

Input/Output Wallowa Lake Dam Scenario



**John Williams
Associate Professor
Dept Rangeland Resource
Oregon State University**

**For the Wallowa County Board of Commissioners
In partnership with
The
Wallowa County Natural Resource Advisory Committee**

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**Input/Output Wallowa Lake Dam
Scenario
John Williams
2004**

A major issue facing Wallowa County in 2004 is the Wallowa Lake Dam rehabilitation. The Dam is owned and operated by the Associated Ditch Company (ADC), a non-profit corporation whose members are local irrigators. After a dam safety inspection identified the need for considerable improvements and the subsequent analysis, the ADC began pursuing funding and authorization for the needed rehabilitation.

There is considerable concern in the community that another “Klamath Falls” not occur in our county where irrigators lose the use of their irrigation water rights. Even though there are considerable differences between Klamath Falls and Wallowa County*, concern is widespread. To aid the community and the decision makers in understanding the issues around the Wallowa Lake Dam, the Wallowa County Natural Resource Advisory Committee, an advisory committee to the Wallowa County Board of Commissioners, requested that Oregon State University look at the economics relating to the dam issue. Oregon State is completing the Draft of the Wallowa County Economic Structure: An Input-Output Analysis, authored by Bruce Sorte, Department of Agricultural Resource Economics which models the local economy.

* In Wallowa County, unlike the Klamath situation, the lake water rights are all adjudicated, the dam is owned by the irrigators not the federal government, the dam was built by the irrigators not the federal government, the irrigators are offering 4462 acre feet of water for sale/exchange, the entities supporting the process are much wider including the Nez Perce tribe.

The scenario that is being developed will analyze two questions. First, *“What could be the changes in the economy if the dam were removed?”* Second *“What could be the changes in the economy if the dam were successfully repaired?”*

It was decided to create a scenario with just these two alternatives as we felt that any other alternatives were not feasible. The two major issues needing addressed include the need to stop the crumbling of the concrete (no rebar was initially used in the dam building) and to increase the weight of the dam so that it is stable enough to withstand potential floods without tipping over. To accomplish this a near complete removal and rebuilding will be as economical as any intermediate fixes. Because of this we felt that the dam would either be rebuilt or removed as the only two viable alternatives.

Scenario #1: Dam Removal

Effects on Irrigated Farmland

It is estimated that in Wallowa County there are a total of 45,100 acres of irrigated land. The local Farm Service Agency has recorded 28,687 acres of irrigated land from their

annual sign-ups for the various crop programs. The acres not reported consist mostly of irrigated pasture and grass hay fields.

Focus groups¹ were utilized to gather technical information on the following questions. First, “What acres will be affected and how?” Second, “What adjustments would be made in crops grown?” Third “What would be the yield loss?” and finally, “What would be the economic loss?”

The first question asked was what acres will be affected and how. The irrigated acres were discussed by area as follows.

Using the approximately 45,100 acres currently irrigated in the Wallowa Valley, the amount of loss of irrigation water was estimated as shown in the table below.

Irrigation acres projected water loss due to absence of Wallowa Lake Dam *

Area	Acres	% loss	Timing of loss
Dam 1	13,000	100%	Full season
Dam 2	3,000	65%	No water after Aug 1/some reduction July
Prairie Creek	1,500	95%	Very little water except early spring
Sheep Creek	2,200	0%	
Hurricane Creek	1,500	0%	
Upper Alder Slope	3,500	0%	
Lower Alder Slope	1,000	25%	No water after Aug. 1
Wallowa River	5,000	50%	No water after late July
Mid Valley	10,000	50%	No water after late July
North Lower Valley	1,600	40%	No water after Aug 1
South Lower Valley	2,200	40%	No water after Aug 1
Bear Creek	600	0%	

- See explanations below.

Dam There are 16,000 acres being irrigated with direct water rights from the stored water of the dam. Of those, 13,000 acres (dam 1) would go dry with no irrigation water available, 3,000 acres (dam 2) would have a 65% reduction in water availability. This is all early season water and would be spread very thin to attempt to irrigate as many acres as possible. Priority dates, the ability to revert back to the original river water rights and the ability to deliver water to their land will decide which of these acres would continue to be irrigated.

