FLORIDA MESA CANAL COMPANIES

PHASE I HYDROPOWER FEASIBILITY STUDY

Prepared for:

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Florida Mesa Canal Companies
Phase I Hydropower Feasibility Study

1.0 INTRODUCTION AND BACKGROUND

The Florida Mesa Canal Companies need to develop additional sources of revenue to assist with funding future costs associated with the improvements and ultimate replacement of the ditch network conveyance system components. One potential source for additional revenue is to develop hydropower resources and sell the power generated to the local electric company, La Plata Electric Association (LPEA). WWE considered ten locations for potential development of hydropower resources that could be utilized to provide additional revenue for the Florida Canal Companies. See Figure 1 for the locations of the drops considered.

Two of the sites considered were previously identified by the U.S. Bureau of Reclamation in a 1988 Rehabilitation and Betterment (R&B) Report. Excerpts from the R&B Report is included in Appendix A. At the time that the R&B Report was prepared, the location of nearby power to tie into and the economics of the project development versus revenue generated made the projects unfeasible. Changes in the potential revenue from the power generated and the location of nearby power grid suggest that the feasibility of developing these hydropower resources should be revisited. In addition, eight other sites have been identified as potential locations for development of hydropower.

2.0 LA PLATA ELECTRIC ASSOCIATION

WWE met with staff from LPEA regarding locations of existing power network, feasibility of selling power to LPEA, and the cost for infrastructure to connect to the power grid. An engineer at LPEA, Dan Harms, indicated that the minimum power that LPEA would be interested in is 25 kW. If the power generation is greater than 100 kW, LPEA would likely not purchase it; however, Tri-State Power could be a potential purchaser for power of this magnitude.

Mr. Harms reported that there is a substation located near Falfa, and connection to the power grid near this location would be easier than at locations further from Falfa, see Figure 1. Mr. Harms also suggested using a planning number of $0.05 per kW for power sales, which would include

Renewable Energy Credits (REC) available through the LPEA. This planning number is based on the contract that LPEA recently negotiated for purchase of hydropower generated at Lemon Reservoir.

Infrastructure required to connect the hydropower site to the existing LPEA system will include three phase power from the existing grid to the site, a transformer, and a meter. A specific meter is required to allow Florida Mesa Ditch Companies to meter and sell power to LPEA. LPEA will design and install electrical infrastructure to within 300 feet of the service, and the owner, Florida Mesa Ditch Companies in this case, is responsible for service beyond this point. Cost for installation of three phase power depends on the length of the power line and whether the power line is installed buried or overhead. A cost sheet for electric service lines is included in Appendix B. Please note that for three phase power, the costs do not include the transformer cost, which can be substantial (in the tens of thousands of dollars range).

3.0 HYDRAULIC CALCULATIONS

To estimate the potential revenue for each of the proposed locations, WWE performed preliminary power calculations using the following formula to estimate kW of power generation under ideal/ theoretical conditions:

$$\text{Power} = \Delta H * Q / 11.81$$

Where power is in kW, ΔH is the change in elevation or drop across the proposed penstock in feet, and Q is the flow in cubic feet per second (cfs). The change in elevation across the penstock is approximated using available La Plata County topography with 5 foot contours and field elevation approximations. The flows are based on a report entitled Florida Water Conservancy District Water Conservation and Management Plan which quantified the flows diverted to the Florida Mesa Canal Companies Ditches during average and dry years and information provided by ditch operators. The relevant tables from the Water Conservation and Management Plan are included in Appendix C. Minor losses and turbine efficiency losses are also factored into the power generation estimation. For the purposes of this Report, minor losses of 10 percent and efficiency losses of 30 percent were assumed.

Power generation is calculated for an average and a dry year based on flow in the ditch. The power generated is then multiplied by 24 to obtain the kW generated per day (assuming the hydropower turbine will operate 24 hours a day during the irrigation season). The total power generated over the irrigation season is calculated by multiplying the power per day by the number of days in the irrigation season, which is 153 days for an average year and 123 days for a dry year.

Finally, to calculate the total revenue that is anticipated from each hydropower site, the power generated per season is multiplied by $0.05 per kW.

4.0 FEASIBILITY ANALYSIS

WWE's feasibility analysis of each of the potential locations for hydropower development considered several factors including location, infrastructure improvement requirements, water yield, hydraulic elevation, proximity to existing electrical infrastructure, site access, water rights, environmental constraints, and potential revenue. This section provides a description of each alternative with respect to each of the considerations. For the purposes of this Report, land ownership was not considered. It is assumed that for most projects, the existing easements will be adequate to accommodate the hydropower infrastructure. Table 1 provides a summary of the power generation and revenue estimates for each alternative. Table 2 provides an alternatives analysis matrix to weigh the considerations and assist with identifying the most ideal location(s) for developing hydropower. A photo log of the hydropower sites considered is also included in Appendix D.

