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EXECUTIVE SUMMARY
for:

PRAIRIE DOG CREEK WATERSHED MASTER PLAN

LEVEL I STUDY

Prepared for:

Wyoming Water Development Commission

Submitted by:

EnTech, Inc.

Consulting Engineers

Sheridan, Wyoming

in association with

Steady Stream Hydrology, Inc.

November, 2001

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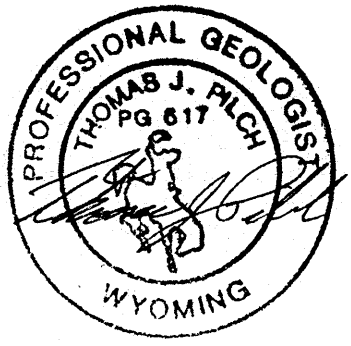

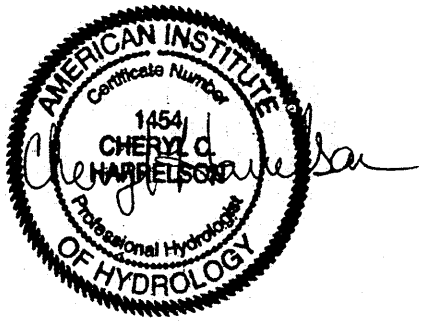

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1. INTRODUCTION

In September 1999, the Sheridan County Conservation District (SCCD) submitted an application to the Wyoming Water Development Commission (WWDC) to conduct an assessment of the Prairie Dog Creek Watershed (PDCW). The application marked the culmination of several years of discussions and ultimately recognition that the PDCW's unique characteristics and associated problems required such an assessment.

In early 1998, the SCCD was approached by the Prairie Dog Water Supply Company (PDWSC), the Piney and Cruse Creek Ditch Company (PCCDC), the Meade Coffeen Ditch Company (MCDC) and others within the watershed for assistance with the development of a management plan for the watershed. Although attempts at securing grant funds for such a watershed assessment initially failed, a tremendous amount of landowner support at the local level began to be developed. Several landowners complained of "accelerated stream bank erosion, erosive conveyance systems, excessive turbidity, sediment accumulation in irrigation systems and visual impairments."

In addition to working with these interest groups on these watershed assessment issues, the SCCD was requested by members of the group for assistance in engineering assessments for alternatives for the mitigation of possible erosion problems in the upper portion of the PDCW. These possible erosion problems have been suspected of causing downstream impacts, including excessive turbidity and sand accumulation in certain sections of ditches. Assistance was provided to the SCCD at that time by the U.S. Department of Agriculture's National Resources Conservation Service (NRCS) in the form of:

- Survey work, test borings, and a resulting study of ways to address water quality problems associated with the PCCDC's and MCDC's Tunnel Hill transbasin drops; and
- Technical knowledge sharing to assist the SCCD to write and submit a grant application to the Wyoming Association of Conservation Districts.

Finally, two other issues began to surface regarding the PDCW that required assessment. The first issue was the potential impact of the rapidly-developing coal bed methane (CBM) industry within the PDCW. Water wells installed by CBM operating companies have recently begun pumping groundwater from underlying coal beds in order to release methane gas from the underlying coal seams. The quantity and quality of the water produced as part of the CBM development have raised concerns of area wide landowners, as well as the states of both Wyoming and Montana. The second issue dealt with a concern regarding the appropriateness of Prairie Dog Creek's stream classification as promulgated by the Wyoming Department of Environmental Quality (WDEQ). At the time of application by the SCCD to the WWDC, Prairie Dog Creek was classified by WDEQ as a Class 2 coldwater stream, yet ironically, without the presence of the water that is diverted into the PDCW from the Piney Creek drainage, water quality and flow, as well as stream classification, would likely have been considerably different. Since the date of the application, WDEQ has made a reclassification of Wyoming streams. Prairie Dog Creek is now listed as a Class 2AB stream, which is actually very similar to the previous Class 2 designation.

