

# CURRENT USE AND POTENTIAL IMPACTS OF WHITEWATER RECREATION IN OREGON

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OF WHITEWATER RECREATION IN OREGON**

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## TABLE OF CONTENTS

FORWARD	.....	i
ABSTRACT	.....	iii
LIST OF FIGURES	.....	iv
LIST OF TABLES	.....	iv
1. INTRODUCTION	.....	1
	Overview of Oregon rivers	2
	Impacts associated with whitewater recreation	5
2. OREGON'S PRIMARY WHITEWATER RECREATION "SYSTEM"	.....	9
3. RIVER DESCRIPTIONS	.....	12
	Willamette	12
	Deschutes	12
	Clackamas	13
	Molalla	14
	Sandy	14
	McKenzie	14
	North Santiam	15
	North Umpqua	15
	White Salmon	16
	Coast Range streams	17
	Oregon Cascade streams	17
	Southwest Washington streams	17
4. POTENTIAL IMPACTS OF GROWTH IN WHITEWATER RECREATION	.....	<del>19</del> 21
REFERENCES	.....	<del>23</del> 25

## ABSTRACT

This report describes the range of whitewater resources available in Oregon, with special emphasis on the region within 100 miles of the state's major Willamette Valley population centers. It is argued that recreation resources such as whitewater rivers can be viewed as a system, and that interactions between a user and a particular river may also affect other users and other rivers. River segments which lie within a couple hours' drive from the Willamette Valley are defined as the state's primary whitewater recreation "system."

Current use patterns within the system are discussed, as well as the potential impacts of whitewater boating on river settings and their users. Rivers which receive the heaviest use are the Clackamas, Deschutes, McKenzie, Molalla, North Santiam, North Umpqua, Sandy, White Salmon, and Willamette. Social and ecological impacts associated with recreation use are well-documented on the Deschutes. Other rivers where social impacts may be a source of future concern include the Clackamas, which is the closest major whitewater river to Portland, and the McKenzie and North Umpqua, two rivers where rafting is a growing recreational use of resources that have long been important to specialist anglers.

**LIST OF FIGURES**

Figure 1 ..... 4

**LIST OF TABLES**

Table 1 ..... 3

Table 2 ..... 10

## 1. INTRODUCTION

Participation in whitewater recreation has grown phenomenally in the United States since World War II, spurred on by Americans' increasing prosperity and mobility, along with a technological revolution that made river-running enjoyable instead of life-threatening (Nash, 1977). The trend has not bypassed Oregon, which has within its borders several nationally renowned whitewater rivers. Use pressures on the Rogue River in southwestern Oregon have been so great that, in an attempt to keep impacts within acceptable limits, a 120 person-per-day launch limit has been imposed for more than a decade. Since 1983, demand for permits has been high enough that a lottery system is employed to allocate use during the peak summer floating season. The popularity of the Deschutes River in central Oregon seems to be growing even more rapidly. Records of boater pass sales show steady growth in use during the 1980s, increasing nearly 50 percent from about 90,000 boater days in 1982 to 130,000 boater days in 1988 (BLM, 1990). Boating on other Oregon rivers has grown as well, although absolute numbers of boaters are generally not as high.

Oregon has many streams which are suitable for whitewater recreation during all or part of the year. These rivers may be viewed as an inter-related recreation system. Because boating conditions are best at different times on different rivers, a kind of succession takes place as boaters move from one set of rivers to others during the course of a year. If natural events or management actions lead to a change in conditions on one river, boaters may switch to other resources. Their choices will depend on how those settings fit together within the whitewater recreation "system."

This report describes the range of whitewater resources available in Oregon, current use patterns, and the potential impacts of whitewater boating on river settings and their users. It is designed primarily for use by managers and other interested readers who want to know more about how Oregon's whitewater recreation resources are presently used, and potential problems that may arise if current trends in usage continue. Although an overview discusses resources throughout Oregon, the report's principal focus is on the streams which are nearest to the major population centers of Portland and the

Willamette Valley, since those are the ones most susceptible to problems related to increased recreational use.

### Overview of Oregon rivers

Two ingredients are essential for providing whitewater recreation: free-flowing streams and sufficient gradient. Oregon has an abundance of both. Inflatable rafts are normally used only on larger streams with flows above 1,000 cfs. However, kayakers can negotiate much smaller waters, and their stream choices are limited mainly by their skills and their imaginations. The Willamette Kayak and Canoe Club (WKCC) lists more than 80 Oregon streams in its 1986 guidebook, and there may be dozens more which have been run at least once.

The list of streams receiving significant whitewater boating use is shorter, however. The 35 streams in Table 1 each offer at least 10 miles of runnable whitewater, and are rated by the WKCC at Class 2 or above on the American Whitewater Affiliation's international scale of whitewater difficulty. (Class 2 streams are described as those having "easy rapids with waves of up to three feet, and wide, clear channels that are obvious without scouting. Some maneuvering is required.")