Florida Farmers Ditch West - North of Highway 160

Approximately 500 feet north of Highway 160 on the Florida Farmers Ditch West, there is an existing penstock that carries the ditch down a drop. This site is designated as Drop #1 on Figure 1. The penstock is a 36 inch diameter reinforced concrete pipe with an approximate length of 80 feet and an approximate elevation change of 20 vertical feet. This site is an ideal location for hydropower development because the penstock is already in place and a good amount of fall is available. An additional consideration for this site could be to extend the penstock downstream. This would allow for an additional 15 feet of drop and improve access to the turbine.

The average year flow on the Florida Farmer's Ditch West is approximately 22 cfs, while the dry year flow is approximately 10 cfs.

Existing LPEA electrical infrastructure is located approximately 500 feet from the proposed turbine location.

The site is accessible by a dirt road off of Highway 160; however, the proposed turbine location is in a small valley and would require some site work to access via vehicle.

If the turbine operates only during times when there would be water in the ditch as part of normal ditch operations, there would be no water rights implications associated with this alternative.

WWE does not anticipate environmental constraints associated with this alternative.

The turbine at this location is expected to produce approximately 22 kW during an average year and approximately 10 kW during a dry year. The expected revenue for an average and dry year is approximately $4,100 and $1,500, respectively.

Florida Ditch to Florida Farmers Ditch – South of Horse Gulch

One possible development site that was indentified in the R&B Report is located at approximately station 203+00 of the Florida Ditch, just south of where the Florida Ditch crosses County Road 237. This site is designated as Drop #2 on Figure 1. At this location the Florida Ditch is flowing on top of the Florida Mesa, while the Farmers Ditch is flowing down in the valley. The approximate head difference at the proposed drop location is approximately 130 vertical feet. One concept for this alternative is to increase the amount of water that is currently diverted to the Florida Ditch and decrease the diversion into the Florida Farmer's Ditch. Water could be released into the Farmers Ditch at station 203+00 of the Florida Ditch. This alternative would require enlargement of the Florida Ditch from the Farmers Ditch headgate to station 203+00, approximately 3.8 miles, in addition to a penstock to release water back into the Farmers Ditch.

The flow to be diverted to the Florida Canal is conceptualized to be 70 cfs during an average year and 50 cfs during a dry year.

The existing three phase power for the LPEA is located approximately 1000 feet (as the crow flies) from the proposed drop location.

The Farmer's Ditch at this location is adjacent and parallel to County Road 234. However, the terrain between the Florida Farmer's Ditch and the Florida Ditch is steep, rocky and wooded. Installation of the penstock would require a large disturbance area. In addition, the penstock and ditch enlargement may require easements, and access roads, or other infrastructure.

This alternative would also require changes to the point of diversion for the water rights in the Florida Farmer's Ditch.

WWE does not anticipate environmental constraints associated with this alternative, although the Bureau of Reclamation may impose reviews, including National Environmental Policy Act and archeological investigations, which would need to be further defined.

The anticipated power generation for this alternative is approximately 642 kW during an average year and 330 kW during a dry year. The revenue for this alternative is estimated to be approximately $85,000 during an average year and $49,000 during a dry year. However, the power generation by this alternative is greater than what the LPEA indicated they would be able to purchase at one location. Tri-State Power could be a potential purchaser for the power at this site. The proximity of the Tri-State Power grid and the willingness by the power company to enter an agreement for power sales with the Florida Ditch Companies needs to be further investigated.

In addition, although this alternative provides the opportunity for substantial revenue on a yearly basis, there is likely a substantially higher capital cost for infrastructure improvements for this alternative compared to other alternatives, including enlarging the Florida Ditch and installing a penstock and turbine in an undisturbed area, which could diminish the feasibility of this alternative.

Florida Ditch to Florida Farmers Ditch – North of Horse Gulch

Another potential location for a hydropower site could be approximately 2000 feet north of the previously described Drop #2, north of Horse Gulch and County Road 237. This location is at

approximately station 130+00 on the Florida Ditch and has the benefit over the previous alternative of requiring approximately 7300 lineal feet less of ditch enlargement. This location is identified as Drop #3 on Figure 1. The trade off to this alternative is that there is less available elevation drop at this location than at Drop #2, approximately 95 feet. Other aspects of this alternative compare similarly to the Drop #2. This alternative would require 2.5 miles of ditch enlargement and a penstock and turbine.

The existing LPEA three phase power is approximately 1000 feet from the proposed penstock and the turbine would be easily accessible by way of County Road 234.

Also similar to Drop #2 this location would require a change in point of diversion to allow the increased flow if the Florida Ditch.

The expected power generation from this alternative for an average and dry year is 338 kW and 241 kW, respectively. The expected revenue for this alternative would be approximately $62,000 for an average year and $36,000 for a dry year. As with the previous alternative, power sales to Tri-State Power and the significantly greater capital cost required for this alternative need to be further investigated.

