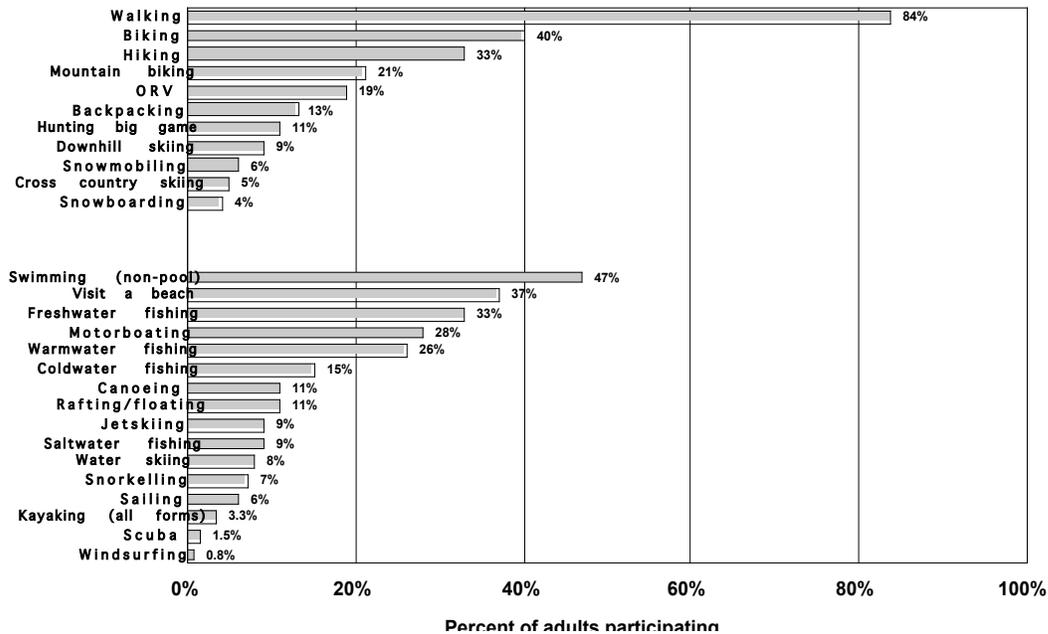


Figure 1. Participation in 25 recreation activities (from 1999-2000 NSRE).

Outdoor Industry Association Study (OIA)

The Outdoor Industry Association (OIA) conducts a national survey about human-powered recreation, offering more specific information about 21 activities (see Figure 3). The survey uses a phone methodology and has a sample size of about 4,000. It has been conducted annually since 1998. Short and long reports of results are offered to members of the association (mostly retail stores) for fees; we were unable to obtain a copy of the long report for this study, so only summary results from the 2002 report (with data from 2001) are presented.

Overall, about 69% of the adult population (149 million people) participate in those 21 activities, and 22% (47 million) are enthusiasts (information about how these are defined is not available in the short report).

Figure 2 shows participation and enthusiast percentages for the 21 specific activities, with whitewater kayaking split-out from recreational kayaking and touring/sea kayaking. Results show that whitewater is the least popular of the three forms of kayaking.

Taken together, OIA data suggest total kayaking participation in 2001 was 4.7% (all forms; there is some overlap among the three), which translates into about 10 million

total kayaking participants. About 1.2% (2.6 million) were whitewater kayakers and 0.2% (about 435,000) were whitewater enthusiasts.

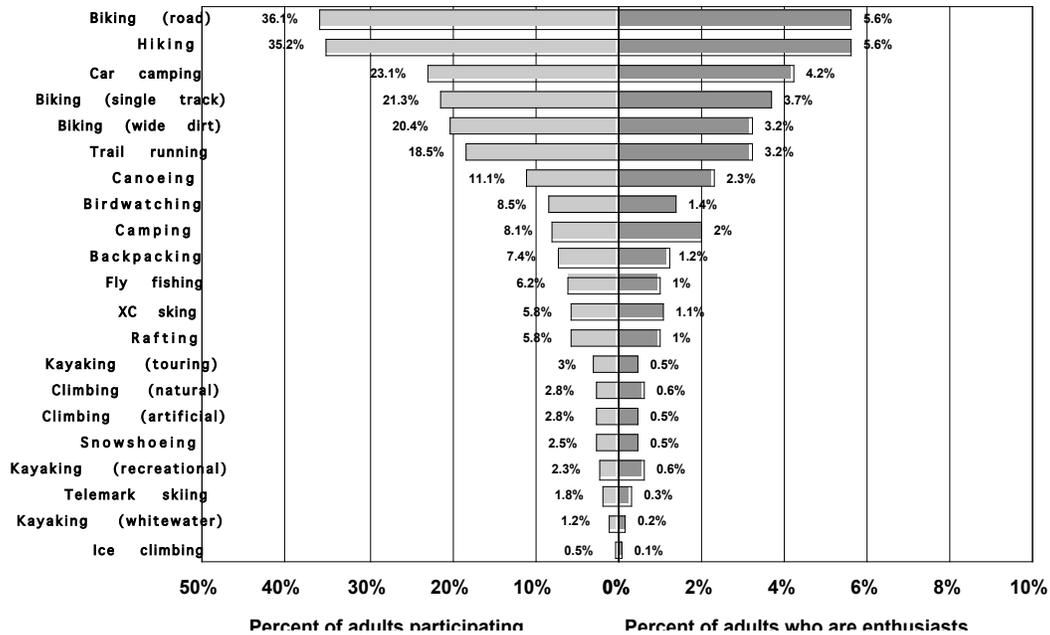


Figure 2. Percent of participants and enthusiasts for 21 activities (from 2001 OIA study).

Note: Scales are different on each side of the axis.