There is considerable variation in the whitewater mileage, skill requirements, level of development, and range of boating-related services available on Oregon's whitewater recreation rivers. Each of those factors can influence the ways in which boaters use a particular river, and the kinds of boaters who use them.<sup>1</sup>

Boaters may choose rivers of different lengths depending on whether they seek a single-day, overnight, or vacation-length excursion. Remoteness also plays a part in those decisions, since people are less willing to drive long distances to make short-duration river trips. Some rivers are more difficult to run than others, and conditions may vary for different river segments. For example, the lower reaches of the Sandy River east of Portland can be successfully negotiated by youngsters in inner tubes.

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<sup>1</sup>For a comprehensive discussion of factors which influence the choice of a whitewater recreation setting, see Shelby, Johnson and Brunson (1990).



Table 1

## Oregon rivers offering whitewater runs of 10 or more miles

Map No.	River	Miles <sup>a</sup>	Class <sup>b</sup>	Season <sup>c</sup>	Guide Svc.	Devel. level <sup>d</sup>	Primary Ownership	Remoteness <sup>e</sup>
1	Nehalem	14	3	R	yes <sup>f</sup>	high	state/priv	1.0
2	Wilson	23	2-4	R	yes <sup>f</sup>	high	state	1.0
3	Nestucca	22	2-3	R	yes <sup>f</sup>	high	priv/fed	1.0
4	Siletz	13	2-4	R	no	med	private	1.5
5	Coquille, S.Fk.	17	2-4	R	yes <sup>f</sup>	med	fed/priv	2.5
6	Rogue	38	3-4	Y	yes	high	federal	1.0
7	Illinois	34	4+	R,S	yes	med	federal	1.5
8	Upper Klamath	23	3-4+	S,Y	yes	med	fed/priv	1.0
9	North Umpqua	67	2-4	R,S,Y	yes	med	federal	1.5
10	Willamette, M.Fork	10	2+	Y	no	med	federal	<1
11	Fall Creek	18	2-3	R,Y	no	med	priv/fed	<1
12	McKenzie	59	2-3	Y	yes	high	priv/fed	<1
13	Willamette	14	2	Y	yes	high	greenway	<1
14	Calapooia	18	2-3	R	no	med	private	1.0
15	South Santiam	28	2-4	R,S	no	med	fed/priv	1.0
16	Middle Santiam	18	3-4	R,S	no	low	federal	1.5
17	Quartzville Creek	16	4-5	R,S	no	med	federal	1.5
18	Crabtree Creek	15	2-4	R	no	med	private	<1
19	Thomas Creek	14	2-3	R	no	med	private	<1
20	North Santiam	35	2-4	R,S,Y	yes	high	priv/fed	<1
21	Little N. Santiam	10	2	R,S	no	med	fed/priv	<1
22	Molalla	21	2-5	R	no	med	private	<1
23	Yamhill, S.Fk.	14	2	R	no	med	private	<1
24	Clackamas	49	2-4	R,S,Y	yes	high	fed/priv	<1
25	Sandy	35	2-4+	R,S	yes <sup>f</sup>	med	priv/fed	<1
26	Hood	14	3-4	R,S	no	med	private	1.5
27	White	29	2-3+	S	no	low	federal	2.0
28	Deschutes	107	3-4	S,Y	yes	high	fed/priv	2.0
29	Metolius	28	3	Y	yes <sup>f</sup>	high	federal	2.0
30	Crooked	27	3-4	S,Y	no	med	priv/fed	3.0
31	John Day	114	2	S	yes	high	fed/priv	3.0
32	John Day, N.Fk.	40	2+	S	no	med	fed/priv	2.5
33	Grande Ronde	90	2-3	S,Y	yes	high	priv/fed	2.0
34	Snake	78	3	Y	yes	med	federal	3.0
35	Owyhee	98	4-5	S	yes	low	fed/priv	2.5

<sup>a</sup>Mileage for all stretches rated Class 2 or above, as compiled by the Willamette Canoe and Kayak Club (1986)

<sup>b</sup>Ratings on the American Whitewater Affiliation international scale of difficulty. Some runs have rapids of higher difficulty.

