

2011 City Council Retreat

City of Longmont

Public Works and Natural Resources Department

February 12, 2011



Button Rock Preserve Forest Stewardship Program & Windy Gap Firming Project

Purpose Statement: The purpose of this retreat topic will be to provide Council with a brief update of two of the City’s ongoing raw water system planning and action programs. The first program that will be reviewed is the Button Rock Preserve Forest Stewardship Program. Staff will update City Council on the program; the desired outcomes from the program; progress achieved to date; partnerships and coordination with surrounding agencies and property owners; and program funding. At the conclusion of the update, staff will ask City Council for any additional direction you would like to provide as well as a confirmation that the appropriate level of forest management is occurring.

This topic will also provide Council with an overview of the City’s Raw Water Master Planning; the latest update regarding the status of the Windy Gap Firming water storage project; and discussion of work underway to evaluate the City’s participation level in the project. Additional input on this subject will be invited from City Council, however any decisions on future participation will occur at a future time after these study efforts are completed.

Possible guest presenters will be invited to add additional perspectives on these issues.

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Button Rock Preserve Forest Stewardship Program

Introduction

The Public Works and Natural Resources Department has been performing management and land preservation efforts at Button Rock Preserve since the area was first acquired by the City. As a result of significant impacts to various watersheds from forest fires and due to drought conditions in the early part of this decade, Longmont began formal forestry stewardship activities at Button Rock Preserve area in 2003. As those efforts have progressed, staff has updated City Council on a number of occasions. At this time, it is requested that City Council review this program and provide staff any input you may have with current efforts.

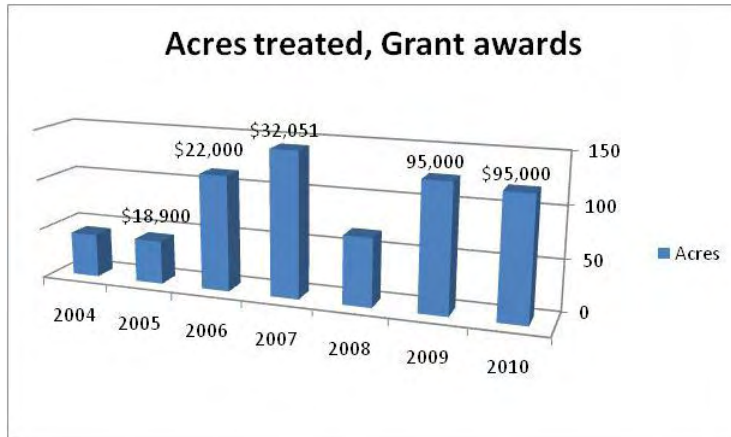
Background

At the March 2003 Water Board meeting, staff proposed the development of a formal forest health management plan for the Button Preserve Watershed area. Water Board concurred with the concept and recommended moving forward. During the spring and summer of 2003, Button

Rock Preserve staff and Blue Mountain Environmental Consultants gathered natural resource data and conducted field studies to develop and produce the Button Rock Preserve Forest Stewardship Plan. At the September 30, 2003 City Council meeting, staff presented the Forest Stewardship Planning document, which outlines forest resource management strategies and goals for 20 years and beyond. City Council adopted this plan and



directed staff to proceed with the document's forestry prescriptions. Those prescriptions include thinning of timber, noxious weed management, and wildlife habitat preservation; all of which are intended to preserve and improve local watershed resource health. Since that time, staff has been working in cooperation with the local Colorado State Forest Service office to annually apply for matching federal and state grant funding. Using awarded grants and city match funds, from October 2003 through November 2010, City staff completed thinning a total of 655 acres of forested terrain near Button Rock Dam and lands surrounding Ralph Price Reservoir including a two mile wildfire fuelbreak along the Cook Mountain perimeter road. Grants awarded in 2010 for 2011 projects will enable thinning of an additional 130 acres of preserve forest lands adjacent



to Ralph Price Reservoir and along the west boundary of the city property. The City’s efforts to implement the Forest Stewardship Plan began by preparing a forest thinning demonstration area along a well traveled visitor path to help educate and inform area recreationists of the restoration work in the preserve. After that, the next forest thinning locations were prioritized to

maximize benefit to Ralph Price Reservoir, Longmont Dam and city lands adjacent to private property. Since that time, the neighboring private landowners have started to mitigate their forest acreages to improve health thus complimenting the work we began in 2004.

History

Upon completion of Button Rock Dam and the filling of Ralph Price Reservoir, the city began to restore the landscape and natural resources impacted by the dam construction process. The terrain was contoured to minimize erosion, meadows reseeded and several forest areas replanted with seedling trees. Regulations were established with an emphasis on protection and preservation of the resources while providing low impact recreational opportunities to the public consisting of fishing, hiking, rock scrambling, and nature viewing. For the next 20 years, meadow areas of the preserve were available for cattle grazing and fuelwood gathering in the forests following a pine bark beetle outbreak. The grazing and fuelwood gathering was discontinued around 1985, while the recreational management maintained its resource protective objectives. The forested areas had been given the ability to regenerate robustly from 1969 through 2002 as naturally occurring wildfires were immediately extinguished and thinning new growth trees was not pursued. During that period, forest health was maintained through removal of dead trees resulting from insect infestation, disease and drought.

In 2002, over 502,000 acres of Colorado forests burned, as low fuel moisture and high fuel continuity contributed to a record wildfire season. Included in that total was 4,900 acres of forest located 1 mile north of Button Rock Preserve near Big Elk Meadows. It was apparent that local Ponderosa pine restoration was needed to return forests to an ecologically sustainable condition and to reduce the hazard of catastrophic fire and insect epidemics. Statewide efforts had begun in earnest to improve forest conditions. City staff desired to preserve and protect the biological integrity and watershed function of the Button Rock Preserve through the development and implementation of a Forest Stewardship Plan. Of primary concern were the needs to reduce the

risk of catastrophic wildfire, control noxious weeds, forest disease and insect epidemics while protecting the raw water supply and wildlife habitat. An ecologically based management approach which blends the needs of the facility, wildlife and visitors with the environment in a way that promotes a healthy and sustainable ecosystem was pursued. The city enlisted the assistance of Blue Mountain Environmental Consultants to conduct research and perform field studies, then compile data of existing preserve natural resources. They were also charged with providing the document for guidance of healthy forest management and noxious weed control in a manner which would minimize disturbance to wildlife habitat. The forest thinning restoration goals for Button Rock Preserve were based on guidelines established by US Forest Service research recommendations for Front Range Ponderosa pine forests. The thinning prescriptions also followed directives outlined within the Colorado State Forest Service Firewise Program and Community Wildfire Protection Plan models. The following themes were incorporated:

- Create clearings ranging in size from 1 to 10 acres, amounting to 15 to 25% of the landscape.
- Major reductions in Ponderosa Pine tree density was needed, especially in small diameter classes, resulting in canopy covers of 10 to 30% over most of the landscape.
- Most Douglas-fir should be removed, except on northern slopes, where they should be thinned.
- Old trees (> 200 years) need to be retained.
- Fire should be re-introduced to minimize in-growth of new trees, maintain low forest density, thin Douglas-fir, and reduce fuels.
- Implement forest prescriptions on 75 to 125 acres annually.

Since 2003, the city has thinned 655 acres of forest, returned meadows to historical open tree canopies and created a two mile fuel break on the north, east and west side of Cook Mountain. An average 93 acres of treated forest per year has occurred since beginning the restoration. The management units with individual timber thinning prescriptions are delineated within the Forest Stewardship planning document. Cutting boundaries are annually prioritized by staff, and then each removal tree is marked with a paint spot. The timber is cut down by contracted labor. Leftover tree limbs and wood product are chipped, piled, or removed by staff, with the assistance of the Boulder Youth Corps and the Longmont Youth Community Services program. Fuelwood is hauled to the preserve parking area where it is available for free to the public.

