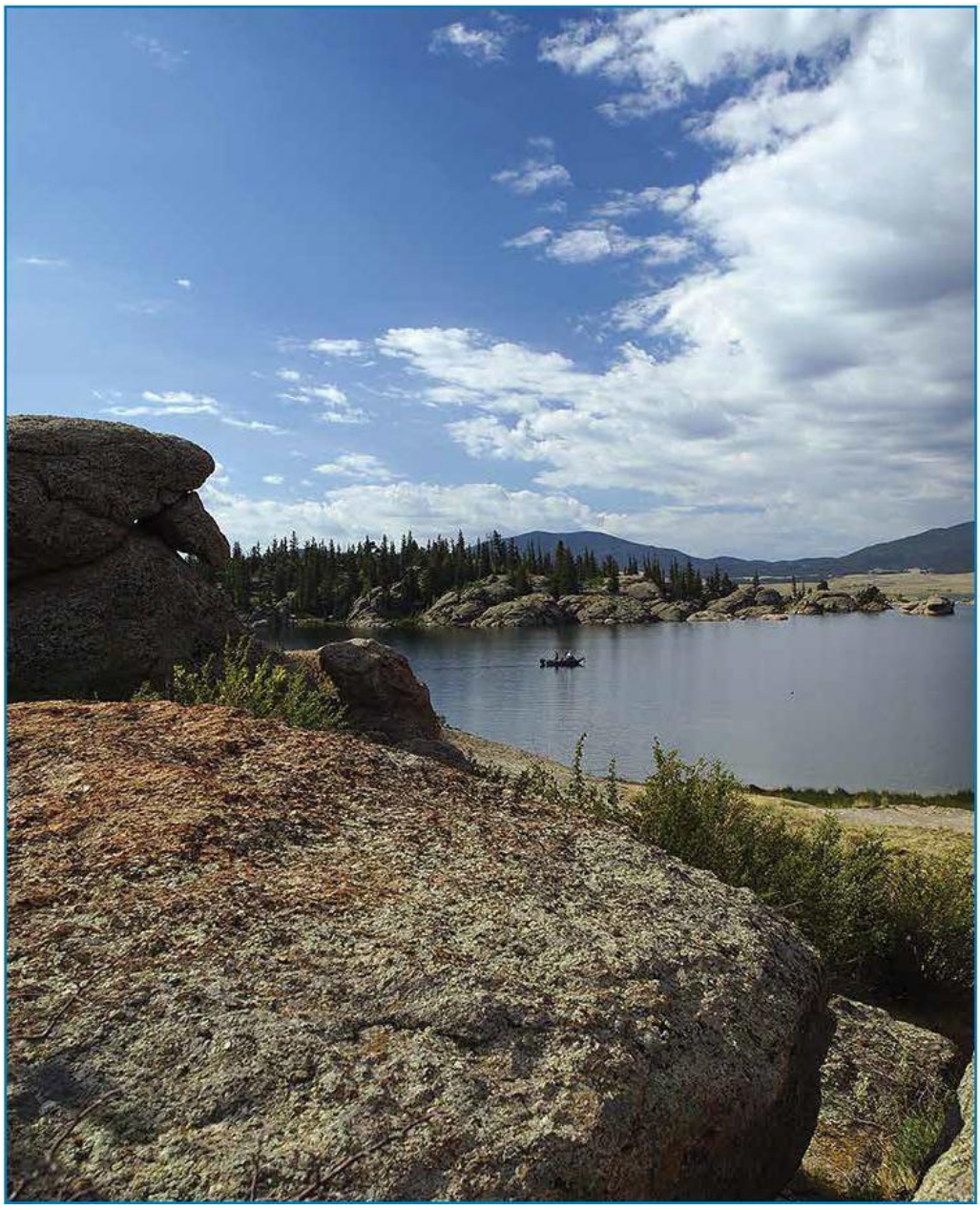
UPPER SOUTH PLATTE BEST MANAGEMENT PRACTICES FOR PROTECTING SOURCE WATER QUALITY



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DENVER WATER

SUMMARY

Protecting water quality throughout a watershed is a constant and challenging responsibility requiring persistent oversight and planning. The responsibility for protecting and preserving this most precious and invaluable resource falls to a broad range of stakeholders, beneficiaries, and end users. Individuals from county and local governments, federal agencies, land owners, local residents, and private sector project designers may not think of themselves as protectors and stewards of a region's drinking water quality but, in fact, their decisions can have significant impacts on source water quality and supply. Water providers and utilities have added responsibility to ensure that the water they serve is safe for their customers.