Prairie Creek These 1,500 acres are on the edge of the valley and are operating on supplemental rights from Prairie Creek. This supplemental water is Wallowa Lake dam water that is actually tail water first utilized by the Wallowa Lake dam irrigators then picked up and reused from Prairie Creek below the original fields. It is estimated that these acres would see a 95% reduction in water available for irrigation.

Sheep Creek There is an inter-basin transfer of water from the Big Sheep Creek basin via a canal that brings the water from Big Sheep Creek around the headwaters of Little Sheep Creek into upper Prairie Creek. These 1,500 acres would be unaffected.

Hurricane Creek These 1,500 acres on the west side of the valley receive their water from Hurricane Creek. They have traditionally lost water around August 1 due to Hurricane Creek drying up at that time. These 1,500 would be unaffected. Historic information from these acres was used to estimate what the water availability would be in some other rivers.

Alder Slope Alder Slope gets its water from Hurricane Creek utilizing two different ditches. The upper Alder Slope ditch receives water from Hurricane Creek and irrigates approximately 3,500 acres. The lower Alder Slope ditch draws water from Hurricane Creek and also receives supplemental water from the Wallowa River through a transfer ditch. The Hurricane Creek water would be unaffected. The Wallowa River water would not be available. It is estimated that the lower ditch irrigates 1,000 acres and approximately 25% of the water is supplemental water from the Wallowa River. These 1,000 acres would have a 40% reduction in water with no water after Aug 1.

Wallowa River There are a series of ditches that divert water directly from the Wallowa River starting in Joseph and continuing clear through the valley to Wallowa. It is estimated that these ditches irrigate 5,000 acres. The effects on these will vary widely dependent on the location of the ditch, the date of individual water rights and the ability of each ditch to divert water, however, the effect in general would be little water after late July.

Mid Valley There are approximately 10,000 acres in this area that receives its water from the Lostine River which has storage in Minam Lake Reservoir. The lower half of those acres have older water rights and are supplemented by the Cross Country Ditch which carries water from the Wallowa River to the Lostine River. This has allowed the junior water rights in the upper Lostine River area to have full use of their late season rights. Access to irrigation water by the Mid Valley area would be reduced by approximately 50% with no water after late July. This would be due to the Cross County Ditch water being eliminated and the older rights re-establishing their use of the Lostine River water.

North Lower Valley There are approximately 1,600 acres in this area irrigated from the Wallowa River. Since the Wallowa River flow in August is mostly stored water from Wallowa Lake there would be a 40% reduction in water with no water after Aug 1.

South Lower Valley There are approximately 2,200 acres that are irrigated either directly from the Wallowa River or from Bear Creek with supplemental water from the Chamberlain Ditch which transfers water from the Wallowa River into the Bear Creek drainage. There would be a 40% reduction in water with no water after Aug 1.

Bear Creek The 600 acres irrigated from Bear Creek, which is above the Chamberlain Ditch would be unaffected.

Effects on Crop Production

Reductions in irrigation are predicted to result in a shift in the types of crops that are grown. Acres planted to wheat, and to some degree barley, would increase as these crops can be successfully grown with a shorter irrigation season. Part of this assumption is based on many of the acres having reduced water availability after August 1. These crops can also be grown as dry land crops in the case of those acres that will be completely losing their water. There would also likely be increases in the conversion of crop land to pasture.

As shown in the tables below, there are currently \$14,502,000 of annual farm gate sales* from irrigated acres in Wallowa County. Following dam removal there would be \$8,334,107 of annual farm gate sales. This translates into a \$6,158,000 dollar loss of annual farm gate sales of crop production.

*Farm Gate Sales is the value of the farm products when it leaves the farm.