Prairie Dog Creek appeared on the 1996 303(d) list as prepared by the WDEQ, listing the stream as being "impaired". WDEQ included Prairie Dog Creek in its "Beneficial Use Reconnaissance Program" (BURP) to begin the data collection required to commence with an evaluation of the need to establish a Total Maximum Daily Load (TMDL) for constituents in the creek. The BURP assessment included water quality sampling and testing from ten sites along Prairie Dog Creek, beginning at the point where Jenks Creek and Prairie Dog Creek join near I-90. Results of this water quality sampling and testing have been included within this final report, and Prairie Dog Creek has been removed from the 303(d) list. It now appears on WDEQ's "Needs to be Monitored" list. EnTech, Inc. Consulting Engineers of Sheridan, Wyoming (EnTech) has worked closely with the WDEQ in the development of this report. The WWDC stressed the need for this cooperative effort between the WDEQ and EnTech to eliminate

the collection of redundant information.

Although the SCCD's grant application to the Wyoming Association of Conservation Districts was unsuccessful in procuring monies for the district, in early 2000 the Wyoming State Legislature authorized the expenditure of up to $100,000 by the WWDC to evaluate and describe the PDCW. This authorization included an evaluation of those lands served by the PCCDC and the MCDC that are outside of the PDCW and are instead within the Little Goose Creek drainage. The funding was also authorized to identify problems and problem areas within the PDCW and proposed practical economic solutions to these problems and problem areas. Finally, a watershed management plan for the PDCW was proposed for development utilizing this funding.

It is the goal of this report to develop a plan to guide the users of the PDCW towards decisions that will provide for a healthy future of the entire watershed.

2. DESCRIPTION OF WATERSHED

The PDCW encompasses the majority of central Sheridan County in northeastern Wyoming. It extends from the community of Story near the Johnson County line to the Wyoming-Montana border. Figure 1 depicts the 112-mile long watershed boundary and the enclosed 226,115 acres (353.3 square miles). The watershed lies within the larger Upper Tongue River watershed.

2.1 General Characteristics

The study provided information on the following general characteristics of the PDCW.

- Geography
- Land Ownership and Topography
- Climate
- Waterways
  - Prairie Dog Creek and Major Tributaries
    - Jenks Creek (drainage area = 4.45 square miles)
    - Murphy Gulch (drainage area = 18.8 square miles).
    - Buffalo Run Creek (drainage area = 4.5 square miles)
    - Meade Creek (drainage area = 13.0 square miles).
    - Wildcat Creek (drainage area = 27.3 square miles)
    - Dutch Creek (drainage area = 196.7 square miles)
    - Coutant Creek (drainage area = 25.8 square miles)
- Irrigation Delivery Systems
  - Ditch Companies
    - Prairie Dog Water Supply Company (PDWSC)
    - Piney and Cruse Creek Ditch Company (PCCDC)
    - Meade Creek Ditch Company (MCDC)
  - South Piney Creek and North Piney Creek Diversions
  - Diversion Dams and Feeder Ditches
  - Transbasin Diversions
- Geology
- Soils
- Population
- Transportation
- Employment and Education
- Agricultural Land Use

