

A NUTS & BOLTS APPROACH TO WHITEWATER RECREATION STUDIES

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INTRODUCTION

Over the last few years, "instream " recreation interests have begun increasingly to share the spotlight with more traditional recreation uses such as reservoir swimming, fishing, and lake boating. One of the most quickly developing of these instream interests is whitewater recreation.

As with any new area of development, updated concepts relating to whitewater use, safety issues, liability, and relating to the science of recreation itself are also needed. To address this, numerous whitewater tests have occurred over the past few years; the test methodology has been better explained; and relationships with other instream flow needs have been explored.

Unfortunately, these studies sometimes occur in a vacuum. Across the country, whitewater tests are being redesigned, almost on a monthly basis, with little or no input from previous testing, or stockpiling of experiences. As well as reinventing an expensive wheel, we are also recreating the same problems.

While individual tests will contain unique variables (such as difficulty, topography, divergent interests and other issues), some factors hold constant. Much can be learned from one study to the next, thus saving time, money and risk.

One simple way to accomplish this is by utilizing existing whitewater expertise and networks.

THE AMERICAN WHITEWATER AFFILIATION

The American Whitewater Affiliation (AWA) is a national organization dedicated to conserving America's whitewater resources and to enhancing opportunities to safely enjoy them. The AWA is made up of over 3000 individual whitewater boating enthusiasts and more than 100 local paddling club affiliates.

AWA, through publication of the journal, American Whitewater, and by other means, provides information and education about whitewater rivers, river conservation, boating safety, technique, events, and river access.

AWA has coordinated and participated in numerous whitewater studies on rivers across the US. In the last two years, the AWA Hydropower Program has been involved in approximately 12¹ studies' relating just to the Federal Energy Regulatory Commission (FERC) 1993 relicensing, with very positive results so far. Over the last

¹ Deerfield, MA/VT (FERC No. 2323), Moxie, ME (No.2613), Tallulah, GA (No.2354), Pine, Peshtigo WI (Nos.2486-2522), Menominee, MI (No.2536), Pemigewasset, NH (No.2456), St. Louis MN (No.2360), and the Sacandaga (No.2047), Beaver (No.2645), Black (No.2422) and Raquette, NY (No.2320).

two years AWA has been successful in educating the public, agency representatives, and the FERC on the sport of whitewater, as well as contributing to the restoration of over twelve miles of previously un-usable whitewater rivers.²

On the other hand, there have been a few problems with the way some tests have been conducted.

Based on this experience, this paper will discuss AWA recommendations necessary for developing an effective, and "common-sense" approach to whitewater boating studies.

THE NEED FOR QUALITY WHITEWATER STUDIES

Whitewater recreation must develop an adequate record to enable it to play its part in balancing competing uses for instream flows, and to provide for full potential use of our river resources.

Whitewater recreation must also provide this record to policy makers who are charged with allocating these water resources.

"Good allocation decisions --- decisions that include consideration of all the impacts --- will only be made with better information about those impacts."³

In the past year, this need has grown substantially as the policy makers within the FERC, mandated with balancing all public use of our rivers, undertake the relicensing of 157 hydropower projects (over 200 dams in 59 watersheds) referred to as the "Class of '93".⁴ Many of these projects contain whitewater river segments never before available for recreation.

These projects, as well as the many other projects to be issued new license terms before the year 2010, will offer the best opportunity to develop the science, methodology, and precedents needed to fit whitewater recreation into the overall river equation.

² This includes whitewater segments on the Deerfield River (MA/VT), and the Sacandaga and Mongaup (NY).

³ Instream Flows for Recreation: A handbook on Concepts and Research Methods, Whittaker, Shelby, Jackson, Beschta, 1993, Preface.

⁴ Hydro Relicensing Roundtable, June 17, 1993, Federal Energy Regulatory Commission, Docket No. EL93-48-000.

The need to capitalize on this opportunity is critical, given the growth of this sport and the limited number of whitewater rivers.

