Water-based Recreation in Oklahoma: Water Rights, Valuation and Implications For Public Policy, Economic Development and Management[1]

Tracy A. Boyer
Associate Professor, Natural Resources

Larry D. Sanders
Professor/Extension Specialist, Policy and Public Affairs

Richard Melstrom
Professor, Natural Resources

Art Stoecker
Assistant Professor, International Economic Development

Shannon Ferrell
Associate Professor, Agricultural Law

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Introduction

Oklahoma has an abundance of water-based recreation: fishing, boating, waterfowl and aquatic-based sport hunting, swimming and scenic and wildlife viewing. At the same time, there are many reminders of the fragility of these water-dependent resources on which recreation depends, such as periodic droughts, damaging floods and critical variability in stream flows and lake levels. This fact sheet will provide a brief overview of the water-based recreation resources in the state and scientific estimates of the economic value of Oklahoma water in alternate uses. Water managers and those who enjoy water-based recreation will find information that will help value and better manage the resource.

1 Graduate research assistants Deepayan Debnath and Michael Reilley with the department assisted in the research that was the basis for segments of this paper. Contact Sanders at larry.sanders@okstate.edu, with comments/questions. Authors appreciate the review comments of Dave Engle and Brian Whitacre, Oklahoma State University.

The State's Surface Waters—A Valuable Resource

Surface waters form the key foundation for water-based recreation in the state. Oklahoma has nearly 56,000 miles of shoreline along lakes and ponds containing about 1,400 square miles of water area. The most surface area is in Eufaula Lake with more than 105,000 acres, with Lake Texoma second (88,000 acres). Additionally, the Oklahoma Water Resources Board (OWRB) reports that there are more than 167,000 miles of rivers and streams in the state.

Water Rights Background

To understand the issues surrounding the use of water for recreational purposes, it is important to examine how water is allocated. Oklahoma's water law separates water into three distinct forms: standing, ground and surface waters.

- Standing water is water running over the ground that has not reached the banks of a streambed, or water that is simply standing on the surface outside of a stream. The owner of the land where this water is found owns the water and generally can use it as they wish.
- Groundwater is water below the surface, outside of a streambed, that is not saltwater. While groundwater is owned by the owner of the surface land, the use of groundwater is subject to state laws governing its extraction and use. Although groundwater might not appear to impact recreation, it can impact stream water flow and other water sources.
- Stream water is water inside the banks of a streambed. Stream water is not "owned" by any one party, but is instead regarded as property of the state.

Water in streams in Oklahoma is managed by a hybrid doctrine of riparian and prior appropriation. Riparian doctrine gives the owners of property adjoining a stream the right to use the water from the stream, and restricts access to streams by those who do not own land adjoining them. Prior appropriation allows entities (for example, farmers, ranchers and energy companies) to apply to the state for an appropriation of water from a stream, even if they do not own land along the stream. When water is in limited supply, those who applied for their appropriations first have priority to the water. The owners of land next to a stream can use the water for a number of household and agricultural uses without applying for an appropriation. If those landowners want additional water, they must apply for an appropriation of the stream water, and parties that do not own land next to the stream can apply for an appropriation. Applicants typically include municipalities,

agricultural producers and industry. When water supplies are low, riparian landowners receive the highest priority for their domestic uses, with remaining water users assigned priority based on when they applied for their appropriations.

Market and Non-market Valuation

What is the value of a scenic sunset over Lake Altus or a day of fly fishing at the Mountain Fork River? People are not accustomed to placing dollar values on such experiences. The most common form of monetary exchange involves customers paying businesses for goods and services with set or negotiated prices. This is the basis of market valuation. An angler may buy rods, tackle and licenses from the sporting goods store, but is that the total value of a trip to go fly fishing? What about anglers who spend little, if any money for their outing? Natural resources do have economic values, but these values are not always marketed values.

Economists typically define the value of a good as the maximum amount of money an individual is willing to give up to get the good. The value or economic benefit of a recreational fishing trip is therefore the most an angler is willing to pay to take the trip. Determining this "willingness to pay" is the basis for economic valuation. Although it is tempting to equate spending with value, they are different concepts. In general, goods are only consumed or purchased by an individual if the cost is less than what that person is willing to pay. For water-based recreation activities, there may only be a small fee (or no fee at all) to visit the water, but meager spending does not imply this use has little value.

Natural resources and environmental amenities often suffer from overuse or under-provision when property rights are poorly defined or markets fail to account for the value of ecosystem services provided by natural resources. Although market uses of water are more readily apparent, recreational uses are often falsely counted as zero in setting public policy. Understanding the opportunity cost of water is critical for managing it for its highest and best use. In some cases, recreational values are greater than other marketed values for a land or water resource. Moreover, non-consumptive uses of water such as hunting, fishing and boating may provide critical revenue for rural economies despite local natural resources not being specifically managed for those uses. In addition, recreational values are not always in conflict with other uses, but complementary. For example, the ecosystem services provided by effectively managed agricultural land can enhance recreational opportunities by conserving habitat and protecting water quality.