Button Rock Forest Stewardship Costs 2004-2010

Year	City Payroll	Youth Corps	Equipment use	Mtn High Tree	Supplies	Year Totals	Grants	Net Cost City
2010	14930.80	22300.00	8698.20	89650.00	476.05	136055.05	-69628.00	66427.05
2009	7690.00	18943.75	2650.00	85965.00	172.41	115421.16	-60372.00	55049.16
2008	21002.34	10500.00	1200.00	28000.00	233.94	60936.28		60936.28
2007	36009.35	10500.00	4879.00	12000.00	1022.37	64410.72	-32051.00	32359.72
2006	19447.44	10500.00	6812.00	48650.00	950.92	86360.36	-22000.00	64360.36
2005	17757.61	10500.00	4691.00		1577.60	34526.21	-18900.00	15626.21
2004	3491.08	5250.00			56.85	8797.93		8797.93
Totals	120328.62	88493.75	28930.20	264265.00	4490.14	506507.71	-202951.00	303556.71

- 655 acres of forest thinned in seven years
- Average of 93 acres improved each year
- 620 cords of fuelwood removed from watershed
- 1200 yards of slash chipped, piled or scattered
- \$773 per acre average cost to mitigate forest
- \$463 per acre average cost to city after federal grant reimbursements

The Water Resources budget annually includes \$30,000 for the Forest Stewardship work, \$22,000 for Boulder County Youth Corps, \$5,000 directed towards noxious weed management, and \$5,000 - \$10,000 of in-kind staff time for assistance to and management of the forest program. These sources can be used as matching funds with the awarded grants when work is performed on the grant projects.

As we begin the 8th year of the stewardship effort we will continue to proceed thinning additional acreages of preserve forests. We will also begin returning to the areas first mitigated to assess additional thinning needs and to perform annual forestry maintenance efforts insuring the prior work completed is maintained into the future.

Catastrophic Wildfire Costs

Forest restoration and wildfire mitigation efforts cannot prevent wildfire from occurring. Human related caused fires and lightning can ignite flames in forested areas. The timber thinning efforts underway reduce understory which helps to prevent fire on the ground from spreading to the tree canopy and remove a large percentage of wood fuels from the forest which lessens wildfire ash and debris. They also create healthier timber stands which enable the remaining trees to grow more robust providing a better chance of surviving low level fires. Cost of landscape and watershed reclamation after a major wildfire varies greatly. Each area to be reclaimed is unique and needs to be recovered quickly. Severely burned areas need reseeding, removal of debris, construction of rainfall erosion control structures in drainages, and mulching of the landscape. The costs can range from \$500 per acre for reseeding to over \$5,000 per acre for after fire mitigation dependent upon topography and proximity to water supplies.

The farther the wildfire is from a reservoir, the greater the opportunity for natural processes to control the potential fire impacts. However, large rain events after a fire can carry debris great distances to downstream reservoirs. Wildfire debris flows can render reservoir water supplies unusable until cleanup is achieved. Temporary loss of usage of our primary water storage area warrants consideration when evaluating total water storage needs for the City.

Analysis of Impacts on Longmont

Reviewing the St Vrain Watershed Basemap on page 9 one can see that the Button Rock Preserve has narrowly avoided the catastrophic wildland fire scenario that occurred at Fourmile Canyon in the fall of 2010. The fire suppression for that fire alone cost \$10 million with the loss of 357 structures including 170 homes. With a very significant increase in Pine Beetle activity in Boulder County in 2010 the likelihood of such an event certainly increases. Staff has included a general overview of options for the continued Forest Stewardship Program at Button Rock:

Option 1 - A more aggressive approach with implementation of forest thinning:

- Larger cutting units typically cost less per acre as load-in and gear-up costs can be combined.
- Initial restoration completed ahead of scheduled implementation.
- Quicker reduction of forest fuels.
- Greater impacts to landscape as crews remain longer in area each season.
- Wildlife has less opportunity to move about within Preserve and may seek habitat outside boundaries.
- May need to temporarily close areas to public visitation.
- Additional city staff may be needed to manage the efforts.
- Reduces time available to monitor and upkeep previously thinned areas.

Option 2 - A less aggressive approach with implementation of forest thinning:

- Smaller cutting units typically cost more per acre.
- Initial restoration completed behind scheduled implementation.
- Slower reduction of forest fuels
- Less annual costs to city

Option 3 - Continuing as scheduled in planning document:

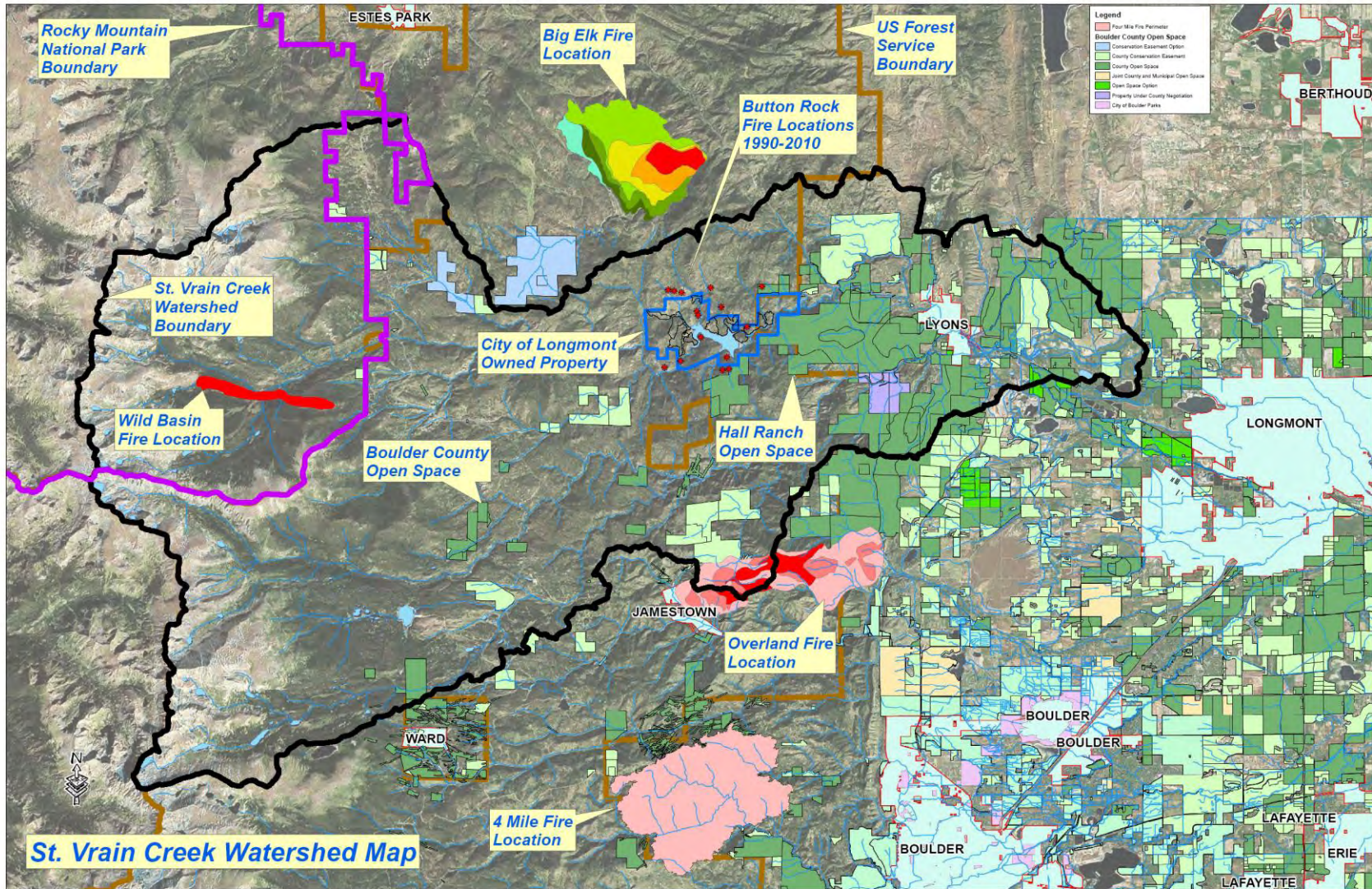
- The scheduled pace for implementation was based on many aspects including Best Management Practices, landscape natural recovery processes, wildlife interaction, noxious weed migration, anticipated staffing and funding available.