Kayaking participation trends over time

Summary: *Whitewater kayaking has grown substantially in recent years and appears to be among the fastest growing of the human-powered outdoor recreation activities. Whether this growth will be sustained depends on several factors (discussed in greater detail below). Documenting existing growth is challenging, but several information sources support the notion.*

NSRE

This periodic national survey did not have kayaking as a separate category in 1960 (it was combined with canoeing), but tracking the “combined canoeing and kayaking” category shows an increase from 2% (about 2.6 million people) in 1960 to 8% (17.5 million) in 1994-95. The study estimated that one-fifth of these used their boats in whitewater.

Comparing 1994-95 and 1999-2000 findings, kayaking participation (all forms) has risen from 1.2% to 3.3%, making it one of the fastest growing activities during that period. Taken together, these data suggest substantial growth in kayaking.

OIA Study

The 2002 OIA short report (based on 2001 data) notes that all forms of kayaking (taken together) increased 37% in the past year. Other activities with high growth rates included cross country skiing (66%), canoeing (33%), rafting (26%), single track biking (22%), and hiking (12%). Year-to-year growth rates are probably less stable than overall participation rates and should be viewed with some caution, although they probably indicate the direction and general ranking of activity growth.

Although we did not have access to the OIA long reports that show activity-specific trends for five years (1998-2002), a presentation at the First Annual Whitewater Symposium (Pulliam, 2003) summarized findings from those reports. Some highlights:

- Overall kayaking participation (all forms) has increased from 2% to nearly 5% (roughly 4 million people to 10 million) from 1998 to 2002, while enthusiast participation has increased from 0.2% to 1%.
- Within the whitewater category, participation from 2001 to 2002 appears to have increased from 1.2% (2.6 million people) to 1.8% (3.9 million people), although enthusiast levels have remained stable.
- Whitewater grew the fastest of the three types of kayaking from 2001 to 2002 (50% for whitewater kayaking compared to 30% for recreational kayaking and 20% for touring/sea kayaking).

First Annual Whitewater Symposium

A discussion panel on the “State of the Whitewater Industry” at the First Annual Whitewater Symposium held in October 2003 provided additional context for the national participation findings. Based on presentations from the panel (Ford, 2003; Pulliam, 2003), there is broad consensus that kayaking use has substantially increased in recent years, although that growth may have slowed in the last two years. The downturn in the national economy was one possible explanation; others were offered and are discussed in a separate section below.

National Marine Manufacturer’s Association Statistics (NMMA)

This manufacturer’s association tracks boat sales with a category for canoes under 17 feet, which includes virtually all whitewater and recreational kayaks (but not necessarily all sea kayaks, and it also includes open canoes). Data show increases from 1997 to 1999 (from about 85,000 to just over 100,000 boats sold annually), but a decline to about 90,000 in 2002. While boat sales do not necessarily reflect participation rates, they are one indicator of demand and probably reflect new entrants into the sport.

A presentation at the whitewater symposium (Ford, 2003) suggested that sales of outboard motor boats, personal water craft (PWCs), and canoes were down about 10%

from 2000 to 2002, while kayak sales dropped 5%. All of these activities showed growth in the NSRE from 1995 to 2000. This suggests that the economy affects participation in these activities, new boat sales may not be the best indicator of participation growth, and kayaking may be slightly less affected than other boating sectors.

Several interviewees (Hart, Jensen, Steindorf, Weingarden, Spenser) noted that high growth in kayak sales in recent years has created an active used boat market with substantial effects on new boat sales. If a new entrant to the sport buys a used boat and the seller buys a new boat, we now have two boaters and only one new boat sale. In this situation, new boat sales do not necessarily reflect growth of the sport.

Boat designs changed substantially in the mid-1990s, becoming much shorter and more specialized for different types of whitewater (with a particular focus on planing hulls for surfing and playboating). This has almost certainly influenced growth in the sport, but it confounds the utility of boat sales information. With the new designs, existing and new boaters purchased new boats and created strong growth in manufacturing and retailing. Recent design changes are less noticeable by average boaters, and new boats are more likely to be purchased by new entrants rather than veterans whose existing boats are satisfactory.

Membership in American Whitewater

American Whitewater is a non-profit organization of kayakers, rafters, and other whitewater enthusiasts. A substantial proportion of AW membership is focused on kayaking (or whitewater canoeing), although the organization has broadened its focus in recent years. AW national membership is about 6,000, but they also report about 80,000 members in affiliate local boating clubs. It is unknown what proportion of membership are kayakers and the extent to which kayakers have fueled the organization's growth since the mid-1980s. It is also unknown whether growth is attributable to greater interest in the organization's activities vs. growth in the sport.

Regional kayaking participation and trends

Summary: *Regional kayaking participation and trends are likely to follow national trends, although there are some reasons to believe the potential for growth in Portland and the Northwest is higher than other parts of the country (see discussion of participation factors later in this report). Specific regional estimates are discussed below.*

Applying national rates to the Portland area

Applying national participation rates suggests there may be 30,000 to 50,000 kayakers (all forms) currently in the Portland metropolitan area. Of these, about 10,000 to 20,000 may be whitewater kayakers, with about 3,000 whitewater "enthusiasts." This assumes a general population level of about 1.1 million adults in Multnomah, Washington, and Clackamas counties (2003 Census estimates). Casting a wider regional net that includes

southwest Washington (Vancouver), the Willamette Valley (Salem, Corvallis, Eugene/Springfield), and the Columbia Gorge might double these estimates.

Regional kayaking use may be growing at a faster rate than the national average, if for no other reason than higher population growth. The Portland area grew faster than the national rate throughout the 1990s, and some parts of Portland have had very large population increases. For example,, two Portland suburbs, Beaverton and Gresham, grew over 25% from 1990 to 2000. In the near future, Oregon population growth is expected to slow from the 1990s pace, with increases estimated at about 1% per year through 2010 (Center for population research and census, 1998). In the next decade, population increases may not drive total participation as much as they have in the past.