Florida Ditch and Florida Farmers Ditch Downstream of Confluence

Approximately 500 feet south of the confluence of the Florida Ditch and the Florida Farmer's Ditch, there is another possible hydropower location. This location was also identified in the R&B Report and is shown as Drop # 4 on Figure 1. This location also has an existing penstock with an approximate drop of 15 feet.

The site is accessible via residential and ditch access roads. The average year flow through this portion of the ditch is approximately 110 cfs and the dry year flow is approximately 50 cfs.

Existing LPEA power is located approximately 700 feet from the proposed hydropower location and County Road 234.

If the turbine operates only during times when there would be water in the ditch as part of normal ditch operations, there would be no water rights implications associated with this alternative.

The expected power generation at this location for an average and dry year is approximately 84 kW and 64 kW, respectively. The expected revenue for an average year is $15,000 and for a dry year is $6,000.

Between Florida Canal and Pine Ditch Turnout

Between the beginning of the Florida Canal and the Pine Ditch turnout, there are five existing penstocks that could be suitable for hydropower. These locations are labeled Drop #5a – #5e on Figure 1. Each of these penstocks has an approximate elevation change of 10 feet. During an average year the flow is typically 160 cfs and during a dry year the flow is typically 100 cfs. Given the large flows in the Canal at these locations, even with only a small drop, there is a large potential power generation.

An added advantage of these locations is that they are relatively closer to the substation at Falfa than other previously described locations. Overhead three phase power is available approximately 1000 – 2000 feet from each of these drop locations. Underground three phase power is also available along Harmony Lane, which could be a viable tie in location for Drop #5e, which is approximately 1000 feet from the power line. The underground power line is owned by First National Bank and may require additional coordination to connect to.

Each penstock would be easily accessible by way of ditch maintenance roads along Florida Canal.

If the turbine operates only during times when there would be water in the ditch as part of normal ditch operations, there would be no water rights implications associated with this alternative.

The expected power generation during an average year is 81 kW for each drop, and during a dry year is 51 kW. Therefore, the average year revenue is $15,000 and the dry year expected revenue is $7,500. If all five of these drops were developed for hydropower generation, the expected revenue for an average and dry year would be $75,000 and $37,000, respectively.

Florida Canal Downstream of Overstagg Turnout

The final location considered for hydropower development is on the Florida Canal downstream from the Overstagg Ditch turnout. The existing 40 inch diameter penstock is approximately 220 feet long and has a drop of approximately 20 vertical feet. Approaching the penstock, the ditch as a relatively steep grade and approximately 300 feet upstream of the penstock, there is another existing drop of approximately 15 feet. The pipeline could be extended to gain more elevation change.

Existing electrical grid is less than 300 feet from the proposed penstock location and the site is very near the Falfa substation.

The penstock is accessible through existing residential roads off of County Road 221. However, the penstock outfall is in a small valley and is surrounded by trees, site work and potentially some tree removal may be required to install the penstock.

If the turbine operates only during times when there would be water in the ditch as part of normal ditch operations, there would be no water rights implications associated with this alternative.

If hydropower were developed at this site using the existing penstock, the expected power generation for an average and dry year would be 61 and 36 kW, respectively. The anticipated yearly revenue would be $11,000 for an average year and $5,000 for a dry year.

5.0 FUNDING OPPORTUNITIES

Micro hydropower is an emerging industry in Colorado and several funding avenues exist for development of projects. Potential funding sources could be USDA Rural Development, Colorado Water Resource and Power Development Authority (CWRPDA) or Colorado Water Conservation Board (CWCB). Each of these entities offer grants and/or loans for hydropower development, which could assist Florida Mesa Canal Companies. The following briefly describes loans and grants available through these entities.

Colorado Water Resource and Power Development Authority

CWRPDA designates small hydropower projects as those producing 5 megawatts (MW) or less and offers loan and grant opportunities through the State Revolving Fund. The CWRPDA has funding available for small hydropower projects, with loan terms of 20-years, 2 percent interest rate, and up to $2 million in project amount. The CWRPDA also offers up to $15,000 in grant matching funds to be used for feasibility studies. The annual budget available for grant matching funds is currently $150,000.

Historically neither the loan nor grant funding allocated for small hydropower development has been utilized within its one year budget period. Irrigation districts and conservancy districts are eligible for these loan and grant funds. As of May 2011, the available program loan capacity is $6.8 million through this funding avenue. Upon approval of the project loan by the CWRPDA board the borrower has six months to execute the loan.

Colorado Water Conservation Board

The CWCB has loans available for development of small hydropower facilities; however, no grants are available. For 2011, the CWCB has $20 to $25 million available and hydroelectric projects are eligible for these loans.

The minimum loan amount for CWCB project is $100,000. The loan terms provided by the CWCB for an agricultural user are an interest rate of 2.75 percent and a loan period of 30 years. The loans can be used to cover 90 percent of the total project cost. CWCB loans include a 1 percent loan service fee.