- At the current rate of implementation, visitor activity, wildlife disturbance, and resource damage has been minimized.
- Enables staff time to monitor and upkeep previously thinned areas while continuing to move forward into new locations.
- Current city funding has balanced well with grant awards available in the local region.

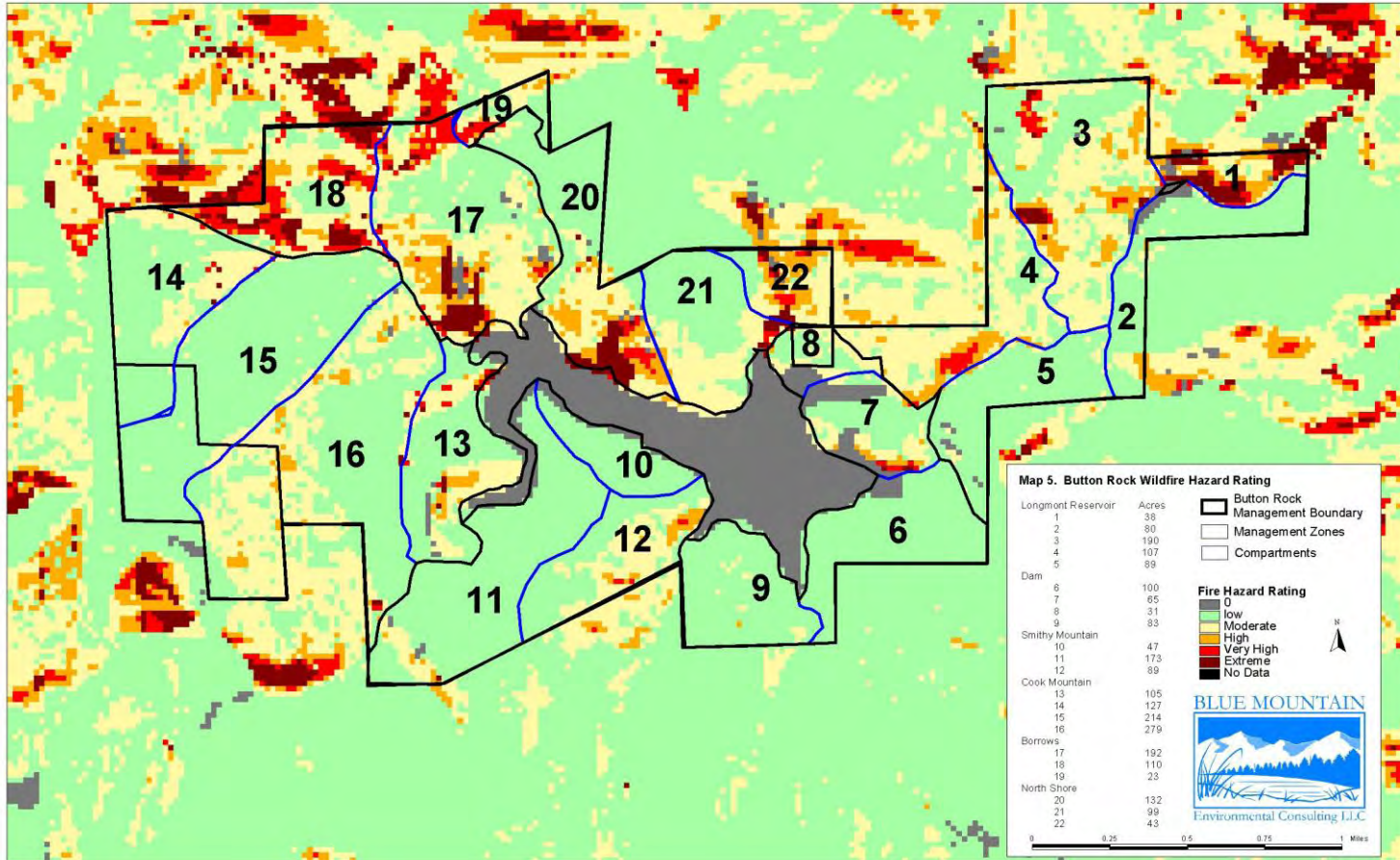
Questions and Considerations

Staff would like to discuss the direction for ongoing implementation of the Button Rock Forest Stewardship Program with City Council. Specifically:

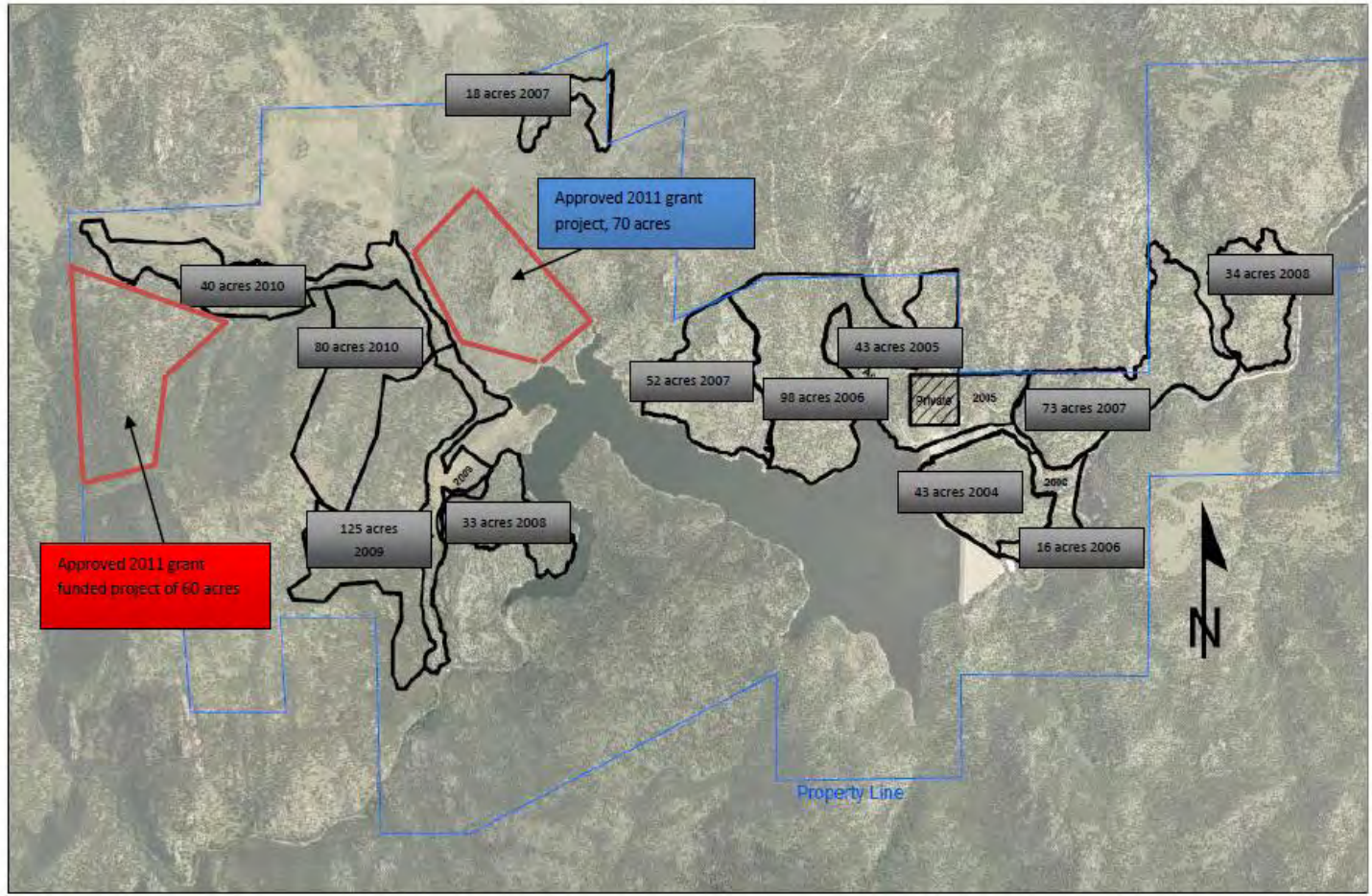
- Is the current level of Forest Stewardship at Button Rock Preserve appropriate, or should the City be increasing or decreasing that level of effort?
- Should the City be increasing its efforts to team with other land managers in the Saint Vrain Creek watershed (such as Boulder County, US Forest Service or local private property owners)? If so, should that be coordination only or include a financial component?
- It is possible that a major event, such as a fire, could significantly affect water quality in the watershed. Should the Department complete additional planning for this type of event and what would recovery and remediation for this type of event look like?