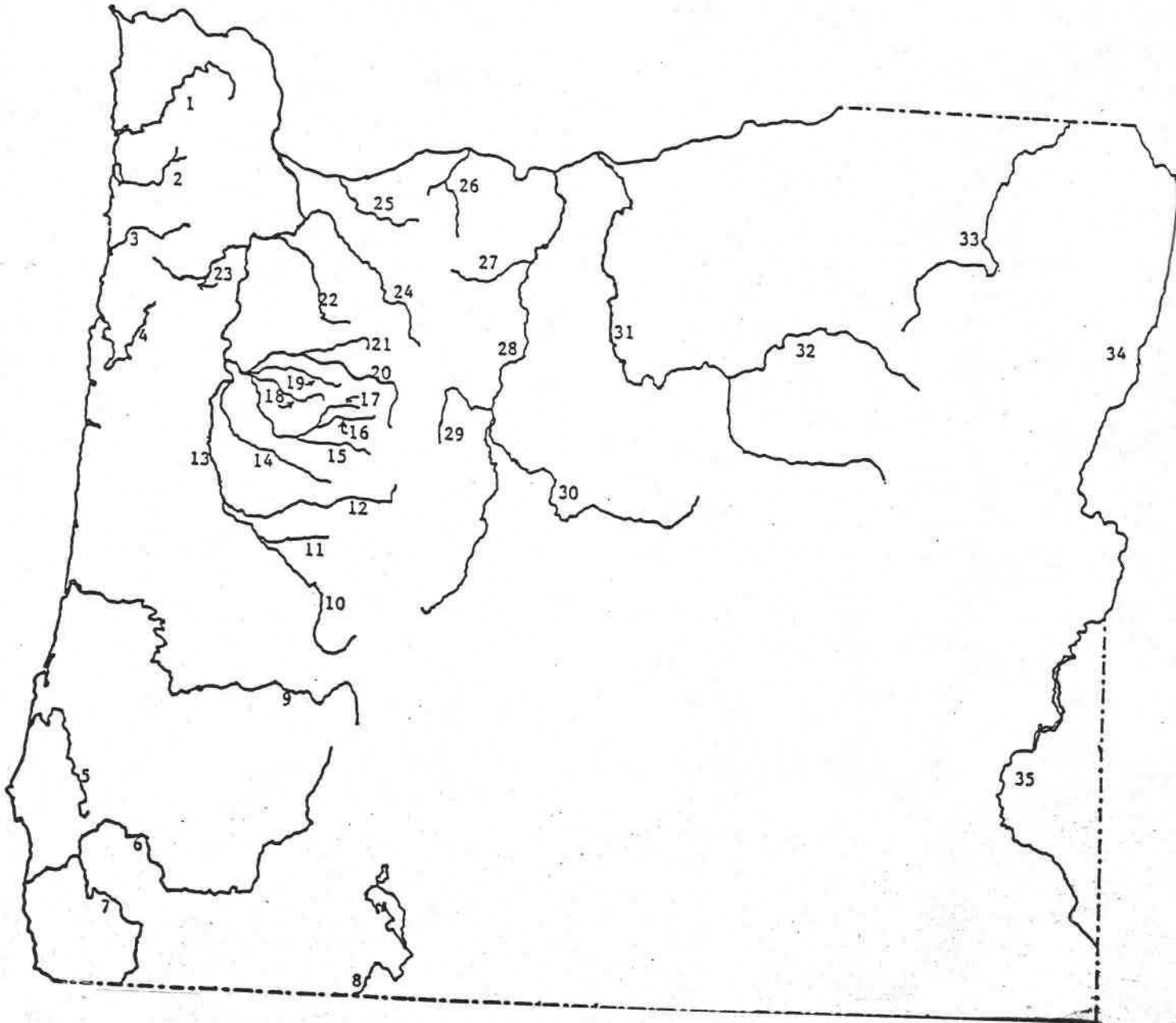
<sup>c</sup>Y=runnable year=round, R=rainy season only, S=during spring thaw

<sup>d</sup>High=river has ramps and other boater facilities, and is usually followed by a road; med=few specialized facilities, road access is not difficult; low=no facilities, road access is difficult.

<sup>e</sup>Hours of travel time to put-in from nearest metropolitan area

<sup>f</sup>Guides specialize in fishing, mainly using drift boats

Figure 1. Map Key to Table 1



Upstream, however, are rapids that should be run only by experienced kayakers. Not only do rivers vary along their length, but conditions at any given point will vary in time. Sometimes the character of a river may change on very short notice due to large storms, dam releases, or irrigation drawdowns upstream.

Furthermore, there are differences in the ways that people enjoy whitewater rivers. Some attract mainly people who enjoy rapids; others are prime fishing resources. Winter-season whitewater runs might attract mostly dedicated kayakers or rafters who go boating nearly every weekend. At the other end of the spectrum, flotillas of inner tubes and air mattresses appear on some of Oregon's most accessible and easily floated whitewater rivers on hot summer weekends.

Figure 1 shows the locations of these streams. A majority of the state's whitewater rivers have their sources in the Cascades. Six are Coast Range rivers (Nehalem, Nestucca, Wilson, Coquille, Yamhill, Siletz), and seven others originate in the mountains of southern or eastern Oregon (Crooked, Illinois, John Day, North Fork John Day, Upper Klamath, Grande Ronde, Owyhee). The Snake River, which rises in Wyoming, flows through Hells Canyon along the Idaho border. The levels of these rivers fluctuate seasonally, and many are runnable only after rainy periods or when high-country snows thaw in spring. Only 14 Oregon rivers have segments which can be run year-round; of these, all but the spring-fed Metolius are regulated by flows from upstream dams.

#### Impacts associated with whitewater recreation

Managers of these whitewater resources must contend with the impacts of recreation upon the social and physical environment. Because rivers are generally scoured by flood or snowmelt, they tend to be less susceptible than other environments to long-term damage from trampling of vegetation, littering, poor sanitation, or other physical problems. However, the short-term harm can be considerable, detracting from the enjoyment of the experience and, in extreme cases, even posing a threat to health or safety of users. Increased use tends to enhance the danger of wildfire, especially in

central and eastern Oregon. Wildlife impacts can also be expected; in a review of scientific literature on the effects of "nonconsumptive" recreation activities on wildlife (Boyle and Sampson, 1985), negative reports were found in all but 11 of the 165 articles reviewed.