A precise estimate of whitewater kayaking participation trends in the Portland area is difficult to make based on national trend data, but it has probably doubled since the early 1990s. As discussed with national trends data, it is unknown whether the recent increases will be sustained.

Oregon SCORP participation data

The State of Oregon (OPRD 2003) conducted a statewide survey of recreation users in 2002 as part of its Statewide Comprehensive Outdoor Recreation Plan (SCORP). This provided participation information on 76 outdoor recreation activities (including whitewater kayaking) for the entire state and 11 planning regions (Portland and the Clackamas are in region 2). The survey used a combined phone + mail survey methodology; 4,400 were contacted by phone and about 2,600 returned mail surveys (59% response rate).

Results suggest that about 1% of the statewide population participates in whitewater kayaking (similar to national studies), but only about 0.5% in region 2. Using these rates and assuming 1.1 million adults in the Portland area, the number of whitewater kayakers would total about 5,000 to 10,000. The small sample for region 2 combined with the small proportion of people who kayak make more precise estimates difficult.

Participation rates from the same survey nonetheless provide further support for general rankings of whitewater kayaking compared to other outdoor activities. Similar or lower participation rates occur for:

- windsurfing (0.7%)
- personal watercraft (1.3%)
- rock climbing (1.4%)
- cross country skiing (2.0%)
- scuba (2.6%)
- waterskiing (2.5%)
- rafting (2.9%)

Higher participation rates occur for:

- sailing (6%)

- skateboarding/skating (6%)
- outdoor basketball (7%)
- skiing/snowboarding (8%)

Considerably higher rates occur for:

- outdoor golf (16%)
- biking (17%)
- hiking (21%)
- running/jogging (24%)
- walking for pleasure (33%)
- sightseeing/driving (42%)

PDXKayaker website and interviews with local paddling leaders

“PDXKayaker” is a website and message forum on the internet that has been operating since 1999. The site allows area boaters to exchange information and organize trips. The list of members is currently over 1,200, and has grown substantially each year. The website moderators/developers (Markantis, Hass) estimate that about 1,000 are active kayakers who live in the area (with perhaps 200 less active or from outside Portland). The site has about 400 to 800 messages posted per month, and moderators estimate that about 75% of the messages relate to trips. The site is also loosely affiliated with weekly social gatherings at a Portland area pub.

Every Portland area interviewee mentioned website membership as one indicator of the size of the active Portland paddling community. The list suggests a minimum number of kayakers at about 1,000, well below national and statewide participation rates but similar to estimates of the number of “enthusiasts” from the OIA survey.

PDXKayaker site membership numbers probably substantially underestimate the total Portland kayaking community. Most interviewees suggested membership represents more active paddlers or younger paddlers (under age 30) rather than “old school” boaters, and many thought it also better represents the “enthusiast” population rather than all kayakers. Website membership probably does not include 1) paddlers who don’t use the internet on a regular basis; 2) paddlers who don’t join groups; 3) paddlers who have another family member/friend who monitors messages (e.g., a husband and wife might not both join the site); 4) paddlers who already have a group of friends with whom they kayak (or who don’t want to use the internet to find more); and 5) paddlers who kayak infrequently.

Most interviewees estimated total Portland area kayakers at about twice the PDXkayaker number (2,000 to 2,500) while some suggested about 1,500. No interviewee suggested the active Portland paddling community was larger than 3,000, although several suggested it was likely to continue growing. This is probably comparable to the “enthusiast” participation rates in national studies.

Portland area boat sales

The four largest kayaking equipment stores in the Portland area (Alder Creek, Ebb and Flow, Kayak Shed/Outdoor Play, and Next Adventure) were contacted for this study, and each provided useful estimates of the size and trends in Portland area kayaking. We also requested boat sales information from each (with a promise that such information would only be presented in aggregate or general terms for proprietary reasons). Although all four tentatively promised that information, not all sent it and most did not provide extensive sales trend data.

Based on the information received, recent new boat sales in the Portland area probably exceed 400 boats per year and may exceed 500 to 600. An additional 200 used boats may be sold through shops or retail websites, and one store owner estimates another 250 to 300 used boats may be sold over the internet by boaters themselves. This puts new and used boat sales at about 850 to 1,100 per year.

This range is generally consistent with an active paddling community size of 2,000 to 3,000, but it is difficult specify such a correlation. Many boaters own multiple boats (different designs work better in different types of rivers or paddling conditions), and little is known about how often kayakers buy new boats (e.g., to have “cutting edge” designs, to match skill increases, for different types of rivers, or because old boats get “beat up”).

An informal survey conducted by “BoaterTalk” (a national kayaking message forum, where between 500 and 1,500 boaters have registered responses to a series of weekly poll questions) suggests that 21% of kayakers own just one boat, and 49% own three or more. While this group is probably more “enthusiast” than the general paddling community, this finding shows the difficulty of using sales information to estimate the kayaking population. Having noted this caveat, one retail owner estimated that 80% of new boat sales are to newcomers; if true, this would be a useful indicator.

Data tentatively suggest that new boat sales increased in the late 1990s through 2001, but have been flat or slightly down in the last two years. Interviewees who provided or commented on such information believe it is primarily related to the downturn in the economy and the availability of good used boats, not decreased interest.