Saint Vrain Creek Watershed Basemap (above WTP) With major Local Fires Highlighted



Button Rock Preserve Area
Wildfire Hazard Ratings Map



Button Rock Preserve Forest Stewardship thinning 2004 -2010, 655 acres completed, 130 acres planned for thinning in 2011.

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Button Rock Forest Stewardship Plan

Summary

The Big Elk fire was directly adjacent to the Button Rock Preserve and burned 4,413 acres of grassland, ponderosa pine, and mixed conifer forest in 10 days costing \$4.2 million before restoration. In 2002, 502,000 acres of Colorado forests burned, low fuel moisture and high fuel continuity contributed to this record fire season. Ponderosa pine restoration is needed to return forests to an ecologically sustainable condition and to reduce the hazard of catastrophic fires and insect epidemics.

The City of Longmont seeks to preserve the biological integrity and watershed function of the Button Rock Preserve through the implementation of a Forest Stewardship Plan. Of special concern are the risk of catastrophic wildfire, forest insect and disease infestations, and the spread of noxious weeds. Management also requested that plant and animal species lists are prepared.

Blue Mountain Environmental Consulting met these objectives through the implementation of field sampling efforts, database searches, literature reviews, employment of Geographic Information Systems techniques, and spatial modeling. The condition of forests and rangelands were assessed with the Forest Health Monitoring plot, which evaluates overstory and understory condition. Samples were stratified on the basis of aspect with 5 replicates in southern, eastern/western, and northern forests. Overstory analysis include forest composition, density, and structure. Understory analysis evaluates the composition and abundance of grasses, forbs, and shrubs. Additional inventory efforts focused on the distribution and composition of noxious weeds within the Button Rock Preserve. Known corridors of weed migration including roads, trails, disturbed sites, and riparian corridors were sampled.

Forest density was found to range between 120 and 125 Ft²/Ac on southern and northern slopes respectively. Composition was similar to that of historical forests. A list of understory species is provided and tabulated according to origin and abundance. Twenty-four separate weed populations were mapped during the field effort. Noxious species encountered include: cheatgrass, dalmatian toadflax, white top, curly doc, Canada thistle, musk thistle, bouncing bet, and diffuse knapweed. Field data are summarized and supplemented with information from database searches and have been integrated with Geographic Information Systems. An extensive list of wildlife, including Threatened and Endangered species, is also provided. Wildfire hazards were modeled with BEHAVE. Mitigation measures were then incorporated into forest prescriptions and treatment areas were prioritized in accordance with hazard ratings.

Restoration measures for Front Range ponderosa pine forests include: the creation of clearings ranging in size from 1 - 20 hectares, major reductions in tree density (especially in small diameter classes) resulting in canopy covers of 10 - 30% over most of the landscape, retention of trees greater than 200 years old, removal of most Douglas-fir (except on northern aspects where it should be thinned), and the re-introduction of fire to reduce ingrowth, maintain low forest density and thin Douglas-fir. These goals are reflected in the management prescriptions that have been made for 22 separate management compartments. Species specific management prescriptions are included for all noxious weeds found on the property; a treatment schedule for all operations is included. This document also contains supplementary information necessary for project implementation including: performance standards for forestry operations, forest insect and disease descriptions, extensive weed management discussions, reference literature, and sources of additional assistance.

Windy Gap Firming Project

Introduction

The City of Longmont is owner of 80 units (8,000 AF) of the Windy Gap water diversion project. As part of that project, it was always contemplated that a storage project would be built to allow this full yield to be realized in a drought period. Longmont has been participating in the Windy Gap Firming project since June of 2000. A final Environmental Impact Statement (EIS) for the project is due out this year. After the EIS is issued, Longmont will need to review its prior decisions on the level of participation in the next phase of this project, the design phase. Staff will discuss with City Council the process for making the decisions on the next steps in the project at the retreat.

Windy Gap Project Background Information:

The City of Longmont entered into a water allotment contract for 80 units of Windy Gap Project



water in July of 1975. Windy Gap's water right was filed by Longmont Mayor Ralph Price in the summer of 1967. Project construction began in 1981 and was completed in 1985. There are 480 units in the Windy Gap Project, with a total average yield of 48,000 acre-feet of water.

Because of the priority date of this project, water storage is necessary to realize this average water yield. This is known as "firming the yield of the project". Firming of this water diversion project has two goals. The first goal is to provide for a dry year yield. Second, the project needs to be firming to achieve the average yield of

48,000 acre-feet (8,000 acre-feet for Longmont's 80 units in the project).

Windy Gap Firming Project Background Information:

Phase 1 (Project Formulation)

In June of 2000, the Municipal Subdistrict of the Northern Colorado Water Conservancy District (MS-NCWCD) completed Phase 1 of the project, which included a preliminary investigation of a reservoir site to firm the water yield of the Windy Gap Project. The Chimney Hollow site located just west of Carter Lake was identified as a promising site. Other sites, such as the Jasper Reservoir site on the west slope, were also evaluated and will continue to be considered in the permitting phase of this project. The capacity of the Chimney Hollow Reservoir would be between 60,000 and 100,000 acre-feet. This amount of storage is adequate to firm approximately 1/2 to 2/3 of the Windy Gap Project. Additional storage projects will be needed in the longer term to firm the remainder, if the participants choose to do so. Costs for this phase of the project were funded by the Northern Colorado Water Conservancy District's Windy Gap Municipal Subdistrict through the Windy Gap Operational Reserves held by that entity.

Phase 2 (Scoping of Alternatives)

Phase 2 of the firming project consisted of preliminary environmental evaluations, modeling of project alternatives, and related work. The total Phase 2 cost was \$1,750,000, with the City of Longmont's proportional part of Phase 2 being \$265,655. The City's funding for this phase of the project came from the Water Construction Fund, which derives its revenue from sales of water taps.