The loan application requirements include a loan feasibility study which describes in detail the financial and technical considerations of the hydropower project. Examples of a loan feasibility study are available on the CWCB website. Loan requests for projects under $10 million are accepted six times per year and approved at the CWCB bimonthly meetings. Applicants should allow 5 months for loan approval and loan contracting.

USDA Rural Development

Grants and loans for hydropower projects are also available through USDA Rural Development. Eligible borrowers through the USDA are agricultural producers or rural small businesses. It would need to be confirmed that the Florida Mesa Canal Companies are eligible for these loans and grants. Guaranteed loans and guaranteed loan/grant combinations are available up to 75 percent of eligible project costs, with the maximum loan amount of $25 million available. Grants are limited to 25 percent of eligible project cost, not to exceed $500,000 for renewable energy and $250,000 for energy efficiency projects. Interest rates for USDA loans are negotiated between the lender and the borrower and may be fixed or variable. Loan terms for hydropower development would likely be 20 years. Application requirements for projects less than $600,000 are of a simplified version.

Application requirements include an environmental report, a technical report/energy audit, and a feasibility study.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Table 2 has been prepared to quantify the considerations of each alternative. The table assumes that each of the considerations is equally weighted and assigns a numeric value, 1 to 5, to each alternative for each consideration. For the purposes of the analysis, 1 is considered good/desirable and 5 is considered poor/undesirable. The considerations included in the alternatives analysis include:

- Infrastructure requirements
- Proximity to Falfa
- Proximity to electrical grid
- Site access
- Water rights
- Power yield/revenue

The alternatives analysis indicates that with a score of 11, the most ideal alternatives for hydropower development would be Drop #6 on the Florida Canal Downstream of the Overstagg turnout or one or more of Drops #5a – 5e between the confluence and the Pine Ditch.

To further refine the alternatives analysis, the table could be modified to assign weights based on importance of each of the considerations, for example placing higher importance on revenue than proximity to Falfa. Further analysis of each consideration should be performed to refine the decision matrix. In particular, a detailed capital cost analysis should be prepared for each alternative.

WWE recommends that as the next steps, Florida Mesa Canal Companies should develop preliminary capital costs, meet with LPEA regarding the top candidates for hydropower development, and develop a preliminary design for the site(s).

In addition, funding sources as described in the previous section should also be further investigated with respect to implementation of hydropower for Florida Mesa Canal Companies. Consideration to the amount of funding (loans and grants available) and the application requirements should be elaborated upon.

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TABLE 1 - Phase I Hydropower Feasibility Study
Estimated Annual Power and Revenue Generation

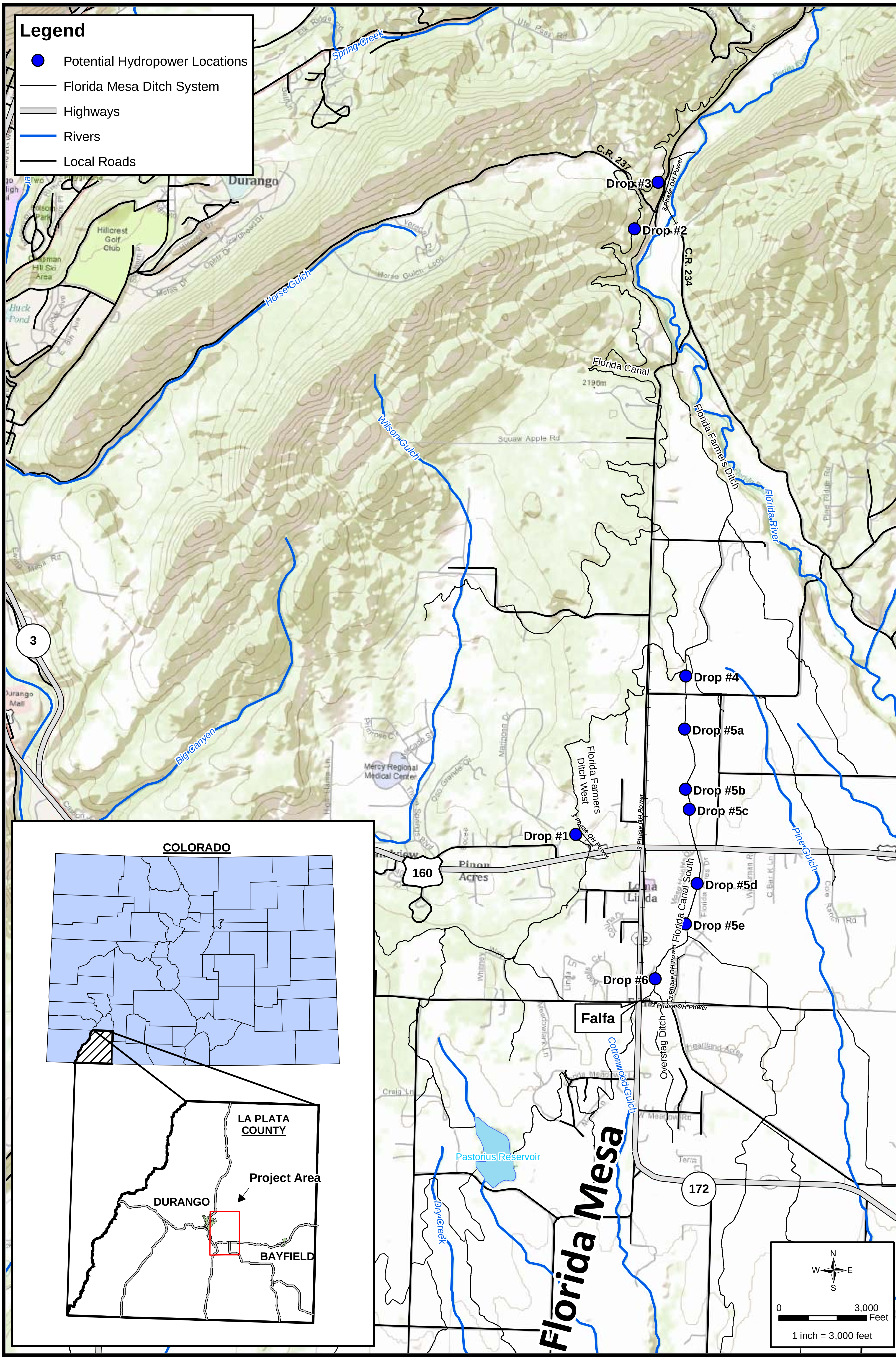
Average year season	May 15th - October 15th	153 days
Low year season	May 15th - September 15th	123 days
Revenue/kw	$0.05	