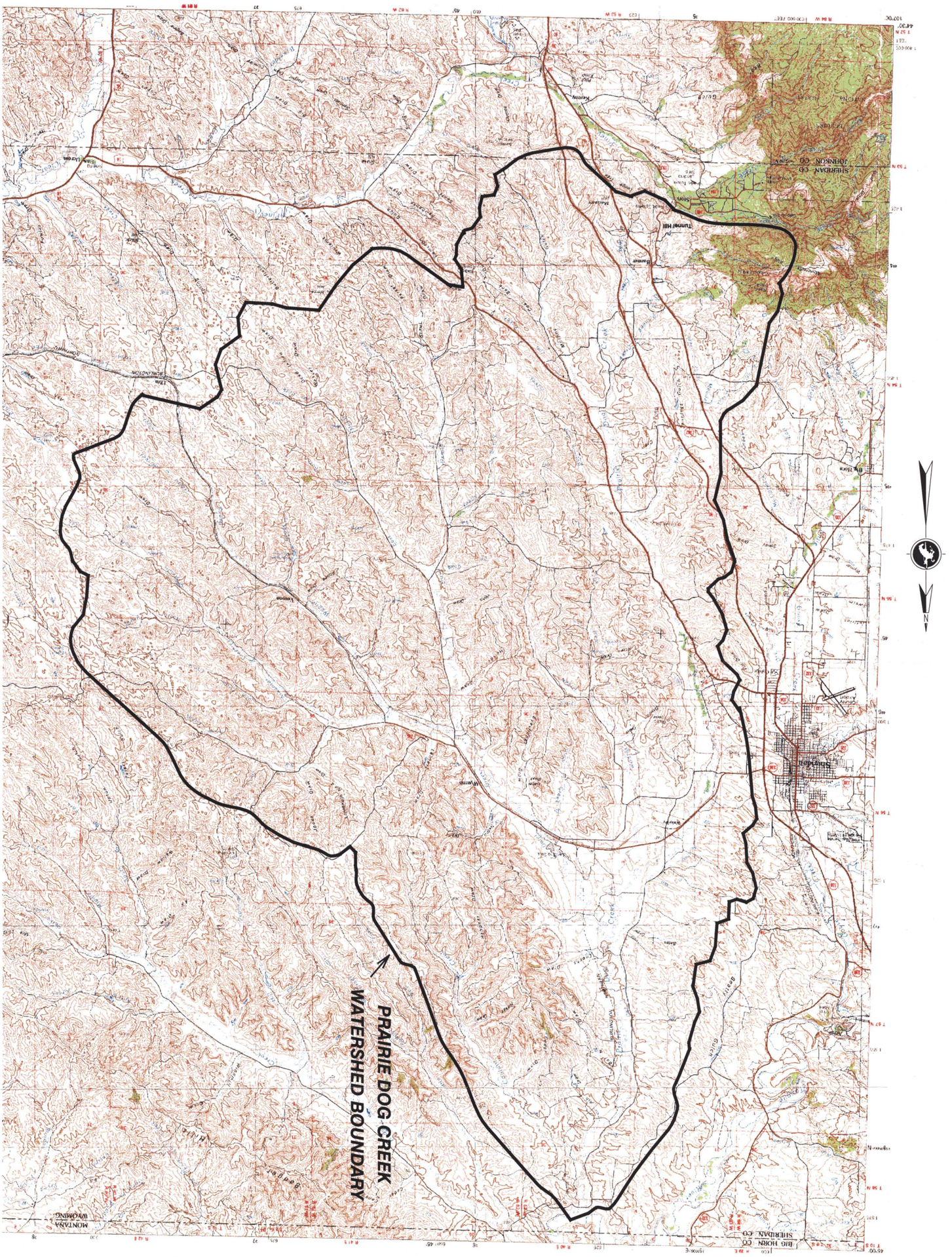

Fig. 1

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PRAIRIE DOG WATERSHED MASTER PLAN LEVEL I STUDY

PRAIRIE DOG CREEK WATERSHED AREA

DESIGN	NO.	AMENDMENT	DATE	INT.
DTE				
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MWE				
DATE				
9/2001				

PROJECT NO. 00008

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- Residential Land Use
- Industrial Land Use
- Fisheries
- Stream Classifications
- Fish Population Data
- Game Animals
- Threatened and Endangered Species
- Recreation
- Surface Water
- Groundwater
    - Sources
    - Permits
    - Possible Groundwater Contamination Sites
    - Onsite Wastewater Disposal Systems

2.2 Water Quality

A plan for sampling the water quality and flow within Prairie Dog Creek was developed for this study. Seven water quality sampling events were performed. The first and last samplings were analyzed for a "long list" of constituents, and the other five samplings were analyzed for a "short list".

The constituents for which samples were taken were selected to provide a baseline for potential future impacts to the PDCW. These identifiable future impacts include CBM, agricultural practices, and activities due to man's presence upon the lands. The "short list" was developed as a means to provide comparable data during the non-irrigation season of certain key constituents (such as electrical conductivity, fecal coliform, and turbidity), and do so throughout the entire length of Prairie Dog Creek in order to possibly identify trends as water traversed downstream. The short list could also be performed relatively cost-effectively and thus more frequently.