Phase 3 (Environmental and Initial Permitting efforts)

Phase 3 of the firming project consisted of environmental studies, preliminary engineering of the preferred alternative and initial permitting efforts for the project. Not included was property acquisition of the preferred site, as this occurred in Phase 4. Longmont's cost for Phase 3 of the firming project was \$650,407. Funding for this phase of the project came ½ each from reserves in the Water Operations and Construction Funds.

The preliminary siting study efforts were documented in a report entitled "Windy Gap Firming Project Alternative Plan Formulation Study, (Boyle/EDAW 2003)."

Phase 4 (Land Acquisition and Final Permitting efforts)

Phase 4 of the firming project is consisting of land acquisition at the preferred firming project site and efforts to continue the permitting process. Longmont's prior pro-rata costs for Phase 4 were \$2,248,441, of which \$674,536 was for property acquisition. The remaining \$1,573,905 was for permitting efforts to date. Currently the purpose and needs statement and the alternatives scoping efforts are complete. The preliminary Environmental Impact Statement (EIS) was released for public comment in August of 2008, public comments were received by December of 2008 and preparation of the Final EIS is under way.

The U.S. Bureau of Reclamation is expected to complete and release a Final Environmental Impact Statement in 2011. Concurrent with preparation of the Final EIS, the Bureau has initiated the process to re-negotiate the Windy Gap Carriage Contract. This re-negotiation process will be necessary to allow the Firming Project to take delivery of water from and re-introduce water back into the C-BT system for eventual delivery to project participants. It is hoped this

contracting process, as well as the Final EIS, will be completed as soon as possible so that the Bureau can issue a Record of Decision allowing the issuance of permits for construction of the reservoir. Once a permit is issued, the next steps will be completion of final construction engineering and determination of project participation. In July of 2010, the NCWCD received a letter from Carlie A. Ronca, Chief of the Resources Division at the Bureau of Reclamation that outlines the remaining steps in the EIS process. A copy of that letter is attached.

Project Construction

The Municipal Subdistrict staff has provided revised preliminary construction cost estimates for additional storage capacity for Windy Gap. Using this cost estimate, and costs for similar projects, it is estimated that this project will cost approximately \$3,200 per acre-foot of storage space. This would equate to a total cost to Longmont of \$25,600,000 to \$32,000,000 based upon potential storage levels ranging from 8,000 to 10,000 acre-feet in the project. Staff anticipates that the final decision to participate in the actual construction of the project will need to be made at the conclusion of the design and bidding phase of this project, which is expected to occur between 2013 and 2015.

January 2005 City Council Retreat Evaluation of the Windy Gap Firing Project, August 2008 City Council review, and August 2009 and 2010 interim agreements.

City Council reviewed the City's participation level in the Windy Gap Firing Project during its 2005 Council Retreat. At that retreat Council directed staff to continue participation in the project, but to reduce the participation level at the next phase to between 12,000 and 13,000 acre-feet.

On August 5, 2008 City Council reviewed and agreed with Water Board and staff's recommendation to reduce the City's level of participation at time of design to between 8,000 and 10,000 acre-feet. At that time it was expected the final EIS would be released in late 2008 or early 2009.

During July & August 2009 and August 2010, City Council reviewed additional interim agreements to continue funding the EIS process. Council agreed with Water Board and staff recommendations to continue funding the City's participation in the current (EIS and permitting) phase of the Windy Gap Firing Project at a level of 12,000 acre-feet.

Concurrent On-going System Evaluations

Staff is currently engaged in a number of efforts to evaluate the status of Longmont's raw water supply & needs. These evaluations likely will consist of the following efforts:

- Front Range Climate Change Vulnerability Study – This study is substantially complete and results were reviewed by Water Board at their December 2010 meeting. The actual report is expected to be released by the American Water Works Association in February or March of 2011 and a representative of the study team will be invited to discuss the results with Water Board at that time. Staff has evaluated the findings of the study for

direct impacts on Longmont's water supply. That evaluation indicates that the potential impacts of climate change on Longmont's water supply are minimal and would only reduce supply by a few percent. This will be further discussed at the retreat.

- Longmont Future Water Demand Evaluation – This study is currently underway and will be completed once the results of a Water Rights Yield analysis (see next bullet) are available. An update of this study will be presented to Water Board this spring. Preliminary results of this effort indicate that lower projections of future industrial and commercial demand rates, increasing conservation by residential users and a smaller build-out area of Longmont will result in lowered future water demands. Assuming a baseline scenario without additional potential demand attributable to other development variables, Longmont's buildout demand could be up to 10% lower than the 2003 projections. An alternative demand scenario would consider the impacts on the City's water use attributable to variables such as future redevelopment; increased development densities; demand impacts due to climate change; and increased future industrial or economic development uses. When these results are refined, including input received from City Council at the 2011 Council Retreat, the results will be factored into the consideration of ultimate participation levels in the Windy Gap Firing project, both in the next phase (design) as well as the final phase (construction).
- Refinement of Longmont's Water Rights Yield Analyses – This effort is underway and preliminary results will be included in the discussion at the retreat. Mark McLean, of the Longmont consulting firm of Deere and Ault Consultants, has been invited to participate in that discussion. As one of Colorado's most respected Water Resource Engineers, Mark assists the City of Longmont in preparing our Water Rights Engineering efforts and has 30 years experience in this field.
- Longmont staff has also initiated a review of the results, costs and efficiency of the City's water conservation efforts. Results of this review will be incorporated in evaluations of future water supply projects and incorporated in the 2012 budget review process.
- Staff is in the initial planning stage of preparing a water supply risk analysis. Staff feels that this analysis should be done in order to allow the community to have input on what level of risk is acceptable when planning for future water supplies. This evaluation would include factors such as system redundancy, safety analysis of the existing and future water supply systems, an analysis of variables that go into water supply planning, future regulatory issues, etc. Staff would also propose that there be a community discussion about what safety factor we would like to build into our water supply.

Staff will describe the current status of these studies and how they potentially might affect Longmont's ultimate participation level in the Windy Gap Firing Project. Staff has also invited a representative from the Northern Colorado Water Conservancy District's Municipal Sub-district, Mr. Don Carlson, to participate in this discussion to provide additional updates on the status of this project. Mr. Carlson is the Assistant General Manager of the Northern Colorado Water Conservancy District. He has worked for the District for approximately 15

years and has many years of experience in Water Resources management in the Northern Colorado area.

Windy Gap Firming Project program funding

This project is included in the 5-year CIP as project #MUW-172 and is also included in the City's budget projections. Depending on participation levels and the timing of funding requests in the design phase, a supplemental appropriation may be needed to cover the costs of participation. Ultimately, the total cost to Longmont will depend on the final bid costs and our level of participation in the construction of the project. Funds for the design phase of the project come from the Water Operations fund and the Water Construction fund. An evaluation of additional funding needs will be presented at the retreat.