			Average Year						Dry Year					
Drop #	Site	Hydraulic Elevation Change	Flow	Power*	Including losses**	Power/Day	Power/Year	Revenue	Flow	Power*	Including losses**	Power/Day	Power/Year	Revenue
		(feet)	(cfs)	(kW)		(kW)	(kW)	($/yr)	(cfs)	(kW)		(kW)	(kW)	($/yr)
1	Florida Farmers Ditch West approximately 100 feet north of HWY 160	20	22	37.3	22	536	82,084	$4,104	10	16.9	10	244	29,995	$1,500
2	Florida Ditch to Florida Farmers - South of Horse Gulch	130	70	770.5	462	11096	1,697,639	$84,882	50	550.4	330	7925	974,835	$48,742
3	Florida Ditch to Florida Farmers - North of Horse Gulch	95	70	563.1	338	8108	1,240,583	$62,029	50	402.2	241	5792	712,379	$35,619
4	Downstream from confluence of Florida Ditch and Florida Farmers Ditch	15	110	139.7	84	2012	307,814	$15,391	50	63.5	38	914	112,481	$5,624
5a - 5e	5 locations on Florida Canal between confluence and Pine Ditch turnout - each	10	160	135.5	81	1951	298,486	$14,924	100	84.7	51	1219	149,975	$7,499
	Total if all 5 are developed							$74,622						$37,494
6	On Florida Canal downstream from Overstagg turnout	20	60	101.6	61	1463	223,865	$11,193	35	59.3	36	854	104,982	$5,249
	Total							$252,221						$134,227

* Power = Hydraulic Elevation Change * Flow / 11.81
** Losses assumed from minor losses through penstock (10%) and efficiency losses through turbine (30%)

Table 2
Alternatives Analysis Matrix

Drop #	Site	Infrastructure Requirements	Proximity to Falfa	Proximity to electrical grid	site access	water rights	power yield/revenue	Total
1	Florida Farmers Ditch West approximately 100 feet north of HWY 160	2	3	3	4	1	4	17
2	Florida Ditch to Florida Farmers - North of Horse Gulch	5	5	3	4	3	1	21
3	Florida Ditch to Florida Farmers - South of Horse Gulch	5	5	3	4	3	1	21
4	Downstream from confluence of Florida Ditch and Florida Farmers Ditch	2	3	3	1	1	3	13
5a - 5e	5 locations on Florida Canal between confluence and Pine Ditch turnout - each	1	2	3	1	1	3	11
	Total if all 5 are developed	4	2	3	1	1	2	13
6	On Florida Canal downstream from Overstagg turnout	2	1	2	2	1	3	11



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LA PLATA COUNTY, COLORADO

POTENTIAL HYDROPOWER LOCATIONS

FLORIDA MESA CANAL COMPANIES

Project No.	DRAFT FIGURE
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APPENDIX A
Excerpt from 1988 Rehabilitation and Betterment Report

No M&I purpose was included in the project repayment contract. Project water could be used for M&I service, but not without a significant investment in time and paperwork. Modification of the existing repayment contract, a new contract, measurement of saved water, a conservation plan, and other matters could arise during the conversion process. Adjudicated water could be used for M&I service, but water rights would have to be acquired under one entity and storage would be needed.