Today, whitewater recreation is one of the fastest expanding sports in the nation⁵, and this trend is expected to continue in the future. With its ability to combine family values, healthy outdoor activity, adventure and adrenaline, whitewater paddling is developing into an ideal image sport for the media. This high level of attention is expected to grow even stronger with the approaching whitewater events scheduled for the 1996 Olympic Games on the Ocoee River in Tennessee.

Combined with this growth is the fact that whitewater is an extremely scarce resource throughout the United States. Many miles of whitewater have been lost to flood control, hydroelectric power, and water supply impoundments. Only 1% of the river mileage in the US still contains whitewater with rapids rated better than class II.⁶

RELATIONSHIP BETWEEN RECREATION AND RESTORATION

The opportunity for more in-depth recreation studies, through these FERC relicensings, parallels the equally timely changes in understanding the inter-related nature of various flow scenarios on a natural stream ecology.

In the past, "...streamflow management typically focus[ed] on one or two critical resource values rather than the simultaneous protection of multiple resources".⁷ Today however, advances in recreation, fishery and other instream flow knowledge have allowed both river users and managers to better appreciate the inter-related nature of river studies.

Only by continuing to advance this knowledge, and looking at the relationships between various flows can we hope to return to full range of river values, closer to a

⁵ The President's Commission on the Outdoors (1987) lists a 515% growth in the number of participants from 1960 to 1987. A 1988 CANOE Magazine Survey lists more recent figures as a 33% increase since 1988, .

⁶ The AWA Nationwide Whitewater Inventory (1990 Edition) lists approximately 2,200 river segments with 36,000 miles of class II and above whitewater. Whitewater recreation on all but a handful (less than two dozen nationwide) of these rivers are entirely dependent on rainfall or snow melt. In some instances, this can provide a season of only a few weeks or days at best.

⁷ Ecological and Geomorphological Concepts for Instream and Out-of-Channel Flow Requirements, Hill, Platts & Beschta, for Rivers, Volume 2, No. 3, p. 198-210, 1991. Published by S.E.L. Associates.

natural river ecology.

"Establishing multiple flows for protection of aquatic resources recognizes that natural systems were built and are maintained by different magnitudes of discharge occurring over time and space."⁸

Use of our rivers for recreation, including whitewater recreation, is fully compatible with a return to a more natural river scenario. River values increasingly include the occasion to enjoy and interact with these rivers.

HOW TO CONDUCT AN EFFECTIVE WHITEWATER STUDY

IN-STREAM FLOW AS A PUBLIC RESOURCE

As public resources, rivers must meet an ever expanding variety of functions and needs. As users of this resource, boaters, fishermen, developers, agricultural interests and others must address this common ownership of flow and of other river values. The concept and practice of discriminating against certain users is unfair and, in the context of the Federal Power Act, unlawful. It is also unfair to the public to designate river segments for only one specific use, they should be open to all.

NEED FOR EARLY INVOLVEMENT BY RECREATION USERS

Early involvement offers several tangible benefits. First, it allows managers, developers, and competing interests to address recreation opportunities in advance, thus avoiding both additional studies further down the road, and the need to fit new information into completed (and now flawed) plans.

Second, it allows resource managers to recruit qualified personnel, increase communications with user groups, and incorporate whitewater expertise in safety, education and available state-of-the-art information.

Finally, it allows resource managers to talk directly with recreation users. "Users are experts about **their** trips and the factors that make them successful experiences, and research has shown that professionals do not always know which conditions users prefer."⁹

⁸ Ibid.

⁹ Instream Flows for Recreation, p. 11.

To be effective, early involvement must take place at both the local and national levels. As mentioned earlier, the simplest way to accomplish this, and to avoid reinventing the whitewater wheel, is to target existing expertise.

WORKING WITH THE PUBLIC

When working within any bureaucratic framework, it is critical to recognize the restraints and problems encountered from a public interest perspective.