Acres Grown Currently

	<u>Acres available</u>	Wheat	Barley	Oats	Peas	Alfalfa Hay	Alfalfa/ Grass Mix	Grass Hay	Specialty	Grazing
Dam 1	13000	810	834	117	400	2031	2255	610	4008	1935
Dam 2	3000	250	100	100	200	675	775	100	400	400
Sheep Creek	2200	450	200	100	200	225	225	200	200	400
Prairie Creek	1500	200	200	100	200	200	200	100	100	200
Hurricane Creek	1500	250	100		100	212	238	300	100	200
Alder Slope	3500	100	150		173	200	225	1000		1652
Alder Slope	1000	50	100			25	50	300		475
Wallowa River	5000	150				300	338	1445	200	2567
Mid Valley	1000	800	800	200		1288	1477	1090	600	3745
Lower Valley	1600	250	50			200	250	600		250
Lower Valley	2200	50	50			100	114	800		1086
Bear Creek	600	0	0			0	0	500		100
	45100	3360	2584	617	1273	5456	6147	7045	5608	13010

Acres Grown After Removal of Dam

	<u>Acres available</u>	<u>Wheat</u>	Barley	Oats	Peas	Alfalfa Hay	Alfalfa/ Grass Mix	Grass Hay	Specialty	Grazing
Dam 1	13000	6000	1000	117		500	500	610	200	4073
Dam 2	3000	1400	100	100		200	300	100	400	400
Sheep Creek	2200	450	200	100	200	225	225	200	200	400
Prairie Creek	1500	500	200	100		100	100	100		400
Hurricane Creek	1500	250	100		100	212	238	300	100	200
Alder Slope	3500	100	150		173	200	225	1000		1652
Alder Slope	1000	50	100			25	50	300		475
Wallowa River	5000	150				300	338	1445	200	2567
Mid Valley	10000	2910	1700	200		600	400	1090	100	3000
Lower Valley	1600	250	50			200	250	600		250
Lower Valley	2200	50	50			100	114	800		1086
Bear Creek	600	0	0			0	0	500		100
	45100	12110	3650	617	473	2662	2740	7045	1200	14603

Acres and Annual Farm Gate Sales by Commodity

CROP	Total acres current	Total acres after Removal of dam	Value of crop grown currently	Value of crop grown after dam removal	Total production lost in dollars
Wheat	3,360	12,110	\$967,680	2,103,088	(increase) \$1,135,408
Barley	2,584	3,650	\$682,176	679,3600	\$2,816
Oats	617	617	\$102,576	71,695	\$30,880
Peas	1,273	473	\$611,040	227,040	\$384,000
Alfalfa Hay	5,456	2,662	\$2,373,360	886,377	\$1,486,982
Alfalfa/ Grass Mix	6,147	2,740	\$2,458,800	821,920	\$1,636,880
Grass Hay	7,045	7,045	\$1,627,395	1,394,082	\$233,31
Specialty Crops	5,608	1,200	\$2,663,800	391,875	\$2,271,925
Grazing	13,010	14,603	\$3,005,310	1,758,667	\$1,246,642
	45,100	45,100	\$14,502,137	\$8,334,107	\$6,158,030

Effects on Livestock Production

The livestock industry for Wallowa County has over 27,000 head of mother cows. In a typical operation based in the Wallowa Valley, mother cows winter in the valley on hay, utilize the irrigated pasture grass for a short time in the spring, then move to the mountains (many times to a federal permit) and then utilize the aftermath pasture from hayfields or grass pastures in the fall.

It is estimated that 40% of the cattle in Wallowa County would be unaffected, as they do not access forage from irrigated lands. These operations would include the north county ranches and those ranches in the Imnaha that do not utilize hay from the valley. Livestock operations were divided between ranch finished (5% of livestock), range finished (57.5%) and feedlot finished (37.5%).

It was estimated that ranch finished operations would be significantly affected due to the dependence on irrigated pasture to finish these home grown type animals. The range finished sector would be the least affected as the primary product sold is the weaner calf which is sold prior to livestock returning to fall feed in the valley. The feedlot finished operation would be significantly affected. These operators own the animal for a much longer time requiring a higher level of quality feed which would be significantly reduced due to the loss of the irrigated acres and the conversion of many acres of forage production to the cereal grain crops. Operations that hold their calves for sale after weaning may convert to selling the calves at weaning due to reduced availability of high quality feed.

As shown in the table below, there are currently \$13,775,000 of annual farm gate sales from cattle in Wallowa County. The annual farm gate sales of cattle production in Wallowa County would be reduced by \$4,720,000.