Also affected are the recreational facilities themselves. Heavy use takes a toll on roads, boat ramps, toilets, campgrounds, and picnic areas. As use increases, public agencies may be financially unable to keep up with the demand for repairs and maintenance, let alone meet the need for new facilities. On the Deschutes, despite many improvements to boat landings and camping areas over the previous 10 years, Shelby et al. (1987) found that heavy use continues to cause impacts that are detrimental to facilities and the physical environment. Private entities, such as corporate forest managers or riverside homeowners, may opt to simply close off access to their properties rather than put up with impacts they may consider unacceptable.

Whitewater boaters generally share the resource with other recreational users, and conflicts between user groups sometimes occur. On the North Umpqua River, the Forest Service began in 1980 to hear complaints that boating activities were disruptive to steelhead angling (Dick Arney, Umpqua National Forest, pers. comm.). An agreement between anglers and raft outfitters on voluntary use restrictions seemed to alleviate that problem, but more recently the agency began hearing from campers who complained that boaters were using campgrounds as launch areas -- blocking access to unoccupied campsites, dragging rafts through occupied sites, or causing disruptions when inflating boats or changing clothes. Boaters may also come into conflict with each other. Rafters on the Deschutes often complain about high-powered jet boats on the river (Shelby et al., 1987). When demand for boating opportunities leads to use restrictions, commercial and private rafters may come into conflict as they vie for permit allocations (Shelby and Danley, 1980).

Crowding is another common problem among river users. Neilsen and Endo (1977) found that "too crowded" was one of the two reasons given most frequently by river-runners who had stopped using Grand Canyon and Canyonlands national parks. Rivers, like other outdoor recreation resources, appear to have a social carrying capacity,

defined by Shelby and Heberlein (1986) as "the level of use beyond which social impacts exceed acceptable levels specified by evaluative standards." These evaluative standards may include the number of boaters seen, the time spent waiting to run particular rapids, the number of boats passing anglers, and so on. Concerns about the recreational carrying capacity were a primary reason for the Shelby et al. (1987) study of the Deschutes, ordered by the Oregon Legislature.

## 2. OREGON'S PRIMARY WHITEWATER RECREATION "SYSTEM"

The primary area of interest for this review extends 100 miles in all directions from Oregon's three largest population centers of Portland, Eugene/Springfield, and Salem. The nine counties of the Willamette Valley are home to more than two-thirds of Oregon residents (1980 census), and rivers near major population centers are more susceptible to use impacts than similar rivers in remote parts of the state. Rivers within a 100-mile radius often serve as single-day destinations for Willamette Valley residents. The so-called "day-use section" of the Deschutes River near Maupin, 97 miles from Portland, has seen a major increase in use in recent years. As many as 240 boaters per hour have been reported passing through a single Deschutes rapid on a weekend day (Shelby et al., 1987). A 1982 survey showed that 68 percent of boaters on the lower Deschutes lived in Portland or the Willamette Valley (Oregon State Parks and Recreation Division, 1983).

The runnable streams within the study area were identified with the aid of regional guidebooks (Garren, 1974; Willamette Kayak and Canoe Club, 1986; Miskimins, 1987; North, 1987). Descriptions were found for a total of 45 whitewater streams within the study area, including eight in southwestern Washington (Table 2). Many of these streams are quite small, runnable only for a few days each year at the time of peak snowmelt or after an especially heavy rain, and may be used by as few as three or four kayakers a year. These streams are unlikely to attract enough use to cause noticeable impacts. However, 31 rivers (including six in Washington) can be considered part of the regular whitewater recreation "system" for residents of the Willamette Valley and Portland metropolitan area (Table 2).

These streams were examined in further detail for factors that could affect a river's attractiveness to whitewater recreationists or the likelihood of conflicts between river users. These factors were identified using the boating guidebooks listed above, fishing guidebooks (Casali and Diness, 1984; Jones, 1974), U.S. government maps, and interviews with boaters, commercial guides, and agency personnel.