Eleven sampling site locations were selected as part of this study to determine water quality for the "long list" and "short list" of analytes. These sites were generally selected immediately below locations where tributaries entered Prairie Dog Creek, thereby possibly aiding in a future determination of sources leading to substandard water quality.

Table 1 portrays a summary of the water quality information obtained, depicting the number of times samples were taken and the range of measured values. The range of measured values for all parameters were compared with WDEQ regulatory limits specified in Chapters 1 and 8 of the Wyoming Water Quality Regulations for uses that currently exist for Prairie Dog Creek, and with recommended limits for agricultural uses of water. Results of the 1998 WDEQ water quality sampling that was conducted is included, sampling that included several of the same sites chosen for the study.

Based upon the data collected, the following parameters warrant possible further investigation. The further investigation is warranted not merely because measured values in all cases violated standards, but these parameters can also portray possible impacts due to future development in the area.

- Electrical Conductivity and Total Dissolved Solids
- Turbidity
- Total Suspended Solids
- Sulfate
- Sodium Adsorption Ratio
- Bicarbonate
- Iron

- Temperature
- Fecal Coliform

Table 1
Results of Water Quality Testing

Parameter	No. of Samples Taken	Range of Measured Values (mg/l unless noted)
Temperature	77	(0.6 – 23.1)°C
pH	77	6.7 – 8.8 S.U.
Electrical Conductivity	77	40 – 1820 µmho/cm
Dissolved Oxygen	77	5.6 – 15.3
Turbidity	77	0.35 – 550 NTU
Total Settleable Solids	22	<0.5
Total Dissolved Solids	22	40 – 1700
Total Suspended Solids	22	5 - 132
Alkalinity	22	14 - 315
Total Phosphorus	22	<0.05 – 0.14
Nitrate + Nitrite	22	<0.01 – 0.84
Total Chloride	22	<1.0 – 4.5
Sulfate	22	1.1 - 865
Calcium	22	5.5 - 154
Magnesium	22	1.4 - 122
Sodium	22	0.8 - 144
Sodium Adsorption Ratio (SAR)	22	0.1 – 2.1 S.U.
Potassium	22	0.6 – 10.7
Carbonate	22	0
Bicarbonate	22	17.1 - 384
Total Iron	22	<0.05 – 2.67
Total Barium	22	<0.05
Boron	22	<0.01 – 0.2
Fecal Coliform Bacteria	77	0 – 1100 groups/100ml

2.3 Coal Bed Methane

As of September 15, 2001, the Wyoming Oil and Gas Conservation Commission (WO&GCC) had issued 859 permits for CBM wells in the PDCW. Of those wells, 37 had either been abandoned, the wells plugged, or the permits expired, leaving a total of 822 active gas permits. The majority of these permits have been issued for CBM development in the Lower Prairie Dog Creek area, specifically in Townships 57 and 58 in Range 83.

The WO&GCC also reports that, of the active permits listed above, 207 wells have or are currently producing gas. All but nine of those wells are located in either T57N, R83W, or T58N, R83W. Of the permitted wells located in T58N, R83W, Section 36 contains 34 wells. Due to the 80-acre/coal seam spacing rule of the WO&GCC, this relatively high number of wells per section appears to indicate that multiple seams of the various coal-bearing formations are being developed for CBM.

Based upon information provided by WDEQ, there have been nine NPDES discharge permits issued in the PDCW, of which only four permits have been issued that allow for surface water discharge of produced CBM water. Of those four permits, apparently only one has a current actual discharge from a CBM well directly into a stream which is tributary to Prairie Dog Creek. This permit (WY0040622, issued to SRW, Inc.) provides for a total of six outfalls and a total of 39 CBM wells, all located in Sections 31 and 32, T54N, R82W. Discharges are into tributaries of Murphy Gulch. All other NPDES permits issued for CBM development have been either for stormwater or do not allow for the water to be discharged to a receiving stream. Those not allowing for direct discharge to a receiving stream require containment of all CBM waters in off-channel reservoirs, or containment of all CBM waters up to the 25-

year, 24-hour storm event in on-channel reservoirs. It is likely that this current practice of WDEQ permit issuance will continue.