Livestock Summary*

Sector	% Livestock sector	Total \$ of sector	% Reduction of sector	\$ Value affected by reduction	Total \$ lost without dam
Ranch Finished	5	\$374,704	60	\$224,822	\$134,893
Range Finished	57.5	\$5,794,452	40	\$3,476,671	\$1,390,668
Feedlot Finished	37.5	\$7,606,252	70	\$4,563,751	\$3,194,625
Totals	100	\$13,775,408		\$8,265,245	\$4,720,188

* For calculations of specific values contact John Williams, OSU Extension Service, Wallowa County

Effects of Flooding

The riparian areas in the Wallowa Valley have artificially evolved over the past 80 years with the flood control effects of the Wallowa Lake Dam, roads, channelization, grazing, domestic and municipal impacts. These impacts have contributed to changed channel morphologies which include a smaller stream channel and more riparian vegetation. Without the very high and low natural flows, debris has built up in the riparian areas to unnaturally high levels. It is assumed that during the first high water following the removal of the dam, the combination of increased riparian vegetation and debris will create a situation of multiple debris dams and increased unpredictability of the flood event.

Flood assumptions after dam removal:

- 1) The Wallowa River will flow unimpeded through the lake, buffered by the natural spread occurring on the residual lake pool.
- 2) Debris removal from bridges during initial high water period may not or cannot occur safely.
- 3) River will mostly follow its existing course during the high water event. Out of bank flow and possible channel rerouting are possible.
- 4) First spring runoff following removal of facility will be a median discharge value (not extreme) estimated between 1,500 cfs and 3,000 cfs.
- 5) Future events will pattern historic occurrences where only portions of the hydrologic system display extremes, while flows from other drainages are closer to median.
- 6) Analysis is based on the best available data and personal observations.

Matthew Marmor, Wallowa County Emergency Program Manager

With those assumptions it is projected that 12 of the 26 public bridges would be destroyed or damaged enough to require replacement. It was observed that most private bridges are not adequately installed to withstand severe high flows, therefore most of the private bridges are expected to fail if water overtops the bridges or if a debris problem develops. There would be significant damage to roads, how many and to what extent is difficult to predict due to the potential for debris problems.

It is estimated that replacement cost would be an average of \$450,000 per public bridge and between \$50,000 and \$100,000 per private bridge. The estimated economic loss due to bridges would be $12 \times \$450,000.00 = \$5,400,000$ for public bridges and an unknown quantity for private bridges.

Approximately 175 homes would be flooded with the largest portion of those located in Enterprise. A smaller number of businesses would also be flooded. Access problems would persist for much of the county for one to two weeks following the high flow. For some sites, access problems could last for months. At a minimum, the city of Wallowa's sewer pond would be swamped.

It is assumed that all of the materials needed to repair the bridges would come from within the county. However, the labor would most probably be no more than 25% local contractors as there will be much more work than local contractors can handle. Repair of flood damage would provide a short-term economic benefit, however access problems would present an economic hazard.

Effects of Recreation/Tourism

Recreation/tourism is an important part of the economy in Wallowa County. People come to Wallowa County for the scenery, solitude, camping, picnicking, boating, snow and water skiing, snowmobiling, auto touring, hiking and backpacking, horseback riding, fishing, hunting and to visit shops and galleries. Recreation is centered around Wallowa Lake and the Eagle Cap Wilderness. Tourism is centered around Joseph and the Wallowa Lake area.

A focus group was asked to respond to two main questions: *“How much of the recreation is based, to some degree, on the lake?”* and then, *“Of the recreation based on the lake what percent reduction would occur if there were no Dam?”*

It was estimated that 90% of total recreation and tourism occurs in the spring/summer/fall seasons. Approximately 80% of the spring/summer/fall season tourism is estimated to be lake-based. Winter recreation/tourism was determined to be minimally lake-based. Using these assumptions, the total yearly average for recreation/tourism based on the lake was estimated at 75%, while an estimated 25% of the yearly recreation/tourism activity is non lake-based.