Portland playboating areas and estimated use

According to a Portland-area playboating website (www.playboatingnorthwest.com), there are many locational playholes or waves within a few hours drive of the metropolitan area. Rivers include the Clackamas (especially Bob’s Hole), Mollala (five features), Santiam (especially Spencer’s Hole), McKenzie, Wilson, Lake Creek, Siletz, Willamette near Eugene (3 features, including “24-7,” a wave-hole created in a diversion canal), Smith (near the North Umpqua), and Green (WA). However, most of these play areas appear to be available at higher winter and spring flows, and few have high daily use

levels.

Based on discussions with area playboaters, the two most popular playboating areas are Bob's Hole (winter and spring) and Spencer's Hole (summer). Although use levels at these sites are not formally tracked, there is general consensus for the following:

- These two playboating areas are used by at least some boaters nearly every day that flows are in optimal ranges. For Bob's Hole, this is usually for three months in the spring and early summer; for Spencer's Hole (which is below a dam), this is for a longer season that includes the entire summer.
- When weather and flows are optimal, there are usually boaters present during daylight hours, particularly on weekends.
- During peak periods (weekends) when weather and flows are good, there may be 15 to 30 boaters in the water or preparing to boat during prime hours (mid-afternoon to early evening). In good weather, there may equal or greater numbers of spectators or boater friends/family in the area (particularly at Spencer's Hole).
- Peak use levels appear somewhat "self-limiting" due to crowding. Once there are more than 15 to 20 boats at a play area, waiting time discourages much additional use except during or immediately prior to competitions.

At Bob's Hole, over 70% of kayakers reported that "waiting to play" was a problem, and 28% reported changing their behavior to cope with the problem (Hall, 2004). The most common coping strategies were to boat on weekdays (78%), boat at off-peak times of the day (52%), change the time of year when they boat (31%), and boat on other rivers (28%). These are broad indicators of demand that is not currently filled by the current supply of opportunities.

Characterizing kayak use patterns

Summary: *Kayaking use patterns and the characteristics of kayakers have implications for future participation and demand. Information sources include interviews with leaders in the kayaking community, responses to BoaterTalk questions, boat sales information, and studies of current Clackamas boaters. Whitewater kayakers tend to be young, male, and unmarried, with high education levels and incomes (or potential income). More boaters have Class III (or lower) than Class IV/V skill levels, and playboating is the largest single specialized type of whitewater kayaking.*

Frequency of boating

National participation information suggested that kayakers boat an average of about 7 days per year, but enthusiast participation levels appear to be higher. For example, over 60% of BoaterTalk respondents reported boating at least twice a week, and 25% reported boating four or more days per week. Variation is probably related to many of the variables discussed below (particularly seasonality and availability of nearby boating), but enthusiasts may average 20 to 30 days of boating per year, while more occasional boaters better fit the NSRE profile.

General vs. specialized kayaking

Some kayakers become more specialized in their whitewater interests. Responses to a BoaterTalk question suggest that about half are unspecialized river runners, but 15% focus on locational playboating, 9% on steep creeks, 6% on ocean surfing, 4% on squirt boating (a specialized form of playboating that uses very low volume boats), and 3% on slalom racing. The rest were novices or focused on the social aspects of kayaking.

For creek boating, Portland area interviews are consistent with the BoaterTalk results; most suggested about 10 to 15% specialize in these types of trips. For playboating regional interest seems to be higher; most estimates range from 20 to 30%. Several noted that more boaters are interested in playboating than running difficult whitewater, but most still take downriver trips because “park and surf” sites are limited.

On the Clackamas, about 43% of kayakers sampled during a recent study (Hall, 2004) were locational playboating at Bob’s Hole, with the remainder involved in downriver trips. This probably overestimates the proportion of playboaters in the regional kayak population because Bob’s Hole is such a well-known attraction.

Boat sales information by type of boat also suggests preferences. Although we did not have access to detailed reports produced by OIA and WaterMark (a company that makes Perception and Dagger kayaks), Pulliam (2003) presented highlights from them at the 2003 whitewater symposium. He suggested that less than 10% of new purchases were creek boats, nearly half were playboats, less than a third were “all around” downriver boats, and less than 10% were “displacement hull” river runners (boats with generally older designs that carry more gear or handle bigger whitewater but are less good for playboating).

Discussions with Johnson, a local slalom racer/organizer, suggests there are relatively few slalom kayakers in the Portland area or the northwest (probably less than 20 and 50, respectively), consistent with the BoaterTalk poll proportions. However, he noted that slalom participation can be substantially higher in communities with slalom courses.

Overall, playboating is probably driving a significant portion of the growth in whitewater kayaking and comprises its largest identifiable “sector.” There is insufficient information to accurately estimate relative interest in locational boating versus running longer river reaches that have playboating features.

Boater skill levels

There are varying opinions of the skill levels among kayakers, and debate about how to classify boaters. Responses to a BoaterTalk question suggest there are few Class V boaters (10%), more Class IV boaters (26%), and the most Class III boaters (47%); the remaining 17% are less skilled or just starting out.

Estimates from local paddling leaders are similar, most agreeing that 10 to 15% are Class V boaters, 20 to 30% are Class IV, and the remainder Class III or lower. These findings are one way to look at “demand” for water of different difficulties.

Demographic characteristics

Most kayakers are relatively young. NSRE data suggests 23% are younger than 25 and only 6% are older than 50. OIA data show an even younger kayak population, with nearly 80% under 45, 60% under 35, and 40% under 25. BoaterTalk responses suggest that 73% took up the activity before they were 25. PDXKayaker moderators note that the ages of their members range from 14 to 50, but most are in their late 20s and early 30s. Website sources probably underestimate older boaters because website use is generally higher among younger people. The mean age of Bob’s Hole kayakers on the Clackamas was 36 (Hall, 2004).

Kayakers are more likely to be males and unmarried. Pulliam (2003) reported that about two-thirds of kayak purchasers are male, two-thirds are unmarried, and most have no children. Current Clackamas boaters appear to have even higher male proportions (80%) (Hall, 2004). These findings have implications for the “participation cycle” of boaters over time.