Some CBM companies have attempted to come up with alternative, innovative means of water disposal. Both land application and re-injection are receiving considerable attention.

2.4 Channel Morphology

In order to determine the current state and stability of Prairie Dog Creek and its tributaries with respect to natural channel forms and patterns, this study initiated a basic inventory of the watershed with respect to channel morphology. A Level I Rosgen Stream Channel Classification approach was utilized to determine basic geomorphic characteristics of the Prairie Dog Creek system. Thirty-four cross-section locations were established and mapped in the fall of 2000. The locations were selected by several factors: ease of access, proximity to areas of intense land use, proximity to irrigation structures and diversions, location within representative reaches of the watershed's drainage network, and location with respect to salient geologic features. Six of the cross-section sites were determined to be most representative, and they were mapped again in the late summer of 2001.

In addition to channel classification and establishment of the 34 permanent cross-section sites, a field investigation of one critical tributary (Jenks Creek) was performed using photos and qualitative descriptions of the channel, vegetation, land use, irrigation systems, and geologic factors. These qualitative field descriptions were also performed at the cross-section sites.

Three Level I stream types were found in the PDCW:

- C-type: Low gradient, meandering, point-bar, riffle/pool, alluvial channels with broad well-defined floodplains. Typically associated with broad valleys containing terraces and slight entrenchment.
- B_C-type: Steeper than a C-type, riffle dominated with infrequently spaced pools. Associated with moderate entrenchment.
- G-type: Entrenched "gully" step/pool on moderate gradients. Associated with narrow valleys or deeply incised alluvial/colluvial materials such as fans or deltas. Unstable, with grade control problems and high bank erosion rates.

These types represent broad categories, and many variations are present within each category.

The cross-sectional data reveals a significant result: Prairie Dog Creek's bankfull discharge and cross-sectional area are relatively consistent for its entire length. The average bankfull width is 19.7 feet and the average bankfull cross-sectional area is 37.9 ft^2. This consistency in bankfull area is not typical of a natural stream, which increases in area and changes stream types gradually as it moves downstream, and the contributing drainage area increases cumulatively. Rather, the results are those expected of a system dominated by a regulated, relatively constant, supply of water. Prairie Dog Creek could, in this way, be seen as behaving more like an irrigation canal than a natural stream. The consistency of channel characteristics throughout the creek's length probably indicates that the creek has completed most of its initial adjustment to the "climatic change" scenario that was created by flow augmentation 115 years ago. The exception to this is at Tunnel Hill, location of the three trans-basin irrigation water diversions into the PDCW. At this location, the augmented flow has and continues to cause abrupt boundaries between stream types where the ditches' drop-structures cut the ridge down and back, creating gullies so abrupt as to be waterfalls. These streams continue working toward equilibrium.

3. WATERSHED MANAGEMENT AND IRRIGATION SYSTEM REHABILITATION PLAN

3.1 Analysis of Current Conditions and Problem Areas

Chapter 2 of this study provided a detailed review of the current conditions within the PDCW. In reviewing these current conditions, it can be concluded that the PDCW is in relatively good shape with respect to overall water quality and stream morphology. There are no catastrophic problems that loom as a threat to the watershed's existence. However, there are some significant problem areas within the PDCW that currently exist, or have the potential to be significant problems. These problem areas are listed in Table 1 and are listed in no particular order regarding importance.

Table 1
Description of Problem Areas

PROBLEM AREA #	DESCRIPTION
1	Erosion of Jenks Creek due to PDWSC Transbasin Diversion
2	Continued Erosion Associated with PCCDC and MCDC Transbasin Diversions
3	Continued Erosion Associated with PCCDC and MCDC Delivery Systems
4	Existing Condition of PDWSC Diversion from South Piney Creek
5	Channel Instability in Prairie Dog Creek
6	Fecal Coliform within Prairie Dog Creek
7	Surface Water Discharges from CBM Wells that Could Impact both the Quality and Quantity of the Waters within the PDCW
8	Possible Water Quality Problems in the Meade Creek Drainage
9	Resolution of Kearney Lake Reservoir Secondary Supply Issues

3.2 Recommended Solutions to Problem Areas

Solutions to existing problem areas must address the needs of the multitude of users of the PDCW. They must include reasonable alternatives to improve and maintain the quality of the watershed to best serve this diverse multitude of users. The diversity extends from ranching, farming and mining and development of natural resources within the watershed, to sustaining a viable wildlife habitat. It is also important that any proposed solutions consider the role of local, state and federal governments in the development of any solutions.