The general public, whether boating, fishery, local or other interests, does not work on river issues fulltime. It is necessary to understand that this public includes those groups without a federal budget, citizens who often are balancing their volunteer interests/concerns with family, employment and other private commitments.

Announcements

Very few individuals (or even associations) read the legal notices of regional newspapers. Even fewer read (or have access to) the Federal Register. Therefore the existing system of notification is insufficient to supply timely communications with these interests.

Direct contact with public interests is necessary for announcing any study. Additional actions which could significantly improve public awareness of upcoming studies include: site posting; public service announcements (such as in monthly utility bills); and a distribution list whereby local and regional groups could get preliminary notices.

Use of this type of list would directly target whitewater or other users, allowing managers (applicants) to supply a summary addressing public and agency concerns. This summary could be widely disseminated, at low cost, and provide a synopsis of issues and related information. With this document, interested parties could make an educated decision on the depth of their future involvement.

Timing of Notifications

Travel costs for regional and national non-profits can more than double when faced with last minute scheduling. This can seriously reduce the number of such trips, and demands for site visits, meetings, and actual studies must be prioritized for cost effectiveness.

Regional and national groups rely heavily on local members and volunteers. But these too are impaired by spur-of-the-moment planning:

Volunteers, property owners, and other public interests need time to rearrange work schedules to meet deadlines. This is often impossible under current scheduling.

Even the lowest level of commitment necessitates financial burdens for those involved (travel, food, lodging). While managers and applicants can plan for this expense, volunteers and local interests many times cannot. More importantly, these interests must take time off from their daily jobs, many without compensation.

A minimum of one months notice should be given to the public for participation. Scheduled weekend studies will dramatically improve public attendance and improve the viability of the study.

[Given the short whitewater season in many areas of the country, whitewater studies should, whenever possible, be scheduled for off-peak recreation time.]

The degree that the public, including the whitewater public, has participated in the many site visits, scoping and agency meetings, and multi-day boating studies - even with this insensitive scheduling - provides testimony to the publics determination to participate.

RECOGNIZING NEEDS

Whitewater studies which violate common sense are a waste of time. In the past two years, several whitewater studies have been undertaken with absolutely no whitewater expertise involved. Studies with intermediate boaters attempting class V rapids, studies involving a grand total of two boaters, and tests conducted during raging snowstorms are enough to discourage even the least scientific minds.

Those involved in conducting whitewater studies must recognize the impacts of the season on safety and participation. While a whitewater test can be scheduled in late October or November in Georgia or Alabama, this same test could prove disastrous (and extremely dangerous due to ice and hypothermia) in northern Maine or Minnesota. Likewise, scheduling whitewater tests in New England during black fly season is also not recommended.

Another area to emphasize is the difficulty of the run. Due to advances in skill levels and boat technology, drops thought impossible to navigate only 10 years ago are now run routinely by expert boaters. The Gauley River (WV), one of the most popular whitewater rivers in the country today, was first run by closed boats only 25 years ago.

Rivers recently considered on the "cutting edge" -the Gauley (WV), Gore Canyon (CO), North Fork of the Payette (ID), Upper Youghiogheny and the Great Falls of the Potomac (MD)- are now hosting expert level race sites.¹⁰

This is an important concept as it provides a strong indication of the future potential for whitewater recreation.

Numerous tests over the years have proven that, without water releases, whitewater difficulty is nearly impossible to judge. Natural or man-made obstacles can get markedly more serious with recreation flows, while others may wash out completely. This is even more critical on bypassed river reaches which have been dewatered for many years.

The theory that greater water levels equals greater danger has proven to be an oftentimes misguided notion, especially on steep and technical whitewater runs.

For advanced to expert whitewater runs, scouting trips with low or zero flows, are highly recommended. This allows the boating participants to identify natural or man-made hazards, determine areas to scout under boating conditions, and, in some instances, allow for removal of hazards such as pinning trees or re-bar.