The focus group looked at what factors would cause a reduction in recreation/tourism if the dam were removed:

1. Lake would be smaller with less room for water-based activities.
2. The unsightliness of the rock/boulder field between the old high-water mark and the new water line. This is already an issue at times, but only in late summer and is not as low as if the dam were removed.
3. Lack of access or difficult access to the water. Currently public boat docks do not function at total drawdown and would have to be fixed. Renovation would only improve access at public locations.
4. The conversion of irrigated green fields to dryland acres in the valley would decrease the area's scenic attraction.

The focus group estimate that visitors to the lake would be reduced by 22%.and that non-lake based visitors would be reduced by 5% This would result in an overall decrease in visitors to Wallowa County of 17.5%. *

* Lake based visitors $75\% \times 22\% = 16.5\%$ AND Non-Lake based visitors $25\% \times 5\% = 1\%$
THEREFORE $16.5\% + 1\% = 17.5\%$

The following economic sectors were defined as being impacted by recreation/tourism. The focus group estimated the % to which each sector was dependent on recreation/tourism. Off-season figures for occupancy/sales were used to estimate the amount of non-recreation dependant business. The total economic loss could be \$2,266,000.

Tourism/Recreation Summary

Sector	Total \$ of sector**	% dependant on Tour/Recreation	\$ Affected	\$ Reduction
General Merchandise Stores	\$3,602,000	12%	\$432,240	\$75,642
Food Stores	\$7,470,000	20%	\$1,494,000	\$261,450
Eating & Drinking Establishments*	\$6,365,000	45%	\$2,864,250	\$501,243
Misc. Retail*	\$3,913,000	50%	\$1,956,500	\$342,387
Hotels and Lodging	\$1,932,000	80%	\$1,545,600	\$270,480
Other accommodations	\$2,609,000		\$2,087,200	\$365,260
Amusement & Recreation	\$3,490,880	65%	\$2,268,500	\$396,987
Video and other Recreation	\$463,000	65%	\$300,950	\$52,666
Totals	\$29,844,880		\$12,949,240	\$2,266,115

* Varified by survey

** Draft Wallowa County Economic Structure: An Input-Output Analysis:

Effects to Land Values and Taxation

Market Value

The estimated loss of property value was calculated for the 13,000 acres that would lose irrigation water. The estimated land values were \$2,500 per acre for irrigated land and \$450 for dry land farm ground. The conversion of irrigated to dry land acres would decrease the market value of these 13,000 acres from \$32,500,000 to \$5,850,000, a net a decrease of \$26,650,000. Some of these acres may have a very short irrigation opportunity while the river flows are high in the spring. Since this timeframe is so short it is assumed that irrigators would not make the necessary repairs and upkeep on the infrastructure necessary to irrigate.

The City of Joseph would also see property value loss due to the drying up of irrigation ditches through or near many properties. It is estimated that 10% of the property in the City of Joseph would be negatively impacted by approximately a 20% decrease in market value. The 2003/2004 assessed value of property in the City of Joseph was \$55,081,387. If ten percent of the properties experienced a twenty percent reduction of in market value this would reduce total property value in Joseph to \$53,979,538, a net decrease of \$1,101,000

There would also be a reduction in property value of lake-front properties. There are 132 lake front properties on the west and north shores. It is estimated that the market value of these \$300,000 properties would be negatively impacted by approximately 35%. The total market value of these properties is estimated at \$39,600,000. Their property value would be reduced to \$25,740,000, a net decrease of \$13,860,000 of market value.

Reduction in Revenue - Taxes

Property taxes on Exclusive Farm Use lands are partially deferred with a farm deferral. Irrigated farmland worth \$2,500 per acre would pay taxes on approximately \$380 value. Dry land farm ground worth \$450 would pay taxes on approximately \$130 value. The difference between irrigated and dry land deferred value for farm ground would be \$320 per acre. For 13,000 acres this would be \$4,160,000 reduction of deferred value. The average rate per thousand in that area of the county is \$9.40 The actual annual tax loss to the combined county entities would be $\$9.40 \times 4160 = \$39,104$.

The City of Joseph would also see a decrease in taxes. This decrease was figured by multiplying the net decrease in land value of \$1,101,849 by the tax rate of \$12.40/\$1000 for a total decrease in annual tax revenue of \$13,662.