Kayaking participation is likely to “cross-over” with other recreation activities. OIA data suggest many whitewater kayakers also participate in sea kayaking (80%), trail running (50%), and single track biking (40%). There is also likely to be crossover with downhill and backcountry skiing (Hart, Steindorf), although OIA data do not assess this. All these activities have seen increases in NSRE studies in recent years, suggesting that interest in more active, adventure-oriented recreation is not a “passing fad.” However, the diversity of activities within this broader category may ultimately “dilute” levels of participation in any one activity.

The advent of human-built whitewater developments

Summary: *Investment in human-built whitewater developments is another indicator of “demand” for whitewater boating in general and playboating in particular. These whitewater developments are being built at an increasing rate in North America. With fewer than 10 in existence before the mid-1990s, nearly 30 are available today with at least 15 more proposed. Some have required substantial public and private investment, indicating long term interest and confidence in the growth of the sport.*

Human-built whitewater developments are a relatively recent phenomenon, but they have proliferated in recent years. They can range from a single simple feature (a wave, hole or other hydraulic) to a series of more elaborate features. They can be built in an existing channel, a rehabilitated channel, or even a separately built “artificial river.” Developments can include facilities for whitewater or for a wider range of activities such as walking or picnicking.

Whitewater developments were first built in the 1970s to create optimum conditions for kayak and canoe slalom training and racing. Of these, less than half were in North America. Currently there appear to be nearly 30 human-built whitewater developments in North America, with about 15 more proposed or in various stages of development. A partial list of whitewater developments is compiled in Appendix B; it is primarily based on a website list associated with a proposed park in Pennsylvania, but includes other parks discovered through web searches or discussions with boaters. The list includes easily available information about the parks or proposals from websites (which may include characteristics, investment costs, or other facts about their development). This information is not intended to be comprehensive, but it broadly illustrates diversity of project types and the scope of public or private investment. Several general conclusions can be drawn from the list and accompanying information:

- There is no obvious pattern to the locations of development. Some are in areas with limited natural whitewater (e.g., Wisconsin, southern Ontario, Florida), while others are in areas with considerable whitewater resources (e.g., Colorado mountain communities, western Maryland, northern New York). Some are in larger urban areas (e.g., Denver, Toronto, Bethesda, MD), while others are more remote (e.g., the ski town courses in Colorado). In most cases, however, they appear to be in locations with nearby population centers or the prospects of considerable use from tourism.
- Construction costs vary widely. A formal analysis of costs would require detailed information about what is included because many whitewater developments are part of larger greenway and recreation area projects. That said, some are relatively modest, while others are multi-million dollar projects with extensive associated facilities. A single feature on a diversion canal near Springfield, Oregon (a wave called “24/7”) was built with minimal investment by simply constricting the flow with a few boards.
- Most projects appear to have some public funding and do not require user fees, while others appear to be privately funded and may be operated for profit.
- Projects have been developed on small rivers, moderately-sized rivers, and side channels of larger rivers. The required flow ranges from as little as 100 cfs to 1,000 cfs or more. Some have relatively short boatable seasons, although longer seasons are an obvious asset.
- In some cases, courses are entirely manufactured, with a lake or the ocean providing the water source. This is a paradigm shift from developments using modified channels or water associated with an existing river.
- As far as we know, no whitewater developments have been part of FERC relicensing processes to date, although one is under consideration on the California’s Feather River (Oroville).

The recent development of whitewater developments may be comparable to the history of ski area development. While downhill skiing was available prior to the advent of ski lifts and resorts, participation in the sport increased dramatically as those were developed in the 1960s and 70s. In some areas, the creation of additional resorts increased demand instead of simply fulfilling existing demand.

It is premature to suggest whether whitewater parks will have similar effects on kayaking. Many existing parks are short, do not have a diversity of rapids for various skill levels, and are not located in high quality natural settings. Few whitewater parks have substantial facilities or other recreation opportunities for boaters' non-paddling friends and families; at least part of the success of downhill winter resorts may be attributable to their off-mountain activities and facilities. However, whitewater parks are often close to urban areas (unlike most ski areas), which may attract use.

There are currently six major downhill skiing/snowboarding areas within about three hours of Portland. All involve several million dollars of private investment for on-mountain facilities; utilize public resources (land, water, or other infrastructure); and have substantial local and regional economic impacts (lodges, restaurants, resort subdivisions, and related services). Based on participation rates, this societal "investment" is made for about 8% (SCORP data) of the population. The open question is whether proportional investments will be made for kayaking (with 1% or about 1/8th the use as skiing/snowboarding). Whitewater development information (presented above) suggests this may be occurring in other parts of the country, but it is unknown if it will occur in the Northwest with its abundant natural rivers.

Human-built whitewater developments provide good opportunities for short, accessible kayaking sessions, particularly if there are a series of features in a "whitewater park." There are a diversity of whitewater parks with different levels of difficulty (Class II to IV), types of kayaking use (slalom vs. playboating or both), types of other recreation uses (some offer water-enhanced recreation with adjacent trails and picnic/playground facilities), and levels of investment. The relationship between use/demand and the attributes of these parks is unclear and probably complex, but the increased number of them appears to reflect increasing demand in the sport.

Factors influencing future kayaking participation

Summary: *As an activity develops, past use may not be the best or only predictor of future use. Several interviewees and researchers have suggested reasons why kayaking (or other activities) may increase, remain stable, or decline. The following list suggests major factors, including: population growth, economy, availability of boatable rivers, free time, diffusion of new technologies and techniques, media and marketing image, instruction, indoor practice opportunities, outdoor practice opportunities, weather and equipment, and the "participation cycle."*

Overall, kayaking appears to be growing rapidly, but some factors may slow this rate of growth. Whitewater kayaking will probably become more of a "mainstream" (rather

than specialized) activity over time, but it is unlikely to match the historical growth curves of skiing/snowboarding. Overall, it is unlikely to exceed 3% participation over the next 20 to 30 years.