Recommended solutions to the problem areas listed in Table 1 are provided below, as well as estimated costs. As these estimated costs are based upon a reconnaissance level review only, considerable further study should be conducted to determine their feasibility and more exact cost. Not all recommended solutions have estimated costs. For those solutions, further study is recommended.

Recommended Solution to Problem Area #1 (Erosion of Jenks Creek due to PDWSC Transbasin Diversion)

This solution is recommended to be the construction of a pipeline from the bottom of Tunnel Hill to a location that the gradient for the channel of Jenks Creek becomes less steep; i.e., at approximately the west meadow of the Banner Ranch in the NW1/4 of Section 9, T53N, R83W. This pipeline would be approximately 5,500 feet in length and 48 inches in diameter. At the pipeline's point of terminus, an outlet works/energy dissipation structure similar to the one constructed at the base of Tunnel Hill in the

1990's would be constructed. As part of the further study, the feasibility of constructing a hydropower generating facility should be reinvestigated

Estimated Cost = $1,468,151

Recommended Solution to Problem Area #2 (Continued Erosion Associated with PCCDC and MCDC Transbasin Diversions)

Two solutions are proposed for consideration, both based upon a report prepared by the NRCS in 1999. The first solution proposes combining the PCCDC and MCDC ditches into one system to divert water over Tunnel Hill. The second solution proposes maintaining individual transbasin structures.

Estimated Cost of the First Solution (Combining PCCDC and MCDC) = $809,042

Estimated Cost of the Second Solution (Rehabilitating Individual PCCDC and MCDC Structures) = $968,966

Recommended Solution to Problem Area #3 (Continued Erosion Associated with PCCDC and MCDC Delivery Systems)

Potential solutions could possibly include installation of energy dissipation/control devices at certain points along ditches and reshaping of upstream cut and embankment areas to minimize bank sloughing into channels.

It is recommended that a more extensive inventory of problem areas in the PCCDC and MCDC delivery systems be conducted (perhaps in a Level II study). After the inventory is completed, cost-effective solutions could be identified, examined and ultimately implemented.

No Cost Estimate

Recommended Solution to Problem Area #4 (Existing Condition of PDWSC Diversion from South Piney Creek)

The proposed solution to this problem is to construct a new diversion dam in South Piney Creek. For purposes of this report, a new concrete diversion dam has been sited approximately 100 feet downstream of the PDWSC's existing diversion facilities. This will require that a new headgate and approximately 100 feet of new ditch be constructed from the new diversion dam to the existing feeder ditch.

Estimated Cost = $134,905

Recommended Solution to Problem Area #5 (Channel Instability in Prairie Dog Creek)

The recommended solution proposes the construction of "natural" channel design techniques, to replace some existing irrigation diversion structures. The structures recommended for Prairie Dog Creek include the following types:

- rock weirs,
- native material revetments with vegetation transplants, and
- cross vane and single vane.

The costs for construction of such "natural" types of structures are unique to each specific site; however, costs are estimated in the range of $10,000 - $15,000 for each structure for a stream such as Prairie Dog Creek.

In those areas where there has been a loss of bank line vegetation (contributing to bank erosion and increased stream sediment supply), land use practices could be improved by implementation of Best Management Practices. It would also be advantageous to conduct further geomorphology inventories within the PDCW in order to more fully understand the system's dynamics.

Recommended Solution to Problem Area #6 (Fecal Coliform within Prairie Dog Creek)

Based upon the data collected, it is evident that a more thorough study of potential contamination sources should be conducted. An area of focus should be the more intensively developed area immediately upstream of the confluence of Prairie Dog Creek and Jenks Creek, where elevated fecal coliform levels

were observed. The future study should include a visual inspection in suspected areas of contamination, such as livestock pens and feedlots, as well as in more highly developed areas of rural residences.