**Table 2**  
Whitewater streams within 100 miles of the Willamette Valley

Abiqua Cr. (Marion <sup>a</sup> )	Mill Cr. (Polk, Yamhill)
Alsea, S. Fk. (Benton)	Molalla (Clackamas)
Blue (Lane)	Nehalem (Clatsop, Tillamook)
Breitenbush (Marion)	Nestucca (Tillamook)
Bull Run (Clackamas)	North Santiam (Marion, Linn)
Butte Cr. (Marion, Clackamas)	North Umpqua (Douglas)
Calapooia (Linn)	Quartzville Cr. (Linn)
Clackamas (Clackamas)	Row (Lane)
Clear Cr. (Clackamas)	Sandy (Clackamas, Multnomah)
Crabtree Cr. (Linn)	Siletz (Lincoln, Polk)
Drift Cr. (Lincoln)	South Santiam (Linn)
Eagle Cr. (Clackamas)	Thomas Cr. (Linn)
Fall Cr. (Lane)	Toutle (Cowlitz, Wash.)
Hood (Hood River)	Washougal (Skamania, Clark, Wash.)
Jordan Cr. (Tillamook)	White (Wasco)
Kalama (Cowlitz, Wash.)	White Salmon (Klickitat, Wash.)
Kilchis, N. Fk. (Tillamook)	Willamette (Lane)
Lake Cr./Siuslaw R. (Lane)	Willamette, Mid. Fk. (Lane)
Lewis (Skamania, Wash.)	Willamette, N. Fk. Mid. Fk. (Lane)
Little North Santiam (Marion)	Wilson (Tillamook)
McKenzie (Lane)	Wind (Skamania, Wash.)
Metolius (Jefferson)	Yamhill, S.Fk. (Polk, Yamhill)
Middle Santiam (Linn)	

<sup>a</sup>Names in parentheses are counties where whitewater runs are found

Attraction factors may be characteristics of a river itself, such as difficulty class, length of runnable segments, or length of season. Or they may be features of the riverside environment, such as the quality of put-in/takeout facilities or availability of campsites. Road access is another attraction factor; of two Deschutes River segments that are equidistant from Portland, the segment followed by a good road gets considerably more use than the one paralleled by a poor road (Shelby et al., 1987). The existence of access fees may also affect a river's attractiveness.

Conflict factors may include riverbank ownership patterns or the river's suitability for jet boat use. Some conflict factors may also be attraction factors; e.g., commercial outfitters may attract first-time users who, if they return on private trips, may ultimately wind up in conflict with outfitted users. The ability to camp beside a stream may attract boaters who end up in conflict with non-boating campers, as on the North Umpqua. A popular fishing stream may attract floating anglers who find themselves in conflict with bank anglers.



### 3. RIVER DESCRIPTIONS

Nine rivers within the study area appear to get the greatest amount of whitewater use: Deschutes, Willamette, Clackamas, Molalla, Sandy, McKenzie, North Santiam, North Umpqua and White Salmon. These rivers are described below. The others fall into three broad categories: Oregon Cascade streams, Coast Range streams and southwestern Washington streams. Rivers within these categories tend to share similar characteristics, and will be discussed collectively.

Willamette. Three portions of the Willamette contain runnable whitewater: the mainstem at and above Eugene, the Middle Fork downstream from Oakridge, and the North Fork of the Middle Fork above Oakridge. Of these, only the 14-mile stretch of the main river upstream from Eugene's Alton Baker Park appears to receive heavy use by floaters. This section of the river is quite popular in hot weather, when it "can be like a carnival with the frenzy of inner tubes and paddlers." (WKCC, 1986). The entire segment is followed by good county or city roads. An annual river-runners' race is held here, and there are numerous facilities provided for boaters, including the Eugene Canoe Path, a canal which circumvents the most dangerous rapids on this stretch of river. Perhaps because of its urban/suburban location, users seem to consider a Willamette float trip primarily as a social occasion (WKCC, 1986). Most users seem to be residents of the Eugene/Springfield area, and people who live elsewhere in Oregon are often surprised to learn that the Willamette contains any whitewater.

Deschutes. One of Oregon's longest rivers, the Deschutes is also one of its most treasured recreation resources. The lower 97 miles of the river received 130,000 boater days of use in 1988, with the heaviest use centered around the town of Maupin about 90 miles southeast of Portland. Boater passes must be purchased for a minimal fee which is collected to offset costs of maintenance and development of river facilities. The Bureau of Land Management is the largest landowner, followed by the private ranchers, the state, and the Warm Springs Confederated Tribes. Commercial outfitting accounts for 10-15 percent of use of the lower river.

Distinct segments are identified on the lower Deschutes. Access to the different river segments varies, and each segment attracts a slightly different user population. An unroaded segment below Warm Springs is known for trout fishing and secluded overnight boat trips. Fishing is less popular on the segment nearest Maupin, which has most of the biggest rapids and is very heavily used in summer. Below Sherar's Falls, summer steelhead fishing is a primary attraction, with many anglers using powerful jet boats to move upstream from the mouth of the river.

Ecological and social impacts on the Deschutes have been a matter of concern for a decade or more. A study commissioned by the Oregon Legislature found some of the highest rates of crowding of any wildland recreation study conducted in the past 15 years (Shelby, Vaske and Heberlein, 1989). Conflicts have been reported between boaters and non-boating anglers, and between jet boaters and non-motorized users. A current planning effort aimed at easing recreation impacts may include recommendations for use limits on all or part of the lower river (BLM, 1990).