Population growth

Population growth is a fundamental input for assessing demand. While short term estimates have the U.S. growing at a moderate rate, it is unknown whether those will apply over the longer term. In the 1960s to 1970s, demographers predicted slow growth and eventually stable or declining populations in developed counties, but this has not come to pass. Population in this country has increased about 1 and 2% per year since World War II (US Census, 2000), and it is expected to grow at this rate in the next few decades (Haub, 1992).

More specific information for Portland and the Northwest suggests the region will probably grow at rates higher than the nation as a whole. This fits with general population increases in western states, urban areas with amenity attributes, and cities associated with the Pacific Rim economy (the area expected to have the greatest global growth). Even assuming the same participation rates as now, one might expect Northwest kayaking increases of 2% per year.

Economy

Several kayak retailers noted the potential influence of the recent economic downturn on boat sales, and possibly kayaking participation as a whole. The logic is that uncertain economic times lead to a greater focus on work, less disposable income for equipment or trips, and less free time for recreation. Conversely, good economies presumably lead people to spend more time on recreation. In addition, higher incomes and education levels associated with strong economies appear to be linked with higher participation rates in specialized activities like kayaking. Kayaking is generally an activity of people from urban areas with high education and income (or the potential for high income such as college students).

National and local boat sales information suggests that kayaking sales and participation may increase when the economy improves. It is beyond the scope of this report to predict macro-economic trends for the nation or the northwest, but we presume both will rebound from the recent downturn and see at least moderate growth over the long term. Portland's position as a growing Pacific Rim city with good infrastructure and amenity attributes also suggests it will out-pace the nation economically, which could drive increased population and participation in activities such as kayaking.

Availability of boatable rivers

The number and proximity of boatable rivers is a major factor in kayaking participation. Like windsurfing or downhill skiing, kayaking requires specialized conditions for quality opportunities (in kayaking's case, there must be rivers with sufficient gradient, flow, channel features, and access). It has been estimated that only about 1% of the nation's

river miles have boatable whitewater (Bowers and Hoffman, 1999), so areas with a concentration of whitewater segments can become “hotbeds” for kayaking participation.

Although we have no specific data about this hypothesis, whitewater rivers and days of boatable flows appear more abundant in the Northwest, Northeast, and Southeast than other parts of the country (e.g., the Southwest, Midwest, and more arid parts of the Rocky Mountain states). These are generally considered areas with higher kayaking participation.

Channel modifications to create whitewater parks are one way that boating opportunities can expand, and the number and size of these parks has been increasing in recent years. It is unknown whether they increase whitewater participation rates or simply provide more opportunities for existing kayakers, but there are reasons to believe both occur (see discussion on whitewater developments above).

Hart noted that some areas (e.g., Wausau, Wisconsin and several cities or towns in Colorado) appear to have increased kayaking participation by developing whitewater parks, but the lack of other non-park opportunities through the year may limit longer term growth. In Wisconsin, boaters travel long distances to a small number of rivers; in Colorado, the boating season on most rivers is short and recent droughts have further reduced opportunities. Hart observes that the Northwest does not suffer from these problems, and whitewater developments are more likely to enhance demand by introducing boaters, who then have multiple opportunities on other rivers.

Types of available rivers probably also influence overall demand for kayaking in a region. Several interviewees suggested that the Portland area has abundant difficult creek runs, but needs more Class III play runs, particularly in the summer, for kayaking participation to continue growing.

Free time

The availability of free time also influences kayaking demand. NSRE data indicate that 47% of Americans don't recreate as often as they would like due to lack of free time (the most frequently cited reason). Americans have less vacation time compared to those in other developed countries, they appear to have longer work weeks, and time spent on recreation has been shrinking in recent years. All these factors increase demand for activities close to home or work which can occur in short periods of time (Cordell et al., 1999).

Support for the “shorter/closer” hypothesis relative to kayaking use is available from a study on the Clackamas (Hall, 2004), where boaters were asked to identify reasons for boating at certain times of the year. The availability of free time was mentioned by 35% of the kayakers, the second most important reason (best river level was the most important at nearly 50%). This has probably contributed to the popularity of whitewater developments, which are generally close to urban areas and can be done used in short sessions. Responses to a “BoaterTalk” question about the length of playboating sessions

shows that 69% spend less than three hours at a time (not including travel time). If the trend toward decreased free time continues, demand for “short session” kayaking opportunities close to urban areas should increase. “Participation cycle” issues (discussed below) could further increase interest in nearby opportunities.

Diffusion of new technologies and techniques

At the recent Whitewater Symposium, Ford (2003) noted that paddlers used to meet and share information primarily through club membership, newsletters, presentations by boaters, and videos. These are now supplemented by web-based list serves and message boards, DVDs, and streaming video. This makes information easier to disperse to many people, and may drive increased interest and participation.

BoaterTalk and PDXKayaker websites are examples of this, and more sites are likely to emerge in the future. There are already specialized websites on Portland area playboating and creek boating, and both appear to attract substantial use (although less than PDXKayaker). Web-technologies allow links between sites, increasing ways for boaters to find other people that share their interests.

Instruction

Instructional programs have been a major focus of the skiing and snowboarding industries, probably with major influences on participation and use. Kayaking, like skiing or snowboarding, is more enjoyable once a certain level of skill is achieved. Instructional programs and techniques are developing within kayaking, and this will probably support growth of the sport.