No cost estimate

Recommended Solution to Problem Area #7 (Surface Water Discharges from CBM Wells that Could Impact both the Quality and Quantity of the Waters within the PDCW)

Due to the lack of clarity of the future of CBM surface water discharges for both quality and quantity, at this time there are no absolute solutions proposed, as at the present time there is no actual problem. Once the ultimate fate of additional surface water discharge allowances are known, only then can a specific problem and potential solution be identified. Stakeholders should adopt a "wait-and-see" attitude on the future of CBM discharges, in lieu of following a specific plan at this time.

No cost estimate

Recommended Solution to Problem Area #8 (Possible Water Quality Problems in the Meade Creek Drainage)

Although water quality analyses were completed under this Level I study, the scope did not include a more in-depth review of water quality issues within the individual sub-basins. It may be that interested parties in the Meade Creek drainage should investigate the possibility of the WDEQ performing water quality testing and analysis in this area. Alternatively, the residents of the Meade Creek sub-basin may wish to consider making application to the WWDC for a study of their area.

No cost estimate

Recommended Solution to Problem Area #9 (Resolution of Kearney Lake Reservoir Secondary Supply Issues)

In order to alleviate the current problem of Kearney Lake Reservoir rights being attached by permit to lands that the reservoir shareholders do not necessarily own, Wyoming State Board of Control (BOC) representatives have indicated that these rights should be "detached" from their currently adjudicated lands. Discussions should commence among officials of the PDWSC, BOC and affected landowners to initiate the process whereby the "detachments" can be consummated.

No Cost Estimate

4. PROJECT FINANCING PLAN

In order to provide for possible future funding for the recommended solutions identified above, it is necessary to compile a proposed project financing plan. Possible funding agencies for these solutions include the following:

- WWDC;
- U.S. Environmental Protection Agency (EPA) – Section 319;
- U.S. Department of Agriculture's (USDA) 566 Program;
- Wyoming Department of Agriculture's Water Quality Grant Improvement Program; and
- WDEQ's State Revolving Loan – Clean Water Act.

4.1 Possible District Formation

In order for any prospective funding agency to have an entity with whom it may contract, it is necessary to establish an organization for such contracting purposes. Typically, this involves establishment of a district. Water conservancy districts, irrigation districts and watershed improvement districts are the usual types of districts utilized in Wyoming for these purposes.

Conversations have been held with numerous representatives of either districts or private companies (ditch and reservoir) throughout the state that eventually formed public districts to implement improvements on their respective systems. In all cases, the principal reason that these districts were

formed was to benefit from the large number of state and federal funding programs available to public districts, programs that provide for both grants and loans. Similarly, in all cases, the ditch or reservoir company that originally owned the facilities that required improvement or rehabilitation continued to exist after formation of the public district. Lastly, and again in all cases, the affected ditch or reservoir companies had considerable representation on the board of directors of the public districts ultimately formed to secure the state and/or federal funds.

Due to the diverse interests of the various beneficiaries of the recommended improvements, it seems logical to form either a water conservancy or watershed improvement district, vs. an irrigation district, in order to equitably allocate the local share of improvement costs. Shareholders of the PDWSC, PCCDC and MCDC have expressed a strong desire to have any possible improvements installed by a future public district funded by the beneficiaries of such improvements. W.S. 41-8-101 through 41-8-126 provide that a watershed improvement district may levy assessments against only those lands that are benefited by particular improvements. As such, it initially appears that a watershed improvement district would be the most suitable public entity to be formed for the purpose of jointly pursuing a plan to alleviate the problems identified in Section 3.

5. PATH FORWARD

In order to best address these issues and concerns within the PDCW, the following list provides a recommended path forward for the residents and users of the watershed. This recommended path represents a feasible, attainable management plan for the watershed.