Expert, intermediate, and beginner whitewater studies will present different viewpoints on economics, liability and potential use, as well as on the blueprint for the study itself.

However, the use of novice or beginner boaters for whitewater testing is not recommended. Besides the increased chances for mis-hap, use of inexperienced boaters can seriously increase the time needed for a study, while contributing no substantial benefits to the value of the experience. In whitewater sports, boaters seldom remain in their beginner stage for long periods, and are quickly drawn to more demanding whitewater runs.

Recognize the need for an adequate number of releases. Even with the numerous and divergent demands for flows, whitewater studies should push for adequate releases to avoid overuse of the area and to maximize the recreation value of the river. To fail in this responsibility is to reduce the economic value of recreation, and its growth in the future. Remember that whitewater releases can often be scheduled to coincide with other needs (power generation, fishery, lake drawdown, etc).

¹⁰ The Great Falls Race, held August 15, 1993, just outside of Washington, DC, hosted over 50 boating participants and 1500 spectators for a 7:00 am. race start. The quarter mile course drops 55 feet and ends with the spectacular 22 foot Spout.

Recognize the need for adequate duration of releases. Depending on the length of the run, its drop and volume, and its popularity, duration of whitewater releases can vary significantly. For instance, the Monroe Bridge section of the Deerfield River (MA/VT) requires a four hour release at 900 cfs., while the Fife Brook run requires only three hours at 700 cfs. The four mile, class IV-V run on the Upper Youghiogheny (MD) has been run under two hour releases, but with safety problems and a drastic reduction in the wilderness qualities of the river. Three hour releases would be needed for a valid whitewater test on the Upper Yough.

Artificial flows, such as those released by hydropower or flood control projects, create a "bubble" of water which can sometimes be used for whitewater recreation. With proper study, these flows are extremely manageable, and can easily be changed to avoid sensitive fishery periods, to reduce lake drawdown, or to offer diversified and expanded boating experiences. Remember, less hours per day may mean more days of releases.

[On the Penobscot River (ME), flow discussions are underway to provide weekday flows for boating, enhanced weekend releases for commercial rafting, and reduced flows in the evenings for less skilled boaters.]

There is no substitute for getting boats into the water. Whitewater surveys, outside of surveys for test participants, can provide little information on rivers without a proven track record. In the past, surveys have been sent to boaters who had no way of determining the value or difficulty of a run. In one case, the general public was surveyed on the value of an advanced whitewater run which had never had recreation access or flows.

Even on rivers with a strong history of user and economic statistics, surveys by themselves can fall far short of providing needed information. River segments thought to have only local significance sometimes attract boaters throughout the region, or nationally. Surveys provide no mechanism for gauging this important value. Phone surveys are especially deficient in this area.

A mechanism to update studies on a regular basis must be built directly into the license. This is particularly critical on hydropower projects where the FERC process is open only **once every 30 to 50 years**. Public interests cannot rely on re-opener clauses due to the need for applicants to consent to this, and the future relicensing workload of the FERC.

One example would be to agree on a ratcheting mechanism which allows a coalition of interests to adjust to future growth or decline of the use of the resource. An agreement of this type was developed by the AWA, Adirondack River Outfitters, Glen Park Associates and Niagara Mohawk Power Corporation, regarding the Black

River (NY) in 1985.¹¹

RECOGNIZING VALUES

Given the limits to whitewater rivers, value may come in many shapes and sizes. It is critical to recognize the potential value of each run or river segment, and to address the cumulative recreation values associated within the state or region.

The Nisqually (WA), Moxie (ME), and Tallulah (GA) canyons offer short but extremely beautiful wilderness runs, while the Grand Canyon (AZ) and the Selway (ID) offer multi-day wilderness trips. The Watertown project on the Black River (NY) offers only 150 to 200 foot of standing waves, but an excellent play and training area. The St. Louis river (MN) is a popular destination for the nearby Twin Cities metropolitan area, while the Wolf on the Upper Peninsula (MI) is hours from any major city or town.