Improved whitewater instruction may affect participation. This was another focus at the 2003 whitewater symposium, with presenters concerned about the quality of instruction and which types of boaters were being targeted (or overlooked). Discussion with interviewees (particularly Jensen, Drevo, Steindorf, Markantis, Beus, and Hass) suggests there are many opinions surrounding this topic.

Instruction can be an important component of participation, although the proportion of boaters who receive instruction is not known. Drevo estimates that roughly 1,000 people have been cycled through various courses associated with his business (2000 to present) or his involvement with the Lewis and Clark University paddling club (1997-99), and these were just two instruction options in the greater Portland area in recent years. His business has also seen about 30% growth per year. Most interviewees thought less than 25 to 50% of current kayakers had received any formal instruction.

It is not clear whether instruction increases kayaking use, or if numbers in courses reflect growing interest in the activity. Beus estimates 75% of people who take a course end up buying a boat and becoming committed kayakers, but these might be self-selected (i.e., they take a course because they are committed to learning). Other interviewees suggested many committed paddlers learned from friends and independent practice. Kayaking

skills are not the easiest to master, and good instruction clearly helps. However, explanations of why people start kayaking, become committed to the sport, or decrease their involvement are largely anecdotal.

Some people have compared kayaking to windsurfing/board sailing, an activity that saw dramatic growth in the 1980s. That dramatic growth has generally not been sustained, and windsurfing remains a specialized activity even in areas with “world class” conditions and facilities (e.g., the Columbia Gorge). One possible explanation is the difficulty of mastering skills.

Indoor practice opportunities

Indoor opportunities can be critical for learning how to paddle and roll a kayak. Pool sessions are often available for kayaking and can affect participation. In some areas, “kayak polo” in pools may provide a new way to use one’s boat, improve skills, and increase social links with other kayakers. In the same way that indoor sport climbing has developed in urban areas and may increase outdoor climbing, the availability of indoor kayaking is likely to increase overall participation and use.

Outdoor practice opportunities

In the early stages of learning to kayak, the availability of easy Class II and III whitewater for practicing appears important (Drevo, Jensen, Hart). The Lower Clackamas is a popular choice in the Portland area, particularly in summer months when it has easy rapids and relatively warm water.

Weather and equipment

Many Northwest rivers are cold when whitewater flows are best (winter and spring), and even summer rivers can be cool. Boaters need good equipment and some affinity for being wet. This is probably a participation barrier for a large proportion of the population, although it is challenging to estimate a number. Like many winter recreation activities, potential participants are fewer when inclement conditions are a possibility.

Clothing quality has dramatically improved from the 1960s and 70s with the advent of breathable fabrics, synthetic insulation, and specialized paddling gear. These probably have had moderate positive effects on kayaking participation – at least during cooler times of the year. Kayaking equipment will probably continue to improve boater comfort, but improvements are likely to be smaller compared to the past and have less substantial effects.

Age and the “participation cycle”

Kayaking appears to be a young person’s activity (see boater characteristics above), and it may have a “participation cycle” with implications for demand. Interviewees suggest that participation is high when a boater enters the sport and develops initial skills,

becomes higher as those skills are mastered and enjoyed, but then tails off after a period of years due to age, lifestyle changes (e.g., family, career), or saturation of interest. There was no consensus about the probable length of this cycle (as well as considerable discussion about boaters who don't fit the mold), but the most "active" period in most boaters' careers appears to be 5 to 10 years.

Support for the "participation cycle" is largely anecdotal, but some Clackamas survey data address the idea (Hall, 2004). Data from 2003 show that about half of "down river" kayakers and over two thirds of Bob's Hole locational boaters had been paddling less than 10 years. In addition to general support for the participation cycle, this suggests playboaters either have a shorter cycle, or the "playboating revolution" is in its infancy. It is probably too early to tell whether the recent generation of boaters will continue to kayak as they age.

There is probably also an interaction between the "participation cycle" and instruction quality. Boaters who learn good skills and can paddle a variety of whitewater are probably more likely to stay in the sport, although boaters who are athletic enough to learn without formal instruction may also paddle for many years. It is difficult to quantify these factors.

The participation cycle, if valid, has implications for the growth of kayaking demand. In general, it requires continual recruitment of new boaters as others drop out. It also ties demand to larger demographic trends (e.g., the baby boom is probably responsible for the sport's initial growth in the 60's and 70s). Downhill skiing/snowboarding may also have a participation cycle, but ski areas offer a more easily available diversity of challenges, off-mountain activities are more numerous, and skiing is probably more conducive for family and friendship groups.

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Appendix A: List of interviewees

Rene Beus	Private boater and kayak shop manager
Sam Drevo	Private boater, kayak guide, instructor, and freestyle competitor
Brian Fields	Private boater
John Gangemi	Private boater; conservation director for American Whitewater
Pete Girodano	Private boater
Sam Haas	Private boater; PDX kayaker moderator
John Hart	Private boater and kayak shop owner
Keith Jensen	Private boater, kayak shop owner, local representative for AW
Dave Johnson	Private boater, slalom organizer/racer
Jason Markantes	Private boater; PDX kayaker moderator
Kenny Pitta	Private boater
Jason Rackley	Private boater and Portland area steep creek webpage creator.
Tim Shibahawa	Private boater; PGE fish biologist
Luke Spenser	Private boater, kayak retail sales manager
Dave Steindorf	Private boater, instructor, former kayak retail sales manager
Jed Weingarden	Private boater

Appendix B: Whitewater developments

Table 1. Existing whitewater developments in North America.