1. Investigate the most feasible type of public entity that could be formed that would best address the myriad of issues and concerns within the PDCW. Preliminary investigations point to the formation of a watershed improvement district as being the most appropriate public entity; however, more research should be conducted to ascertain if an irrigation district or conservancy district would be the most suitable.
2. Determine if the best means of addressing the watershed's issues and concerns would be via establishment of one public entity, or if several independent public entities would best be formed.
3. Proceed forward in the establishment of the necessary public entity or entities.
4. Once the public entity (or entities) is formed, request that the USDA perform a feasibility study of eligible improvements under its 566 program. Improvements could potentially include those associated with erosion control (PDWSC/Jenks Creek pipeline, Tunnel Hill transbasin drop pipelines for PCCDC and MCDC, PCCDC "second drop" just downstream of the Tunnel Hill drop, downstream improvements on Prairie Dog Creek, etc.) or stream diversion (diversion dam from South Piney Creek for PDWSC). This feasibility study can be performed at no cost to the applicant.
5. Submit an application to the WWDC for a Level II study. The objectives of the Level II study should include the following:
    a. Completion of a conceptual design of a PDWSC/Jenks Creek pipeline extending from the bottom of Tunnel Hill to the Banner Ranch. Included with this study should be a cursory review of the potential for a cost-effective hydropower generating facility.
    b. Completion of a conceptual design of the Tunnel Hill drop structures needed for the PCCDC and MCDC transbasin facilities. Included with this conceptual design should be an evaluation of the most feasible means of constructing these improvements: via construction of improvements at the current drop locations, or consolidation of PCCDC and MCDC water into one facility. This design would address the "second drop" of the PCCDC's current facilities that is located downstream of the main Tunnel Hill transbasin drop.

c. Completion of a conceptual design of a new diversion dam and related facilities for the PDWSC for the South Piney Creek water.

d. A thorough review of the PCCDC and MCDC main ditches to map the areas where ditch erosion and sloughing are occurring, and an analysis of the most cost-effective means to alleviate these problems.

e. Completion of a conceptual design of improvements and more specific recommendations of Best Management Practices for users of land adjacent to Prairie Dog Creek in areas where the various types of diversion structures and land use practices are affecting channel stability.

f. Further investigations of Prairie Dog Creek, the PCCDC and MCDC ditches, and major tributaries to more accurately identify areas of channel instability and related causes, as well as to determine possible deficiencies in feeder ditch conveyance capacities in the Story area.

g. Further investigations of possible water quality problems in the Meade Creek drainage.

It is important that the WWDC Level II study and the USDA 566 feasibility study be closely coordinated so that information obtained from one study can be utilized in the subsequent study, vs. replicating efforts. To that end, it may be best to submit the Level II study application for consideration by the 2003 Wyoming State Legislature. This postponement will allow for possible district formation to be completed, as well as the USDA 566 feasibility study to be completed, which takes approximately six months.

6. Apply through the WDEQ for EPA Section 319 monies to perform further investigations on the extent and possible sources of elevated fecal coliform levels in Prairie Dog Creek below U.S. Highway 87, particularly in the more intensively developed area above the confluence of Prairie Dog Creek and Jenks Creek. Included with these investigations should be a reconnaissance of possible source areas. At the same time that monies are requested for this purpose, investigate further the feasibility of utilizing funds from this program for the water quality improvements listed above associated with channel erosion and sediment transport.
7. Request that the PDCW be placed on WDEQ's State Revolving Fund listing of projects to possibly secure future low-interest loan monies.
8. Apply for possible funding from the Wyoming Department of Agriculture's Water Quality Improvement Program once the projects that will potentially improve water quality within the PDCW are more accurately identified.
9. Continue to monitor CBM activities as they occur in the PDCW, specifically WDEQ policies and procedures relative to the discharge and/or disposal of CBM produced water. Should these policies and procedures change from what they are now; that is, surface water discharges are henceforth allowed, utilize data now being collected by various state and federal agencies (through its contract with the USGS), this study, and other sources to evaluate potential increases in water quality levels from the baseline numbers outlined in this study.
10. Investigate the water rights in the Kearney Lake Reservoir that have historically been attached to certain lands, and work with those water rights holders, the Wyoming State Board of Control, and the affected landowners to detach these water rights from the designated lands.