Windy Gap Firming Project “Firming ratio” discussion

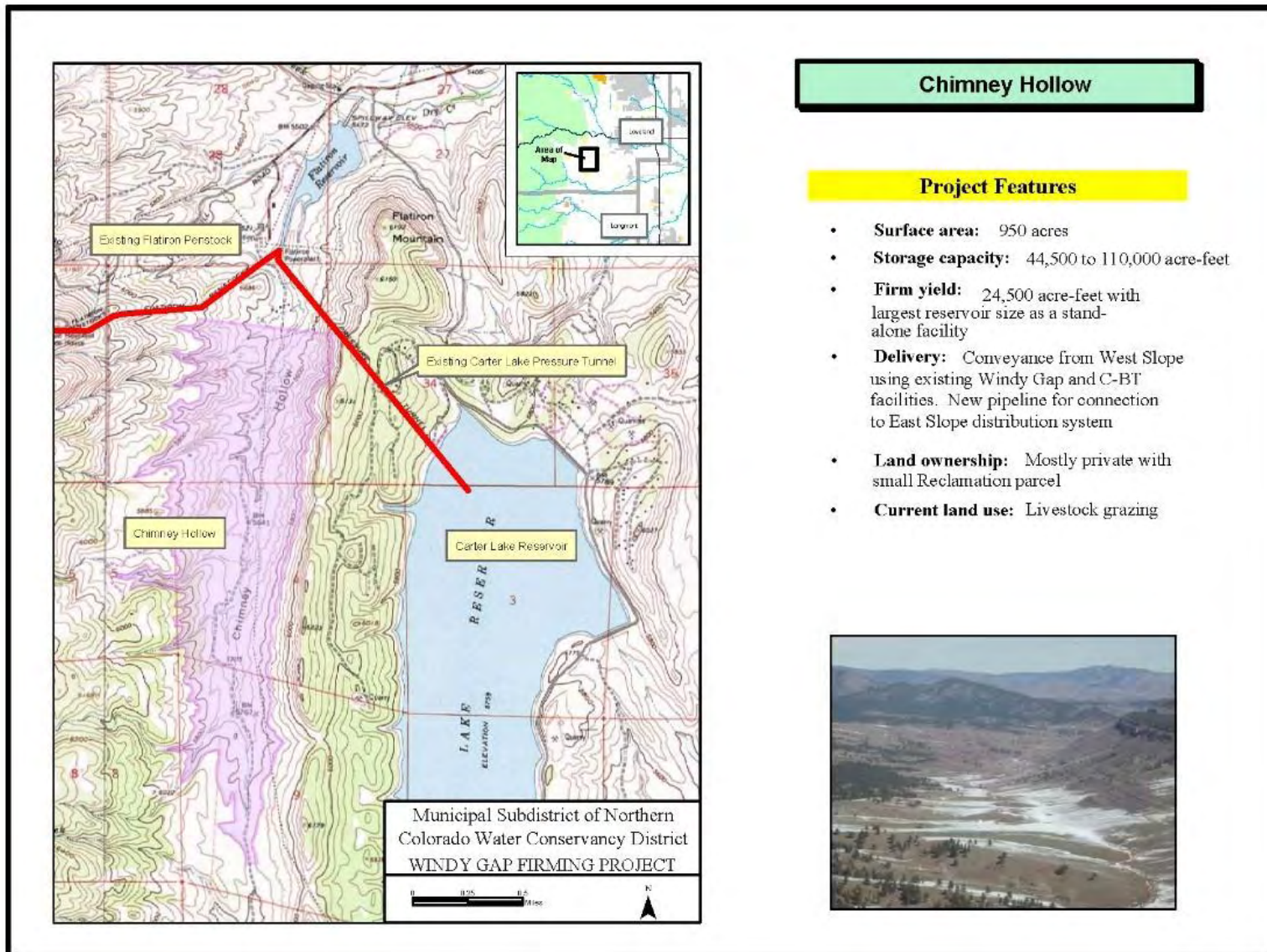
The firming ratio of this project, which is the ratio of the total amount of water provided by a supply project compared to its firm yield, depends on a number of assumptions. These include future operations of the C-BT system, federal laws that might impact the yield of the base Windy Gap Diversion Project decree, future water needs of other senior water users in the Upper Colorado River Basin and the participants' operational choices. Based on current assumptions, the average firming ratio used for the entire Windy Gap firming project is 4.3. Given the existing historic record of the Colorado and Fraser Rivers, as well as the C-BT and Windy Gap systems, a firm yield of one acre foot of water will require 4.3 acre feet of storage capacity in the project. However, Longmont will have a larger ratio of Windy Gap diversion project allotment (80 units or 8,000 AF) compared to the total participation level in the firming project. In other words, Longmont has a greater supply of water available to put into the firming project, which reduces the storage requirements. Because of this, Longmont's firming ratio is lower than that for the entire project and ranges from 3.17 to 3.33, depending on the level of participation in the project. This also assumes a continuation of the City's policy to maintain a firm yield in a 100-year drought. The results of the modeling that show the firming ratios for the project are shown in Appendix C.

Windy Gap Firming Project Anticipated Scheduling

Design of the project will occur after completion of the environmental permitting process. It will take approximately 2 to 3 years for design and construction permit issuance. Another 2 to 3 years will be required for construction of the project.

Questions and Considerations

- In August of 2008, City Council directed staff to participate in the design phase of the Windy Gap Firming Project at the 8,000 to 10,000 AF level. Given the additional evaluation of Longmont's future water demands and time that has lapsed since that August 2008 decision, what additional information beyond the study efforts listed in this discussion are necessary for City council to determine what level of participation in the design phase of the project is currently appropriate?
- Longmont will need to complete the studies referenced in the prior discussion. Does Council agree that this is the appropriate 2011 work plan for the PW&NR Department on this issue and will this effort provide sufficient detail for City Council to make the ultimate decision on participation?
- Does Council wish staff to initiate a water supply risk analysis and development of a water supply factor of safety in the 2011 work plan?



Windy Gap Firing Project

Summary of Project Costs at 10,000 AF

PRELIMINARY													
Windy Gap Firing Project													
Projected Cash Flow - Preliminary Estimate with Mitigation													
May 11, 2010													
Previous Estimate of Total Project Cost:		\$ 272,000,000											
Increase for Potential 2010 NEPA costs:		\$ 1,000,000											
Revised Estimate of Total Project Cost:		\$ 273,000,000											
Participant	Units Owned	Units in Firing Project	Requested Storage Volume (af)	Participant Contributions through 2009							Total Through 2009	Expected Future Contributions	
				2000-2002	2002-2004	2005	2006	2007	2008	2009		2010	2011
				Phase 2	Phase 3	Phase 4	NEPA				NEPA (cont)	Design	
							\$ 1,000,000	\$ -	\$ 1,000,000	\$ 1,000,000		\$ 1,000,000	\$ 9,750,000
Broomfield	56	56	25,200	\$ 278,937	\$ 682,927	\$ 1,195,194	\$ 289,057	\$ -	\$ 289,057	\$ 289,057	\$ 3,024,229	\$ 289,057	\$ 2,918,746
CWCWD	1	1	330	\$ 4,981	\$ 12,195	\$ 15,651	\$ 3,785	\$ -	\$ 3,785	\$ 3,785	\$ 44,183	\$ 3,785	\$ 38,222
Erie	14	20	6,000		\$ 179,878	\$ 315,398	\$ 68,823	\$ -	\$ 68,823	\$ 68,823	\$ 701,745	\$ 68,823	\$ 694,939
Evans	0	5	1,750			\$ 79,679	\$ 20,073	\$ -	\$ 20,073	\$ 20,073	\$ 139,899	\$ 20,073	\$ 202,691
Fort Lupton	0	3	1,050				\$ 12,044	\$ -	\$ 12,044	\$ 12,044	\$ 36,132	\$ 12,044	\$ 121,614
Greeley	67	44	7,000	\$ 333,729	\$ 524,390	\$ 584,317	\$ 80,294	\$ -	\$ 80,294	\$ 80,294	\$ 1,683,317	\$ 80,294	\$ 810,763
Lafayette	1	8	1,800			\$ 187,782	\$ 20,647	\$ -	\$ 20,647	\$ 20,647	\$ 249,723	\$ 20,647	\$ 208,482
Little Thompson WD	0	12	4,850				\$ 55,632	\$ -	\$ 55,632	\$ 55,632	\$ 166,896	\$ 55,632	\$ 561,743
Longmont	80	80	10,000	\$ 265,655	\$ 650,407	\$ 758,853	\$ 149,117	\$ -	\$ 149,117	\$ 137,646	\$ 2,110,795	\$ 137,646	\$ 1,158,232
Louisville	6	9	2,700	\$ 44,829	\$ 109,757	\$ 128,056	\$ 30,970	\$ -	\$ 30,970	\$ 30,970	\$ 375,553	\$ 30,970	\$ 312,723
Loveland	40	40	7,000	\$ 199,241	\$ 487,805	\$ 569,140	\$ 80,294	\$ -	\$ 80,294	\$ 80,294	\$ 1,497,067	\$ 80,294	\$ 810,763
Middle Park WCD	0	0	-		\$ 30,000		\$ -	\$ -	\$ -	\$ -	\$ 30,000	\$ -	\$ -
PRPA	160	51.5	12,000	\$ 448,292	\$ 528,456	\$ 616,569	\$ 137,646	\$ -	\$ 137,646	\$ 137,646	\$ 2,006,256	\$ 137,646	\$ 1,389,879
Superior	15	15	4,500	\$ 174,336	\$ 341,464	\$ 237,142	\$ 51,617	\$ -	\$ 51,617	\$ 51,617	\$ 907,794	\$ 51,617	\$ 521,205
TOTAL	440	344.5	84,180	\$ 1,750,000	\$ 3,547,279	\$ 4,687,781	\$ 1,000,000	\$ -	\$ 1,000,000	\$ 988,529	\$ 12,973,590	\$ 988,529	\$ 9,750,000