The scientific method for valuing environmental goods and services that lack a market price tag, such as a favorite scenic view or a fishery in a public lake, is called non-market valuation.[2] Non-market valuation estimates dollar values for such goods and services so that their values can be compared to the value of marketed uses and management costs. For example, these values can guide managers in deciding how high to maintain water levels to preserve lake recreation versus how much water to run through turbines to produce hydropower. Measuring non-market values requires surveys to gather data and learn about the environmental preferences and behaviors of individuals. Non-market values are seldom estimated because of the cost of these surveys and the difficulty of making individuals consider their own willingness to pay and budget constraints for "goods" they rarely think about in the context of pricing. Other methods also estimate non-market values using data on actual behaviors linked to environmental goods, such as the willingness of individuals to trade off visits to a lake with the costs of travel, and pay a premium for land with waterfront access or a water view.

Other Related Concepts

Consumptive use of water occurs when all or a portion of water withdrawals consumed are not returned to a water source. Water can be sold for municipal purposes and can be considered a consumptive use value (Freeman 2003). Non-consumptive use relates to that portion of the withdrawal that is returned to the water course, or when water is used, but no actual withdrawal occurs, as with recreation activities like fishing and boating. Conjunctive use refers to managing surface and groundwater as a single resource. Conjunctive management in Oklahoma was first recognized legislatively in 2003 with SB 288,[3] which directed the OWRB to conduct a study to determine the amount of water that could be withdrawn from the Arbuckle-Simpson Aquifer without damaging surface water resources. Most rivers and springs are connected to aquifers, and depletion of the groundwater will reduce base flow in the river. Current permitting rules do not allow the OWRB to consider that groundwater and surface waters may be connected, with the exception of the Arbuckle-Simpson Aquifer.[4]

Valuation of Water-based Recreation

Oklahoma's outdoor recreation industries, including fishing and hunting, were responsible for generating nearly $2.5 billion in 2006 (USFWS 2006). In 2011, $1.8 billion was spent on wildlife recreation in Oklahoma, not including the indirect spending each of those dollars brought about in local economies (USFWS 2012). Streams, rivers, ponds and reservoirs provide fishing experiences for the state's anglers, but they also attract nonresidents who pump money into the economy. Stocked fish are critical for maintaining quality fishing sites and thereby providing income-generating opportunities in rural areas.

Estimates of overall usage are substantially larger for the lower Mt. Fork than those for the lower Illinois River. The Lower Mountain Fork River study (Table 1) illustrates that a majority of anglers fishing the blue zone[5] prefer to take their

2 Non-market valuation provides monetary estimates of the value of ecosystem services, which include recreational uses. When evaluating a project that affects the environment, the value of ecosystem services lost (gained) should be counted as a cost (benefit). These may be used to provide a complete evaluation of whether the total benefits of a project outweigh the costs. Since the 1950s, non-market techniques have been used in cost-benefit analysis for environmental decision-making. In fact, cost-benefit analysis is mandated by federal executive order and NEPA for all federally linked projects that may significantly impact the environment.

3 The Oklahoma Water Resources Board, "The Arbuckle-Simpson Hydrology Study," November 2003.

4 82 Okla. Stat. § 1020.9(B).

5 Lower Mt. Fork River is divided into the blue zone and red zone, each having special restrictions. The blue zone comprises the stretches from the Broken Bow Reservoir spillway downstream to the Lost Creek diversion structure, from the first Hwy 259A scenic bridge downstream to the State Park Dam, and from the mouth of Rough Branch Creek downstream to Hwy. 70 bridge.

catch home and are willing to pay about $5.53 more per year per trout to increase the numbers of trout of harvesting size, underscoring the importance of ample stocking to the fishery. Both fisheries receive regularly scheduled year-round stockings, suggesting they are comparable both economically and biologically. Fishermen spend an estimated $10.9 million annually on the lower Mountain Fork River. Much of the spending comes from the 77 percent of non-resident anglers. These expenditures generate an additional $14.1 million in annual economic activity and result in $130,000 extra annual sales tax revenue for McCurtain County. Research shows that the environmental quality of recreation sites matters to people. One study showed that campers swimming and boating on Lake Tenkiller were willing to pay $5.60 per trip for normal lake levels (versus 5 feet below normal levels) and to pay $13.08 per trip for assurances that there would be no algal blooms[6] on their trip.