Clackamas. The Clackamas River contains 49 miles of runnable whitewater within easy reach of Portland. The lower river between Estacada and Oregon City offers popular summer float trips through mild (Class 2) whitewater. Above North Fork Reservoir, more challenging rapids attract rafters and kayakers during a season that begins in November, peaks in late April and May, and continues into July. This portion of the river crosses Forest Service land which is also used by trout anglers, picnickers, and other recreationists. Facilities are fairly frequent along this stretch of river, but often these are not designed specifically with boaters' needs in mind.

A special attraction of the Clackamas is Bob's Hole, where subsurface rocks create a series of waves and eddies prized by kayakers, many of whom consider this feature the best "play spot" in the Pacific Northwest. A freestyle kayak "rodeo" attracts several hundred boaters each spring, and on sunny weekends area residents often travel up the river to picnic and watch the kayakers hone their skills. A raft festival is also held on the Clackamas most years.

Most Clackamas boat trips last one day or less, and are rarely combined with other activities such as fishing. Most boaters make several Clackamas trips each season, with a few users reporting as many as 50 trips to the river in a single year (Shelby et al., 1990). Reported crowding and conflict levels are not high, although problems between boaters and anglers sometimes occur after the trout season begins.

Molalla. This relatively small stream rises lower in the Cascades than other rivers nearby, and has a shorter season which usually ends in May. The land along the river is private except for a county park near the town of Molalla, but the upper end crosses commercial timberland where recreation is tolerated if not encouraged. County and logging roads cross the river frequently, but do not parallel it. At the end of the whitewater section is a state highway (Oregon 211) with a boat ramp that is heavily used as a put-in by salmon/steelhead anglers. Just upstream is a popular swimming and party spot which attracts large crowds of teenagers on sunny spring afternoons. This area is the most likely spot for intergroup conflicts. The river's North Fork is rated Class 5 and poses a challenge for expert kayakers.

Sandy. The Sandy is a relatively small river that flows from Sandy Glacier on Mount Hood into the Columbia River at Troutdale. On its upper reaches, the Sandy is a backwoods river although it rarely is more than a half-mile from U.S. 26. Below the town of Sandy, the river skirts the eastern Portland suburbs. Access is somewhat limited; no single road follows the lower river for any distance, and the banks are almost all private land. The lower limit of Sandy River whitewater is at Oxbow Park, a popular Multnomah County park which charges an entry fee. Use is probably heaviest on the 11 miles above Oxbow Park, where fishing is popular and there is greater water flow. Even the lower river is generally too low to float between July and November. Just above the town of Sandy, the river flows 5 1/2 miles through a narrow, deeply cut gorge that offers a challenging experience for both rafters and hard-shell boaters. This section is fairly popular during a relatively short season. Above Marmot Dam, the runs on the uppermost 18 miles are narrow and difficult, suitable mainly for skilled kayakers.

McKenzie. The McKenzie River flows westward from the top of the Cascades to the Willamette River just north of Eugene. It has about 60 miles of year-round

whitewater above the city of Springfield, and is among the most frequently floated rivers in Oregon. The segment from the Finn Rock rest area downstream to Leaburg Dam has been called "the most popular one-day trip in Oregon" (WKCC, 1986). Except for the uppermost 14 miles, which are Class 3, this is a relatively easy float. The main attraction here is not whitewater, however, but fishing. The river's native rainbow trout are prized by fishermen throughout the West. The most popular floating craft on the McKenzie is probably the driftboat, which was invented specifically for this river. Numerous boat ramps are located on the river, with easy access provided by Oregon 126, a major highway that follows the McKenzie for its entire length. Motorized use is infrequent. The McKenzie Ranger District of the Willamette National Forest has compiled a list of 120 outfitters and guides who may use the river at one time or other during the year.

The uppermost portion of the McKenzie from Olallie Campground to McKenzie Bridge is used primarily between mid-February and July, and had previously been known for its whitewater. But a "circus atmosphere" downstream has forced more and more fishermen to use the upper segment, and the Forest Service estimated in 1987 that 40 percent of the floaters on this stretch were there primarily to fish (Phil Raab, McKenzie Ranger District, pers. comm.) Growth in the number of commercial outfitting permits for this river segment prompted the McKenzie Ranger District to begin monitoring whitewater use in 1987.

North Santiam. The North Santiam offers 35 miles of whitewater of varied character. A six-mile stretch above Detroit Reservoir has Class 3 whitewater enjoyed primarily in April and May by kayakers. Below the reservoir, the river can be used year-round. The first five miles below the reservoir are quite challenging, but the river is very popular between Gates and Stayton. Whitewater enthusiasts share the river with driftboating anglers, and summertime congestion is common at the boat launch beneath the Mehama-Lyons bridge. Commercial outfitters offer on-river fishing trips in the Mehama area. Most of the land below Detroit Reservoir is private, and access to the river is somewhat limited although it is paralleled by a major state highway.

North Umpqua. From Boulder Flat on the North Umpqua to the community of Umpqua on the river's mainstem, the Umpqua system offers 74 miles of whitewater at

the southern edge of the study area. The river is followed by a well-used state highway between the town of Glide and the upper limit of floatable water at Boulder Flat. Frequent roadside pullouts offer access to the river, as do several campgrounds. Below Glide, the river is paralleled by good county roads, but the banks are private and camping opportunities are limited. The lower 42 miles are less popular than the upper segment, used primarily on hot summer weekends. The rafting season on the upper river begins in April and continues into July or August, depending on stream conditions. This section is drawing increased attention from commercial outfitters.