The lake-front property would also see a decrease in taxes. This decrease was figured by multiplying the net decrease in land value of \$13,860,000 by the tax rate of \$10.30/\$1000 for a total decrease in annual tax revenue of \$142,758.

This makes the combined tax loss to be \$195,000.

Scenario #2: Dam Rebuild

In general current existing conditions would continue unchanged under the dam rebuild scenario. Two changes that would result would be a short term economic boost during the planning/construction phase of dam rebuilding and the longer term economic benefit from the reintroduction of Sockeye and Coho. These fish would not be from stock that is listed under the Endangered Species Act, therefore they would not be listed fish.

Effects of Fish Reintroduction

In conjunction with the reconstruction of the dam, the Nez Perce Tribe is working to reintroduce two anadromous fish that are currently not present in the Wallowa River Basin. These are Coho and Sockeye salmon. Coho have not been present for many years. Remnants of the sea run Sockeye are present in Wallowa Lake as land locked Kokanee. The economic impacts are currently difficult to analyze. The potential benefits will be realized some years in the future, while the costs are mostly experienced in the near future. Costs would include the fish passage infrastructure at the dam, hatchery production and reintroduction costs. There may also be some loss to the current Kokanee

fishery that is currently available in Wallowa Lake. The future economic benefits come from the dollars spent by sport fisherman.

The Nez Perce Tribe's adult return goals for Sockeye and Coho from the original subbasin plans and the Tribal Recovery Plan (TRP) are:

Interim (or short term) adult return objectives for Wallowa Lake Sockeye are 2,500. Historically 24,000 -30,000 Sockeye returned to Wallowa Lake. The long-term goal for returns is 10,000 adult fish.

Interim (or short term) adult return objectives for Grande Ronde Coho are 3,500. Historically 20,000 Coho returned to the Grande Ronde system. Reintroduction could begin as soon as 2005. The long-term goal for return of Coho to the Grande Ronde (Wallowa River) is 7,000 adult fish.

Upon reaching these long term levels, the tribe hopes to have 2,000 returning fish of each of these species available for harvest.

Effects of Construction

The dam rehabilitation is currently estimated to cost \$7 million to \$8 million, including the planning and construction of the dam itself, the studies that will need to be completed and the fish passage required by law. The other costs (water transfer, hydro, state park rehabilitation, etc) shown in the other various phases of the project have not been included to simplify needed data collection. In no way are we suggesting that the larger project not be pursued.

The rehabilitation dollars would be captured to some degree in Wallowa County however, until more definite plans are available, the potential benefit to the local economy is difficult to quantify.

ⁱ Those giving input included:

Jim Dawson, ADC board member, irrigator
Rod Childers, Rancher, NRAC member, Stockgrower member
Lisa Dawson, Northeast Oregon Economic Development District
Matt Marmor, Wallowa County Emergency Program Manager
Steve Wolfe, Rancher, President of Wallowa County Farm Bureau
Perry Johnston, Rancher, Wallowa County Stockgrower member
Cynthia Warnock, SWCD manager, Rancher
Coby Menton, Grande Ronde Model Watershed monitoring coordinator
Mack Birkmaier, Rancher, ADC board member
Randy Wortman, member of Assessors office
Kevin Melville, Rancher, Wheat league president and Oregon Grains Commission member
Jeanie Mallory, Rancher, FSA office
Dale Baker, mobile slaughterer
Diane Snyder, Wallowa Resources, NRAC member
Vicki Rosgen, Wallowa County Chamber,
Chris Parkins and associate, Wallowa Lake State Park
Sara Miller, Northeast Oregon Economic Development District
Bruce Dunn, RY Timber, NRAC member
Tony Daggett, operator of the dam
James Yost, Rancher, irrigator
Tom Smith, NRCS
Leonard Post, Rancher, irrigator
Clarice O'Connor, realtor
Ira Jones, Nez Perce Tribe

Groups presented to and requested edits/input as review:

Wallowa County Natural Resources Advisory Committee
Wallowa County Natural Resource Technical Committee
Wallowa County Stockgrowers

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Department of Agricultural Resource Economics