Although many of Oklahoma's 300 multipurpose reservoirs were initially built for uses such as hydropower and flood control, explicitly managing for recreational use may be merited, particularly in times of drought. Economic models of reservoir management for Oklahoma have shown that ignoring the value of recreational uses can lead to the release of too much water and may result in a significant overall economic loss. Specifically, for Lake Tenkiller, when management incorporated recreational values with competing uses, it was possible to gain nearly $300 million in additional value from the lake resource during the 50-year period (Debnath et al., 2015). The gain in recreation values when the reservoir was managed to maintain visitors was $88 million in exchange for a reduction of $26.6 million in municipal benefit and $0.6 million in power generation. Of course, in addition to recreational use values, assumptions about the value of alternative uses, such as power generation, are critical to such estimates.

Values for habitat and ecosystem services not related to recreation may also merit protecting water supplies, although few economic studies have been conducted in Oklahoma to explicitly measure these values. Users were willing to pay $16 per day to improve species numbers by 10 percent in the Upper Illinois, but were much more concerned with personal contact with degraded water due to algal or bacterial contamination (Siyoum, 2006). Research has shown that some people possess non-use values, such as bequest values and existence values, for water resources.[7] Surface water in streams, rivers and wetlands may generate non-use values by supporting valued species and serving other purposes not related to direct use. For example, a New Mexico study showed the public is willing to pay $195 per household per year to provide minimum stream flow to protect noncommercial threatened and endangered fish. A similar Colorado study indicated that the public was willing to pay $95 per household ($112.6 million at the time) to protect stream flows in 11 rivers (Sanders, et. al, 1990)

OCWP and Water Recreation

A critical component of water-based recreation in streams and rivers, including much of the water life, is some level

6 An algal bloom is a sudden increase in algae in an aquatic system, with color varying from green, brown, red to blue-green. Bacteria growth may result, using up the dissolved oxygen and killing other plants and fish.

7 Existence value refers to the potential value of citizens to protect a natural resource or ecosystem for its uniqueness, irrespective of their desire to use the resource now or in the future. Bequest value refers to the potential value for citizens who want to protect the resource for future generations.

Table 1. Water-based recreation studies and value estimates.

Study area	*Recreation scope & values*	*General scope & values*	
Lower Illinois River trout fishery	$2 million/year (2006)		Prado (2006)
Lower Mountain Fork River	fishing: $10.9 million/year expenditures (2011)	additional $14.1 economic activity/ year	Reilley (2011)
Tenkiller Ferry Lake	recreation value during a 50-year period $300 million (2013)	some competition with non-recreation uses	Debnath et al., (2015)
Various	recreation users value experiences $30 (multiuse fish/swim) -2000/day (specialty fishing at LMFR)	varies by site and activity	Prado, (2006); Reilley, (2011)
Various	quality improvements (water clarity, depth, etc.) worth $10-16/day more		Roberts, et al., (2008); Mahasuweerachai, (2010)
Illinois River Basin	recreation use valued $14.3 million to $17.1 million/year (2012)		Siyoum (2006)
Fort Cobb Lake	recreation value of $60/visitor/trip, or about $18/visitor/day (2014)		Boyer et al.,(2015) (unpublished manuscript)

of stream flow. The Oklahoma Comprehensive Water Plan (OCWP) noted stream flows are a factor in the ecosystem environment to support wildlife and recreation. Oklahoma and North Dakota are the only two western states that do not legally define in-stream flows. However, as noted by the Oklahoma Water Resources Board, there are benefits to base flow because of policies such as appropriative water rights, domestic use protection rules, the Scenic Rivers Act, reservoir release schedules, and interstate stream compacts. For example, the Oklahoma Scenic Rivers Act provides that the "free-flowing" condition of scenic rivers be maintained. During the development of the OCWP, there was much discussion about changing the status quo to a policy that allocated water rights to maintain base stream flow. However, those with prior appropriation for non-recreation uses, such as agriculture and municipalities interpreted this change as a loss of rights or withholding of future rights. Minimum stream flow will continue to be a contentious policy issue.

Summary

Studies clearly indicate that water-based recreation is a valuable resource for current and future generations. Few people question the need to maintain and enhance the economic benefits of hydropower, agriculture, municipal, industrial and nonmarket uses, such as recreation. The challenge is how to allocate water to its many uses in the most efficient manner, while explicitly considering both market and non-market values in the timing and quantity of water levels, flows and delivery (Debnath et al. 2015, Debnath et al. 2014).

This Fact Sheet has provided a framework for better understanding the complexities of water valuation. It demonstrates a need for public managers to base decisions about the allocation of water on scientific estimates of both market and non-market values to achieve greater efficiency in competing water uses. Having scientific estimates to weigh trade-offs in allocating water resources is vital in framing the discussion about future management and protection of water in Oklahoma.

The evolving context of politics and culture will provide the framework for ongoing and future management decisions of water resources and its use for recreation. Without recognizing both market and non-market values, Oklahoma will miss out on the best uses of its natural resources.

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