In late June, a summer steelhead run begins on the North Umpqua. Anglers come from around the world to fish a 31-mile stretch of the river which is set aside for fly fishing only. Since this is also a prime rafting area, voluntary guidelines were adopted by the Umpqua National Forest in the early 1980s to avoid potential conflicts. Until June 30, boating is completely unrestricted. After that time, floaters are asked to stay off the river for the first three hours after sunrise and the last three hours before sunset, as these are considered to be the best times of day for fishing.

White Salmon. This small Washington river flows into the Columbia River Gorge opposite Hood River. Whitewater boating is limited to a 16-mile stretch, five miles of which is normally run only by skilled kayakers. Despite its relatively short length, the White Salmon is popular because it is one of the few rivers in the north end of the study area offering a summer whitewater experience. Most visitors come from the Portland metropolitan area or the Columbia Gorge communities.

This is a day-use river, with the average run lasting two hours. The White Salmon flows almost entirely through private land, and launching on the lower 11 miles is restricted to two privately owned launch sites. One of these is operated by a commercial outfitter who offers float trips during April-October. The second is used by other outfitters as well as private users, and features a cable system by which rafts are lowered into the canyon for a fee. Kayakers can carry their boats to the river at no charge. Winter use is minimal, and nearly all boating occurs on weekends. An employee of the cable launch estimated in 1987 that use had increased by 20 percent over 1986, possibly because of low water elsewhere in the region.

Coast Range streams. The rivers that rise in the Coast Range are runnable only in the rainy season. The Wilson and Nehalem, being closest to Portland, probably get the most use. None of these rivers has more than 23 miles of whitewater, usually Class 2. These streams are generally followed by good roads. Winter is also the peak of the anadromous sport-fishing season, and launch areas are sometimes crowded. Most of these streams flow through public or corporate forest land.

Oregon Cascade streams. Most of these streams are runnable in the rainy season and during spring thaws. They tend to be followed by good roads, and the ones flowing through Forest Service land offer numerous camping opportunities. These rivers are generally popular with anglers, but many are best fished in summer after the whitewater season has ended and high water has subsided. The higher-elevation whitewater runs tend to be quite challenging. Outfitting occurs only on the larger rivers. Fall Creek is a popular swimming and picnicking area for residents of Eugene and Springfield, but the segment that is floatable in summer is a very easy Class 2 and use by other than casual floaters is minimal.

One unusual Cascade stream is the Metolius, a renowned trout stream on the east side of the Cascades. Because its source is several large springs, the Metolius can be floated year-round. A series of low bridges near the upper end of the river blocks the progress of most floaters, and most fishing is done from the banks. At 28 miles, the Metolius takes two days to float. The lower 15 miles forms part of the southern boundary of the Warm Springs Indian Reservation. This is a potential source of problems, as tribal authorities have reported trespassing and conflicts between tribal anglers and non-tribal floaters on the portion of the reservation boundary formed by the Deschutes River (Shelby et al, 1987).

Southwest Washington streams. The Wind and Washougal rivers east of Vancouver are rainy-season rivers, while the Kalama, Lewis and Toutle are run mostly during spring thaws. All are followed by good roads. The Wind is a highly technical kayak river, rated at Class 5, and not runnable by most boaters. Lack of public access and camping may limit use on the Washougal, Kalama and Toutle rivers; the Toutle is also a technically difficult river. The Lewis is used by commercial outfitters during its

limited season, but the rafting section of the river is less than 10 miles long. The kayak run is about 15 miles long. The Lewis has been recommended by the Gifford Pinchot National Forest for inclusion in the federal Wild and Scenic Rivers system.

#### 4. POTENTIAL IMPACTS OF GROWTH IN WHITEWATER RECREATION

Shelby and Heberlein (1986) identified four types of carrying capacity that might be reached or exceeded in a recreational setting: ecological, involving impacts on natural communities; physical, involving impacts on available space (such as sleeping space on camping beaches); facility, involving impacts on man-made improvements such as campgrounds or put-in/takeout facilities; and social, involving such considerations as the number of encounters between users. They suggest that social carrying capacity is often the limiting factor in the growth of backcountry recreation. This observation seems to fit the Willamette Valley study area, where crowding or user conflicts are the most likely problems.

The environmental capacity of a river system is difficult to exceed in the study area. Most activity occurs on the water, so damage to banks is confined to put-in and take-out sites. Few multi-day trips are taken on rivers west of the Cascade crest, and environmental damage from camping is minimal. Riparian ecosystems are fairly resilient in western Oregon, where winter rains and snowmelt scour the banks annually and ample rainfall assists rapid vegetative recovery.