Water in the project area is inexpensive and plentiful. The presence of a highly subsidized irrigation project has lowered the cost of water, and provided a more reliable supply, thus reducing its intrinsic value and the need to conserve. Water surpluses in recent years have aggravated the situation.

The majority of water users on the project are part-time farmers or subdivisions. For these smaller ownerships, net farm income does not always support the owner. In many cases, non-farm income subsidizes the farming operation. Part-time operations are characterized by low efficiencies, and commodities grown in the area have relatively low value. These conditions encourage waste and reduce willingness to pay for improvements to ensure water delivery.

Over 40% of the accounts served within the project area are 10 acres or less in size. These "subdivisions" are receiving water at irrigation rates. Over the long term, small tract service is being subsidized by the larger tracts. Account charges are not being used on the project.

The administrative structure for the project could be more efficient. The FWCD currently distributes a portion of the funds collected through their taxing authority to four separate canal companies. The canal companies use these funds and separate assessments to operate and maintain the canal system. The existence of five entities causes duplication of secretarial, supervisory, insurance, and supply costs which could be reduced if combined under one administration.

Hydropower Generation Potential

In 1985 the FWCD contracted for a feasibility study of hydropower at Lemon Dam. The study resulted in a recommendation to install a 110 kW turbine and generator on an existing bypass pipe in the gate chamber of the dam. The bypass pipe would provide flows ranging from about 9 to 13 cfs under static heads of 90 to 160 feet, respectively. The power plant would generate an average of 750,000 kW per year with an average annual revenue of $25,600. The FWCD is pursuing development of this power plant and is presently negotiating a lease of power privilege contract with the United States. Funding of the $175,000 power plant is presently being pursued through the Colorado Water Resources and Power Development Authority (CWRPDA).

Investigations indicate two sites for potential hydroelectric power generation exclusive of Lemon Dam. A large number of elevation drops are found throughout the distribution system, but most of them would be incapable of generating enough power to be commercially marketable.

One possible development site is located on the Florida Canal at Sta. 203+00. This alternative would include enlarging and concrete lining of the canal from Sta. 0+00 to 203+00, increasing the capacity from 80 to 150 cfs. Increased diversion into the Florida Canal could be accompanied by decreased diversion into the Florida Farmer's Ditch, allowing total project river diversions to remain unchanged during the irrigation season. Water would be released from the Florida Canal at Sta. 203+00 through a penstock to the Florida Farmer's Ditch. A maximum of about 120 cfs could be released for up to 60 days per year. Flows would be reduced with the seasonal demands. The available elevation head is about 130 feet. Maximum potential plant capacity could exceed 1,200 kW. Assuming a 60-day operating period at the 120 cfs release rate, about 1,500,000 kW could be generated. Some additional power could be generated from reduced releases during the remainder of the irrigation season. Annual gross revenue would be about $52,500 if the power generated during the 60-day period could be sold at $.035/kW.

Another potential site is located at the junction of the Florida Canal and the Florida Farmer's Ditch. The available elevation head is estimated to be 20 feet with a maximum flow of about 230 cfs. Average flow for a given 60-day period is estimated to be about 125 cfs. Maximum potential plant capacity could exceed 200 kW. About 275,000 kW could be generated during the assumed 60-day operation period. Additional power could be generated from reduced releases during the remainder of the irrigation season. Annual gross revenue would be about $9,600 for the 60-day period, assuming the power could be sold for $.035/kW.

FWCD's plan to retrofit Lemon Dam with a hydroelectric plant is the best choice of available hydropower options. The hydropower sites identified on the canal system should be investigated as alternatives to the Lemon Dam proposal. The major disadvantage of these sites would be the seasonal irrigation flows. Expensive improvements to the Florida Canal would also be required for one of the options. The site identified at Station 203+00 of the Florida Canal appears to be the best option using canal flows. Additional flexibility and power generation may be possible if diversions could be returned to the Florida River instead of the Florida Farmer's Ditch. This would allow the possibility of longer operation periods and greater available head. The effects on the Florida River and downstream users would need to be evaluated.

drop to Florida River

Instead a summary of the alternatives, then explain the details

DESCRIPTION OF PROPOSAL

Improvements to Existing Facilities

A water supply analysis has shown that excess water is diverted through the project area for non-beneficial use. The canal system is occasionally unable to meet peak demands even though over 10 percent of the lands are sprinkler irrigated, smaller tracts are more prevalent, and over 4,000 acres of irrigable land are not in production. It is imperative that the FWCD improve the existing delivery system to reduce losses and avoid excess diversions. The excess water, now wasted, could be used to meet demand for M&I water, irrigation water, and extra water during drought periods.

this has already been stated

1.5 seasonal

Maintenance program

Reclamation recommends the four separate canal companies be dissolved in favor of one district administration. An estimated savings of $8,400 per year could be realized by combining and eliminating duplication of bookkeeping, secretarial, supervisory, legal, insurance and miscellaneous expenses.