Notes:

- Cost allocation based on percent of total requested storage volume
- Costs based on Boyle Engineering's December 2007 Cost Estimate for 90,000 AF Earthfill/Rockfill Dam.
- These estimates do not include an allowance for cost escalation between 2007 and the beginning of construction.
- Middle Park storage of 3,000 ac-ft and associated funding contribution has been eliminated.
- Projection includes an estimate of \$1,000,000 for NEPA costs in 2010. It is unknown at this time if this contribution will be necessary, but it is included for budgetary purposes.

Windy Gap Firing Project

Summary of Project Costs at 8,000 AF

PRELIMINARY														
Windy Gap Firing Project														
Projected Cash Flow - Preliminary Estimate with Mitigation														
May 11, 2010														
Previous Estimate of Total Project Cost:		\$ 272,000,000												
Increase for Potential 2010 NEPA costs:		\$ 1,000,000												
Revised Estimate of Total Project Cost:		\$ 273,000,000												
Participant	Units Owned	Units in Firing Project	Requested Storage Volume (af)	Participant Contributions through 2009								Total Through 2009	Expected Future Contributions	
				2000-2002	2002-2004	2005	2006	2007	2008	2009	2010		2011	
				Phase 2	Phase 3	Phase 4	NEPA						NEPA (cont)	Design
							\$ 1,000,000	\$ -	\$ 1,000,000	\$ 1,000,000			\$ 1,000,000	\$ 9,750,000
Broomfield	56	56	25,200	\$ 278,937	\$ 682,927	\$ 1,195,194	\$ 289,057	\$ -	\$ 289,057	\$ 289,057	\$ 3,024,229	\$ 289,057	\$ 2,989,779	
CWCWD	1	1	330	\$ 4,981	\$ 12,195	\$ 15,651	\$ 3,785	\$ -	\$ 3,785	\$ 3,785	\$ 44,183	\$ 3,785	\$ 39,152	
Erie	14	20	6,000		\$ 179,878	\$ 315,398	\$ 68,823	\$ -	\$ 68,823	\$ 68,823	\$ 701,745	\$ 68,823	\$ 711,852	
Evans	0	5	1,750			\$ 79,679	\$ 20,073	\$ -	\$ 20,073	\$ 20,073	\$ 139,899	\$ 20,073	\$ 207,624	
Fort Lupton	0	3	1,050				\$ 12,044	\$ -	\$ 12,044	\$ 12,044	\$ 36,132	\$ 12,044	\$ 124,574	
Greeley	67	44	7,000	\$ 333,729	\$ 524,390	\$ 584,317	\$ 80,294	\$ -	\$ 80,294	\$ 80,294	\$ 1,683,317	\$ 80,294	\$ 830,494	
Lafayette	1	8	1,800			\$ 187,782	\$ 20,647	\$ -	\$ 20,647	\$ 20,647	\$ 249,723	\$ 20,647	\$ 213,556	
Little Thompson WD	0	12	4,850				\$ 55,632	\$ -	\$ 55,632	\$ 55,632	\$ 166,896	\$ 55,632	\$ 575,414	
Longmont	80	80	8,000	\$ 265,655	\$ 650,407	\$ 758,853	\$ 149,117	\$ -	\$ 149,117	\$ 137,646	\$ 2,110,795	\$ 137,646	\$ 949,136	
Louisville	6	9	2,700	\$ 44,829	\$ 109,757	\$ 128,056	\$ 30,970	\$ -	\$ 30,970	\$ 30,970	\$ 375,553	\$ 30,970	\$ 320,333	
Loveland	40	40	7,000	\$ 199,241	\$ 487,805	\$ 569,140	\$ 80,294	\$ -	\$ 80,294	\$ 80,294	\$ 1,497,067	\$ 80,294	\$ 830,494	
Middle Park WCD	0	0	-		\$ 30,000		\$ -	\$ -	\$ -	\$ -	\$ 30,000	\$ -	\$ -	
PRPA	160	51.5	12,000	\$ 448,292	\$ 528,456	\$ 616,569	\$ 137,646	\$ -	\$ 137,646	\$ 137,646	\$ 2,006,256	\$ 137,646	\$ 1,423,704	
Superior	15	15	4,500	\$ 174,336	\$ 341,464	\$ 237,142	\$ 51,617	\$ -	\$ 51,617	\$ 51,617	\$ 907,794	\$ 51,617	\$ 533,889	
TOTAL	440	344.5	82,180	\$ 1,750,000	\$ 3,547,279	\$ 4,687,781	\$ 1,000,000	\$ -	\$ 1,000,000	\$ 988,529	\$ 12,973,590	\$ 988,529	\$ 9,750,000	

Notes:

- Cost allocation based on percent of total requested storage volume
- Costs based on Boyle Engineering's December 2007 Cost Estimate for 90,000 AF Earthfill/Rockfill Dam.
- These estimates do not include an allowance for cost escalation between 2007 and the beginning of construction.
- Middle Park storage of 3,000 ac-ft and associated funding contribution has been eliminated.
- Projection includes an estimate of \$1,000,000 for NEPA costs in 2010. It is unknown at this time if this contribution will be necessary, but it is included for budgetary purposes.