Physical carrying capacity in river systems is difficult to reach. Probably the most common limiting factor is space on camping beaches; in a day-use area this does not present a problem. There is evidence of facility impacts in some places, e.g., crowded launch areas on the North Santiam and full campgrounds on the Clackamas. These impacts can generally be mitigated without imposing any changes in the way people use a river, however, by adding new facilities or expanding existing ones.

Not so with social impacts, which are usually addressed through regulations designed either to restrict use or to redistribute it in space and/or time. Concerns about social impacts have led to a study of use restrictions on the Deschutes River (BLM, 1990). Periodically suggestions are also made to restrict use on the McKenzie, although no formal action of that type is presently under way. The voluntary restrictions used on the North Umpqua are also a response to social impacts. They were formulated during a series of informal meetings between fishing and rafting user groups, arranged by the



Forest Service. Complaints about camper-rafter conflicts will be approached in a similar fashion, and the potential need for new put-in/takeout facilities is to be included in design planning for an upcoming reconstruction of Oregon Highway 138 (Dick Arney, Umpqua National Forest, pers. comm.). These issues are also being addressed in development of a Wild and Scenic River plan for the North Umpqua.

Arney suggested that conflicts on the North Umpqua are due in part to the nature of the user groups: Anglers on the North Umpqua are entrenched users and consider rafters, who are relative newcomers, as interlopers. Attitudes of this type were reported by Heberlein and Vaske (1977) on a Wisconsin river where longtime anglers reacted negatively to a sudden influx of inner-tubing enthusiasts. Jacob and Schreyer (1980) proposed that differences in specialization level, as well as perceptions of prior claim to a resource, can lead to conflicts between user groups.

Managers of rivers which have important sport fisheries must be especially wary of angler-boater conflicts. Heberlein and Vaske (1977) found that anglers tended to feel crowded after fewer encounters with fellow river users than did other kinds of recreationists, while Vaske et al. (1982) found that consumptive recreationists such as anglers were more likely than non-consumptive users to express dissatisfaction with a trip. Anglers probably outnumber boaters on all of the major rivers except perhaps the White Salmon, and fishing is especially important on infrequently boated rivers such as the Wilson, Nehalem, Nestucca, Siletz and Metolius.

Casual floaters such as innertube users are the least sensitive to crowding, and may tend to flock together on the river rather than avoid other users (Heberlein and Vaske, 1977). Streams such as Fall Creek, the Willamette and lower North Umpqua, which are enjoyed chiefly by casual users, may therefore be able to sustain levels of use that are quite high, without approaching their social carrying capacities.

Aside from the Deschutes, where crowding impacts are well-documented (Shelby et al., 1987), the river in the study area which is most likely to be considered "crowded" is the McKenzie. Use has already reached a point where increased use is believed to have displaced some visitors to other parts of the stream. The middle reaches of the Clackamas may be somewhat susceptible to crowding because of the river's proximity

to Portland and because of the wide variety of recreation opportunities it offers (including boating, fishing, hiking, camping, picnicking, hot springs bathing, firewood cutting). However, a recent survey of Clackamas boaters found little evidence of perceived crowding, partly because the best boating takes place in spring rather than summer, and partly because encounters with other visitors are part of boaters' expectations for a Clackamas experience (Shelby et al., 1990).

Other rivers in the study area may be somewhat less susceptible to social impacts. The North Santiam, though it lies midway between the state's two largest population centers, may be used less heavily because there are rivers offering similar experiences closer to both Portland and Eugene. Distance from populated areas, and the short length of the run, may tend to limit use of the White Salmon. Because most White Salmon boaters use a small put-in which has room for only one party at a time, launches tend to be distributed evenly in time. As a result, users report that the river seems emptier than it actually is. Seasons are shortest on the Sandy and Molalla, and much of the whitewater is either too difficult or too easy to attract a broad spectrum of users. The lower Clackamas and Willamette are also somewhat tame, and large enough to sustain large amounts of use. Each of the seven major rivers has long stretches of private riverbank, but boater-landowner conflicts tend to be lessened by the relative paucity of access to privately owned river segments, and by the fact that floaters rarely use these rivers for overnight trips.

In general, the potential for user impacts is less on rivers which can be used only by kayakers. Commercial outfitting is virtually always done in multi-person craft such as rafts or driftboats. Fishing is also done from rafts or driftboats, but is quite difficult from a kayak. Party sizes may also be smaller for kayakers than for rafters.

A number of rivers in the study area have recently been added to the federal Wild and Scenic Rivers system: Clackamas, Deschutes, McKenzie, Metolius, North Fork of the Middle Fork of the Willamette, North Umpqua, Quartzville Creek, Sandy, and White. The Lewis River in Washington is under consideration for federal protection as well. It has been argued that Wild and Scenic River designation brings with it new mention in maps, guidebooks or magazine and newspaper articles, which in turn draws

new visitors. Becker (1981) found that users of non-designated rivers were more likely to be local residents and repeat visitors than were users of Wild and Scenic Rivers. This seems to suggest that designation enlarges the primary "market area" from which a river attracts visitors. However, it remains to be seen whether any such increases in use might be large enough to change the river experience on Oregon's newly designated whitewater streams.

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