The FWCD should investigate purchasing or leasing of basic maintenance equipment, including a D4 crawler tractor, backhoe-front loader, equipment trailer, 6-yard dump truck and weed spraying equipment. Purchase of this equipment would virtually eliminate the present practice of contracting out all maintenance at hourly rates. Purchase of used equipment is advised because there is a current surplus at reasonable prices. Total cost of used equipment is estimated to be $75,000, equivalent to an annual cost of $3,750, if financed at no interest for 20 years. Operator costs are estimated to be $4,000 annually. Maintenance costs are estimated at $5,000 annually. Total annual equipment cost would be $12,750. Total maintenance expenses including materials are presently averaging $70,000 annually. Leasing or scheduled maintenance using a competitive bidding process could also be a less expensive option than the present arrangement.

Summarize as part of proposal cost.

Reclamation prepared an estimate of the proper spending level for existing O&M responsibilities. This estimate shows present expenditures should be increased by about $1.70 per acre, primarily to enhance maintenance activities on the delivery system. Reserve fund contributions would also need to be increased by $0.40 per acre.

Hydropower generation

The Lemon Dam hydropower proposal is the only option recommended at this time. Further study of the Florida Canal sites should be conducted. The debt service requirements on the Lemon Dam proposal combined with other recommended improvements will consume most of the district's amortization capacity.

Cost Estimates

The total estimated costs of the recommended proposal are summarized in the following table. All estimates were prepared at the appraisal level with allowances of 10% for unlisted items and 20% for contingencies. The amounts shown are rounded to the nearest thousand dollars.

Show on table

APPENDIX B
LPEA Cost Sheet

Ballpark Costs for UG/OH Line Extensions

5/3/2011

Distance	Underground	Ballpark	Overhead	Ballpark
Single Phase				
Up to 660'	$18.21/ft.	17A	$16.23/ft.	17B
660' to 1320' (1/4 mi.)	$12.77/ft.	18A	$12.02/ft.	18B
1320' (1/4 mi.) to 1980'	$11.87/ft.	19A	$10.61/ft.	19B
1980' to 2640' (1/2 mi.)	$10.72/ft.	20A	$9.91/ft.	20B
2640' (1/2 mi.) to 3300'	$10.60/ft.	21A	$9.49/ft.	21B
3300' to 3960' (3/4 mi.)	$10.06/ft.	22A	$9.69/ft.	22B
3960' (3/4 mi.) to 4620'	$10.06/ft.	23A	$9.42/ft.	23B
4620' to 5280' (1 mi.)	$9.72/ft.	24A	$8.86/ft.	24B
Three Phase				
Up to 660'	$38.12/ft.	26A	$20.65/ft.	26B
660' to 1320' (1/4 mi.)	$30.03/ft.	27A	$15.82/ft.	27B
1320' (1/4 mi.) to 1980'	$29.56/ft.	28A	$14.20/ft.	28B
1980' to 2640' (1/2 mi.)	$27.65/ft.	29A	$13.39/ft.	29B
2640' (1/2 mi.) to 3300'	$27.84/ft.	30A	$13.37/ft.	30B
3300' to 3960' (3/4 mi.)	$26.86/ft.	31A	$13.73/ft.	31B
3960' (3/4 mi.) to 4620'	$27.11/ft.	32A	$13.50/ft.	32B
4620' to 5280' (1 mi.)	$26.41/ft.	33A	$12.74/ft.	33B

NOTE: Three phase costs do not include material cost for transformer(s).

These figures are ballpark costs only. Costs for acquisition of Rights-of-Way and/or special equipment are not included. The customer is responsible for providing the trench and backfill for all new underground line extensions. LPEA will provide required service equipment. Upon receipt of a completed application and payment of the applicable design fee, the assigned Staking Engineer will determine an actual cost.

A construction credit will be applied as payment toward the construction cost for those services classified as Permanent per LPEA's current Service Extension Policy. Any remainders (over the construction credit) are non-refundable.

Refunds of construction costs for those services classified as Indeterminate will be made in accordance with LPEA's current Service Extension Policy.

It is necessary that any required costs per LPEA's current Service Extension Policy be paid in advance of the release of construction drawings to the Operations Department.