City / State	River	Comments
Aspen, CO	Roaring Fork	Part of greenway development.
Boulder, CO	Boulder Creek	Five miles of greenway project. 20 to 30 whitewater features.
Breckenridge, CO	Blue River	Estimated planning + construction cost: \$170,000. Course is 1,200 feet long. Available at low flows in summer.
Near Calgary, AL	Kananaskis	May be most popular park in North America with several hundred users over the course of a weekend (Johnson). Two playholes and slalom course available. Extensive junior slalom program.
Casper, Wy	North Platte	Part of greenway and stream restoration effort.
Denver, CO	South Platte	Confluence Park. Urban area; best at 700 cfs or higher. Water quality problems limit use. Additional hole/boat chute at Union Street (separate feature) which is used at high water levels.
Bethesda, MD	Unknown	Outflow from electrical power plant. US National slalom training course. 900 feet long; flows between 450 and 650 cfs.
Durango, CO	Animas River	Modification of existing rapids. 2,000 feet long. Early example. Works best with flows from 1,000 to 4,000 cfs.
Eugene, OR	Willamette	Flow about 100 cfs in a diversion channel. Minor modification of existing weir (and-made boards).
Evanston, Wy	Bear River	Part of greenway/restoration project.
Farmington, NM	Animas River	\$100,000 for whitewater and fish habitat improvements.
Golden, CO	Clear Creek	Built in late 1990s as part of greenway restoration/recreation re-development. Economic benefit of \$1.4 to 2.2m (Hagenstad, et al. 2000). Boatable flows as low as 70 cfs ; quality from 250 to 1,000 cfs. Short (two month) season. 50 to 100 boaters per day in peak season.
Green River, WY	Green River	Initial work complete, with additional work planned. Estimated total cost: \$700,000. Currently 3 holes. Best from 700 to 1,300 cfs.
Gunnison, CO	Gunnison River	Two holes. Designed for use late in summer.
Longmont, CO	North Fork St. Vrain	Estimated cost: \$75,000.
Lyons, Colorado	St. Vrain	Estimated cost: \$140,000.
Minden, ON	Gull River	Slalom focus, but with a playhole. Class IV run. Site of multiple world class racing events. Among first in North America (1984).
Ocoee, TN	Upper Ocoee River	Part of FERC relicensing project and Atlanta Olympics site. Modification of existing stream. Dewatered most of the year.
Ogden, UT	Weber River	Built in 2000; rebuilt in 2002. 3 to 4 playholes and a portage trail. First hole built for 25k. Best flows at 250 cfs.
Pittsford, NY	Erie Canal, Lock 32 whitewater park	Slalom course. May have play holes. Used for kayak training and swiftwater rescue courses.
Prairie du Sac, WI	Unknown	Unknown
Pueblo, CO	Arkansas River	Proposed/under construction. Estimated cost: \$60,000.
Reno, NV	Truckee River	2,600 feet long. 11 drops. Estimated cost: 1.5m. Class II/III.
Salida, CO	Arkansas River	Built in stages. Initial course costs about 160k and donated heavy equipment time. Currently about 1,300 feet long.
South Bend, IA	St. Joseph River	2,300 feet long. Open June to August. User fees. 1,000 cfs.
Steamboat Sps, CO	Yampa River	2 miles long. "Enhanced" natural rapids. Part of larger greenway project. Popular with swimmers and tubers at low water.
Toronto, Ontario	Humber River	Less steep than Minden course. Site of multiple slalom races year.
Vail, Colorado	Gore Creek	Estimated cost: \$240,000. Short season because of low flows.
Watertown, NY	Black River	Includes several park facilities.
Wausau, WI	Wisconsin River	Dam release into side channel. Initial use in 1974; races since 1984. Natural boulders (little grouting). Limited use (12 days per year). Capacity for 5,000 spectators.

Table 2. Proposed whitewater developments in North America.

City / State	River	Comments
Asheville, NC	French Broad River	Proposed park.
Boise, ID	Boise River	Proposed park along greenway.
Bryson County, NC	Tucksegee River	Proposed 1,400 foot long park.
Cross Creek, NC	Cross Creek	Proposed 900 foot long course.
Estes Park, CO	Big Thompson River	Proposed park.
Johnstown, PA	Stoney Creek	Proposed park 500 feet long with 4 feet of drop. Designed to be boatable in summer low flow periods. Upstream has famed challenging whitewater. Part of larger park development.
Kalamazoo, MI	Kalamazoo River	Proposed park.
Mecklenburg, NC	None	Proposed national whitewater center. Estimated construction costs: \$21m. Expected project completion: 2006.
Minneapolis, MN	Mississippi River	Proposed park. 2,000 feet long by 40 feet wide with 25 foot drop; to be built in river side channel. Estimated construction costs at \$15m. Estimated economic impact of 2 to 2.5m per year. Estimated revenue from fees of \$50,000 per year.
Missoula, MT	Clark Fork	Proposed downtown location. Part of river restoration effort. Estimated cost 200k.
Missoula, MT	Confluence of Blackfoot and Clark's Fork	Proposed as part of Superfund clean-up and breaching of Milltown Dam. Substantial pollution impact issues from contaminated sediments. Multi-million dollar project with whitewater as an add-on component.
Near Orlando, FL	None	Proposed 16,000 foot recirculation course. Private investors. Potential national whitewater center; user fees expected to be charged. Will be usable by kayakers and rafters.
Ozark region, AR	Arkansas River	Proposed park.
Pedulla, KY	Unknown	Proposed park.
Whitehorse, Yukon	Yukon River	Proposed park. Initial experimental channel modifications have occurred in coordination with bank stabilization projects.
Williamsport, PA	Susquehanna	Proposed park with extensive fund-raising effort.
Wisp, MD	None	Proposed recirculation course. Estimated cost of \$10m. Length: about 1,000 feet. Part of larger rural development scheme to create an "adventure sport center" for east coast. Near Savage River in western Maryland.