Windy Gap Firming Project Summary of Project Costs at 6,000 AF

PRELIMINARY													
Windy Gap Firming Project													
Projected Cash Flow - Preliminary Estimate with Mitigation													
May 11, 2010													
Previous Estimate of Total Project Cost:		\$	272,000,000										
Increase for Potential 2010 NEPA costs:		\$	1,000,000										
Revised Estimate of Total Project Cost:		\$	273,000,000										
Participant	Units Owned	Units in Firming Project	Requested Storage Volume (af)	Participant Contributions through 2009								Expected Future Contributions	
				2000-2002	2002-2004	2005	2006	2007	2008	2009	Total Through 2009	2010	2011
				Phase 2	Phase 3	Phase 4	NEPA					NEPA (cont)	Design
							\$ 1,000,000	\$ -	\$ 1,000,000	\$ 1,000,000		\$ 1,000,000	\$ 9,750,000
Broomfield	56	56	25,200	\$ 278,937	\$ 682,927	\$ 1,195,194	\$ 289,057	\$ -	\$ 289,057	\$ 289,057	\$ 3,024,229	\$ 289,057	\$ 3,064,355
CWCWD	1	1	330	\$ 4,981	\$ 12,195	\$ 15,651	\$ 3,785	\$ -	\$ 3,785	\$ 3,785	\$ 44,183	\$ 3,785	\$ 40,128
Erie	14	20	6,000	\$ 179,878	\$ 315,398	\$ 68,823	\$ 68,823	\$ -	\$ 68,823	\$ 68,823	\$ 701,745	\$ 68,823	\$ 729,608
Evans	0	5	1,750			\$ 79,679	\$ 20,073	\$ -	\$ 20,073	\$ 20,073	\$ 139,899	\$ 20,073	\$ 212,802
Fort Lupton	0	3	1,050				\$ 12,044	\$ -	\$ 12,044	\$ 12,044	\$ 36,132	\$ 12,044	\$ 127,681
Greeley	67	44	7,000	\$ 333,729	\$ 524,390	\$ 584,317	\$ 80,294	\$ -	\$ 80,294	\$ 80,294	\$ 1,683,317	\$ 80,294	\$ 851,210
Lafayette	1	8	1,800			\$ 187,782	\$ 20,647	\$ -	\$ 20,647	\$ 20,647	\$ 249,723	\$ 20,647	\$ 218,883
Little Thompson WD	0	12	4,850				\$ 55,632	\$ -	\$ 55,632	\$ 55,632	\$ 166,896	\$ 55,632	\$ 589,767
Longmont	80	80	6,000	\$ 265,655	\$ 650,407	\$ 758,853	\$ 149,117	\$ -	\$ 149,117	\$ 137,646	\$ 2,110,795	\$ 137,646	\$ 729,608
Louisville	6	9	2,700	\$ 44,829	\$ 109,757	\$ 128,056	\$ 30,970	\$ -	\$ 30,970	\$ 30,970	\$ 375,553	\$ 30,970	\$ 328,324
Loveland	40	40	7,000	\$ 199,241	\$ 487,805	\$ 569,140	\$ 80,294	\$ -	\$ 80,294	\$ 80,294	\$ 1,497,067	\$ 80,294	\$ 851,210
Middle Park WCD	0	0	-		\$ 30,000		\$ -	\$ -	\$ -	\$ -	\$ 30,000	\$ -	\$ -
PRPA	160	51.5	12,000	\$ 448,292	\$ 528,456	\$ 616,569	\$ 137,646	\$ -	\$ 137,646	\$ 137,646	\$ 2,006,256	\$ 137,646	\$ 1,459,217
Superior	15	15	4,500	\$ 174,336	\$ 341,464	\$ 237,142	\$ 51,617	\$ -	\$ 51,617	\$ 51,617	\$ 907,794	\$ 51,617	\$ 547,206
TOTAL	440	344.5	80,180	\$ 1,750,000	\$ 3,547,279	\$ 4,687,781	\$ 1,000,000	\$ -	\$ 1,000,000	\$ 988,529	\$ 12,973,590	\$ 988,529	\$ 9,750,000

Notes:

- Cost allocation based on percent of total requested storage volume
- Costs based on Boyle Engineering's December 2007 Cost Estimate for 90,000 AF Earthfill/Rockfill Dam.
- These estimates do not include an allowance for cost escalation between 2007 and the beginning of construction.
- Middle Park storage of 3,000 ac-ft and associated funding contribution has been eliminated.
- Projection includes an estimate of \$1,000,000 for NEPA costs in 2010. It is unknown at this time if this contribution will be necessary, but it is included for budgetary purposes.

**Windy Gap Firing Project
Summary of Project Costs**

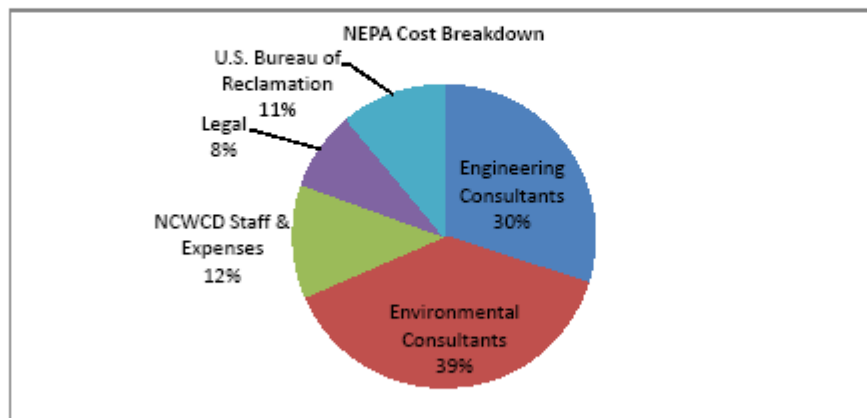
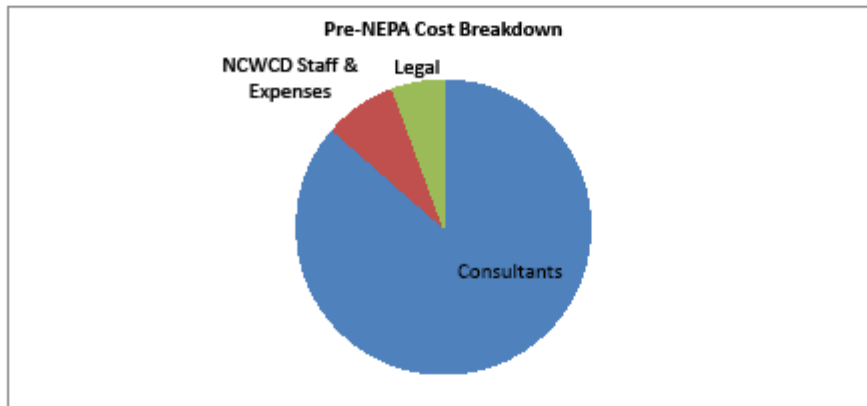
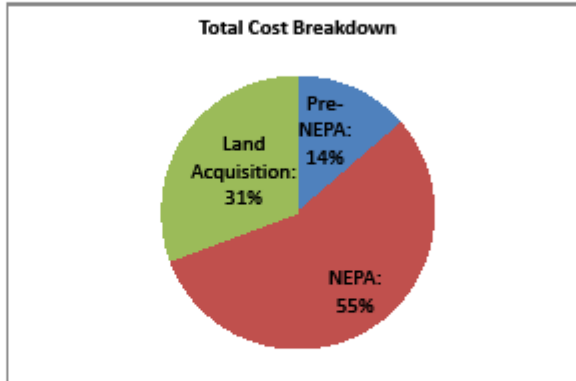
Pre-NEPA (Project Formulation Report)

Consultants	\$ 1,547,120.09
NCWCD Staff & Expenses	\$ 141,331.53
Legal	\$ 100,608.84
Pre-NEPA:	\$ 1,789,060.46

NEPA Phase:

Engineering Consultants	\$ 2,174,922.70
Environmental Consultants	\$ 2,785,887.33
NCWCD Staff & Expenses	\$ 877,625.54
Legal	\$ 606,769.80
U.S. Bureau of Reclamation	\$ 900,000.00
NEPA:	\$ 7,245,405.37

Land Acquisition: \$ 4,005,079.53



Appendix A
Button Rock Preserve
Forest Stewardship Plan

Appendix B
City Council Communication
August 2008

Appendix C
Windy Gap Modeling Results
Summary Sheet

Appendix D
Windy Gap Firming Project (MUW-172)
5 Year CIP Document
Summary Sheet