APPENDIX C
Partial Table 10 Excerpted From Florida Water Conservancy District

Water Conservation and Management Plan

TABLE 10 (Continued)
FWCD Water Conservation and Management Plan
Reservoir Release and Diversion Data

2001 (Avg Year)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Dam Release			Farm Turnout			Efficiency		
	Adjudicated Water	Project Water	Total	Adjudicated Water	Project Water	Total	Adjudicated Water	Project Water	Total
January			-			-			
February			-			-			
March			-			-			
April			-			-			
May	8,267		8,267	8,267		8,267	100%		100%
June	11,960	2,657	14,617	10,070	2,237	12,307	84%		84%
July	3,003	9,908	12,911	2,571	8,481	11,052	86%	86%	86%
August	5,335	2,407	7,742	4,663	2,104	6,767	87%	87%	87%
September	776	7,850	8,626	605	6,123	6,728	78%	78%	78%
October		3,135	3,135		2,445	2,445		78%	78%
November		772	772		595	595		77%	77%
December			-			-			
Annual Total	29,341	26,729	56,070	26,176	21,985	48,161	89%	82%	86%

TABLE 10 (Continued)
FWCD Water Conservation and Management Plan
Reservoir Release and Diversion Data

2002 (Dry Year)	(1)	(2)	(3)	(7)	(8)	(9)	(7)	(8)	(9)
	Dam Release			Farm Turnout			Efficiency		
	Adjudicated Water	Project Water	Total	Adjudicated Water	Project Water	Total	Adjudicated Water	Project Water	Total
January			-			-			
February			-			-			
March			-			-			
April			-			-			
May	3,277	7,642	10,919	2,280	5,317	7,597	70%	70%	70%
June	524	4,158	4,682	371	2,946	3,317	71%	71%	71%
July	498	781	1,279	350	548	898	70%	70%	70%
August	6	-	6	5	-	5	83%		83%
September	6	-	6	5	-	5	83%		83%
October		956	956		671	671		70%	70%
November		298	298		209	209		70%	70%
December			-			-			
Annual Total	4,311	13,835	18,146	3,011	9,691	12,702	70%	70%	70%

APPENDIX D
Photo Log

Photo Log for Florida Farmers Ditch Company – Hydropower Taken 5/5/11

Photo 1 Drop #1 – Penstock outfall.

Photo 2 Drop #1: Penstock inlet.

Photo 3 Drop #1: 36-inch Ø RCP penstock – 80’ long, 20 foot fall.

Photo 4 Drop #1 – Penstock inlet.

Photo Log for Florida Farmers Ditch Company – Hydropower Taken 5/5/11

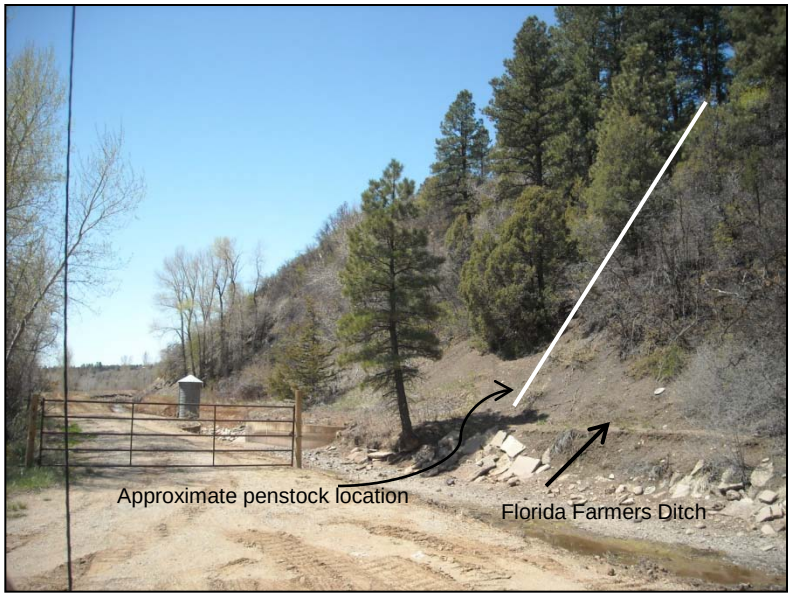

Photo 5 Drop #3.

Photo 6 Drop #4. Downstream of confluence – looking south on Florida Canal.

Photo 7 Drop #4. On walkway looking north toward confluence.

Photo 8 Drop #4. Downstream of confluence, looking south.

Photo Log for Florida Farmers Ditch Company – Hydropower Taken 5/5/11

Photo 9 Drop #4. Penstock at confluence representative of penstocks for Drops #5a,-5e as well.

Photo 10 Drop #4. Outfall of penstock downstream from confluence.

Photo 11 Drop #6. Downstream of Overstagg Turnout, inlet.

Photo 12 Mankiller inlet. 40” Ø pipe, 120’ long 20’ drop.

Photo Log for Florida Farmers Ditch Company – Hydropower Taken 5/5/11

Photo 13 Drop #6. At drop downstream from Overstagg.

Photo 14 Drop #6. Looking upstream downstream from Overstagg Ditch.

Photo 15 Drop #6. Looking west toward outlet.

Photo 16 Outlet of penstock.

Photo Log for Florida Farmers Ditch Company – Hydropower Taken 5/5/11

Photo 17 Drop 6 Outlet.

Photo 18 Drop #6. Downstream of drop.