The artificial Dickerson training course, located only 30 miles outside of Washington (DC), was developed by the Potomac Electric Power Company on a 900 foot section of their warm water discharge chute. It now provides year round training facilities for the U.S. Whitewater Slalom Team.

As recreational popularity continues to grow, so does the recognition of economic and tourism values associated with outdoor sports. Today's average boater is a long way from the earlier concept of river runners. National polls tell us that the average paddler is 44 years old, is male, married with children, college educated, a home owner, and has a mean household income of \$66,000 per year.¹²

This means that six weekends of releases on the Gauley river (WV) net in excess of \$30 million to the state, while in Maine, the Penobscot brings in an annual value of \$20 million. The Deerfield River on the Vermont/Massachusetts border, while smaller in size and current usage, is estimated to generate \$38,000 per day from whitewater recreation.

The four annual weekend releases on the Russell Fork (VA), while attracting perhaps only 1000 boaters and rafters annually, still provides a significant impact to the nearby rural township.¹³ The National Kayak Center on the St. Louis attracts an

¹¹ FERC Project No. 4796.

¹² Based on national surveys conducted by Peter Hart Research Associates in association with the Recreation Roundtable, Nov. 15, 1991, Washington, DC.

¹³ A long term vision of the Breaks Interstate Park Commission includes a \$10.9 million, two-phase development plan on the Russell Fork. This plan, with support from Congressman Rick Boucher, would include a conference center, a chair lift to El

average attendance of more than 5,000 for each competition, accounts for more than 10,000 user days per year, and is calculated to have generated approximately \$1.25 million from 1986 to 1993.

RECOGNIZING EXPERTISE

River managers and hydro applicants must recognize that boaters are experts on whitewater technique, safety, river conditions, river hydrology and flow; and local, regional and national conditions and events.

Nowhere is this more evident than in establishing safety for whitewater studies. On all runs, and especially when dealing with advanced to expert conditions, it has been proven that boaters are on their own once they hit the water. On steep canyon runs (i.e. the Narrows of the Green, NC), safety personnel without boats are sometimes only able to access several narrow tracts, many of which are not critical safety or big-drop areas.

Local search and rescue departments are often poorly funded and unable to undertake swiftwater training. In these cases they will be restricted to land based safety. This leaves all aspects of water rescue and/or extraction to boating participants. In one recent study, local rescue personnel arrived without one lifejacket among them (although they were well aware of their lack of formal training and expertise).

For advanced or expert studies, for those river segments never or infrequently run, and for general safety consideration, it is recommended that an expert team approach be used.

What makes up an expert team? A team is made up of between three and five boaters who can handle any problem on the water: boat scouting at any difficulty, trees, technical portages, medical emergencies and possible extraction. The AWA recommends that two separate teams be used per study.

The best choice is to use boaters who are familiar with one another, and with the skills and short comings of each member of the team.

In addition, members need experience in team building, wilderness medical training, common water sense, and confidence in attempting first descents or other rivers of unknown quality or hazards.

Horrendo rapids, and other facilities and attractions.

How do you assemble such a team? Contact the AWA which has club affiliations, members, and regional coordinators in every region of the country.

CONCLUSION

In just the last year, whitewater studies have already increased the availability of flow information, and explored the correlation between recreation and more historical flow studies (such as fishery, aesthetic, and flood analysis). By continuing in this manner, and following the above recommendations, paddlers, formal recreation organizations, river managers, and hydro developers can help to eliminate some misconceptions which have worked to the detriment of expanded recreational benefits. These include:

- Optimal whitewater flows v. minimum flows

Whitewater study goals are necessary to determine optimal flows for recreation, not minimum flows. Better yet, a range of optimum flows should be provided to promote varied boating experiences, and to maximize the full potential of recreational use and economics.

Dwelling on minimum whitewater flows has led to many problems for recreation. Currently, the FERC is contemplating the re-assessment of the value of two turbine recreation flows on the Mongaup (NY),¹⁴ just one year after determining that a single turbine offered minimum recreation resources.

When addressing the type of experience offered, don't settle for a class II run when additional water could offer outstanding and scarce class III+ resources.

- Fishery flows v. recreation flows

The often held theory that whitewater releases and fishery flows are mutually exclusive is not borne out in fact.

As additional instream flow information is developed, we are coming to realize that natural stream ecology depends heavily on the varied flows available to a natural system. Varied flows enhance watertable recharge, streambank formation, floodplain vegetation and channel formation and maintenance.

Recent studies completed on the Savage River in Maryland (which sustains a trophy population of wild brook and brown trout, and hosted the 1989 World Whitewater Canoe/Kayak Championships) holds that boating flows do not necessarily harm fish

¹⁴ FERC Project No. 9690

populations, as long as consideration is given to issues such as: ramping rates, temperature shock, spawning, young of year vulnerability, and others.¹⁵

In order to re-create natural fluctuations on rivers which have been dammed or dredged, we cannot depend on single flow technologies, but must consistently combine various instream flow studies such as IFIM, PHABSIM, HEC5, as well as artificially elevated whitewater flows.

"Maintenance of stream ecosystems rests on streamflow management practices that protect physical processes which, in turn, influence biological systems. Consequently, multiple flow regimes are needed in most streams to protect multiple resources."¹⁶

Problems have occurred in the past on many rivers where the newly developing art of whitewater study has come up against the timely, and entrenched art of fishery enhancement. This is often, and understandably, the case when fishery enhancements and mitigation measures have just been successfully negotiated.

In some cases river managers, fishery agencies, and hydro developers have intensified this misconception by:

Using IFIM studies, designed to measure only minimum flow effects on fisheries, to determine maximum flow effects such as whitewater releases.

Using consultants with only IFIM experience, and possible ingrained prejudice, to undertake critical whitewater studies.

Attempting to change the natural and historic river conditions to suit their own interests.¹⁷

¹⁵ Effects of Whitewater Releases on Trout and Macroinvertebrate Populations in the Lower Savage River, 1989. MDDNR, Tidewater Program, Freshwater Fisheries Program.

¹⁶ Ecological and Geomorphological Concepts for Instream and Out-of-Channel Flow Requirements, p. 201.

¹⁷ Maryland DNR fisheries personnel are currently attempting to develop a cold-water fishery on the Upper Youghiogeny, a warm-water stream. Proposed temperature enhancement flows would all but eliminate scheduled flows for whitewater recreation, a \$2 million enterprise for the state and county.

"...it is clear that streamflow management practiced only as a fisheries art is inadequate to protect river ecosystems."¹⁸

- Peaking v. artificially elevated flows

Dam peaking operations may have flow changes nearly everyday or weekday of the year. Peaking operations may have many fluctuations in a single day, have no minimum flow releases, include no ramping considerations, and can have significant temperature variations.

By contrast, whitewater flows (Artificial Varied Flows-AVF's) are easily managed to avoid critical seasons and issues, and often are of very short duration and low volume.¹⁹ On most rivers with large volume releases or daily recreation flows, the natural median flow during pre-project conditions is almost always larger than scheduled recreation flows.

AVF's are used by Army Corps operations to both benefit the stream environment and provide whitewater recreation. In certain cases, AVF's have been demonstrated to do both (North Branch of the Potomac). In addition, Maryland fisheries personnel suggest that AVF's for the Savage River (MD) in the early fall may improve trout spawning.

¹⁸ Ecological and Geomorphological Concepts for Instream and Out-of-Channel Flow Requirements, Summery p. 208.

¹⁹ 1300 cfs. v. the 1993 range of volume in the bypass, which ranged from 20 cfs. to 20,000 cfs.