Denver Water understands the importance of maintaining high quality source water, as shown through Denver Water's mission "to be a responsible steward of the resources, assets and natural environments entrusted to us in order to provide a high-quality water supply, a resilient and reliable system, and excellent customer service". Denver Water has been collecting water quality and flow data in its watersheds since the 1970's. After many revisions of the focus and design of the watershed monitoring efforts, the most recent Watershed Monitoring Project was launched in 2002.

As part of an Integrated Resource Planning process in 2011, Denver Water concluded that its water treatment plants are fed by watersheds with relatively high quality water; consequently, the probability of needing to add advanced treatment technologies to these plants in the 20-year budgeting period is considered to be low. However, should advanced treatment be needed, it will be expensive. Cost estimates range from $1.0 to $1.8 billion depending on the technology implemented. Avoiding technology upgrades through watershed protection is anticipated to cost much less.

In 2012, Denver Water selected the Upper South Platte River Watershed for its first preliminary water quality assessment and to develop a standard watershed evaluation approach that can be applied to the remaining watersheds. The watershed covers over 2,600-square-miles and reaches from the Continental Divide to the Strontia Springs Reservoir, southwest of Denver. It varies in elevation from about 6,000 feet to over 14,000 feet above sea level and contains five major municipal and several smaller reservoirs. The watershed is geographically the largest of Denver Water's source water watersheds and provides municipal water for about three quarters of Colorado's residents. It is a recreational mecca with over 1.6 million acres of public lands, renowned for its "gold-medal" fishing streams and is home to numerous threatened and endangered species.

Denver Water hired ARCADIS in December 2012 to evaluate the water quality data for the Upper South Platte River in close collaboration with Denver Water staff and Jim C. Loftis, Ph.D. Professor in the Civil and Environmental Engineering Department at Colorado State University. The results from the water quality assessment demonstrated that the Upper South Platte Watershed is generally in good health and that water quality has been stable or improving over the last 10 years.

Denver Water's formal Upper South Platte Watershed Source Water Protection Planning process was initiated in 2013. The plan was developed as part of a collaborative stakeholder process convened by Denver Water, facilitated by the Coalition for the Upper South Platte, and funded by the Colorado Department of Public Health and Environment through the Colorado Source Water Assessment and Protection program. The planning process and final plan are designed to provide municipal water providers, local governments and the public with information about drinking water, as well as provide a way for water providers and community members to get involved in protecting the quality of their drinking water. The program encourages community-based protection and preventive management strategies to ensure public drinking water resources are kept safe from future contamination.

The planning process recognizes that decision makers, public water providers, and emergency response personnel all play key roles in protecting water quality, both in the short and long terms. They are the community's front line to protect against spills and emergencies, deal with everyday contaminants of concern, mitigate negative impacts of development, and protect against long-term watershed degradation. For this reason, a Steering Committee comprised of broad stakeholders was convened to help direct the project.

The Steering Committee worked with subject matter experts to develop Best Management Practices (BMPs) for contaminants of concern within the watershed. These BMPs will be implemented to protect against contamination from chemical spills, leaking fuel tanks, inadequate septic systems, nutrients from agriculture, mine contamination, oil and gas development, and forest fires. In addition, protecting against long-term watershed degradation requires coordination between land managers and public water providers. It is critical that decision makers, public water providers, and emergency planning personnel have an understanding of potential impacts on source water.

Denver Water has been working with others in Colorado to improve water quality monitoring and evaluation, to increase participation in watershed groups, and to lobby for increased protection of drinking water sources. This plan for the Upper South Platte Watershed will serve as a guide and template for the development of plans in other watersheds upon which Denver Water's customers depend.

The following checklists are designed to assist these front line personnel in performing their water quality protection duties. The checklist is broken out into two sections; the first section details how to set up a plan and the second section provides specific checklist for topic areas that were developed during the plan setup. Section One of the checklist has been completed and can be used as a model for other Source Water Protection planning efforts.

SECTION ONE – HOW TO SET UP A SOURCE WATER PROTECTION PLANNING PROCESS

Task I - Characterize the Source Water Protection Area

The size and configuration of the source water protection area is dependent on natural topography, direction of surface water flow, direction of groundwater flow, soil types, velocity and quantity of flow, and other factors. Each source water protection area includes a set of unique features, such as roads or developments that may impact water quality in wells and surface water intakes. The following steps outline how to set up a source water protection area.

- ☐ Work with CDPHE to obtain a copy of the Source Water Assessment for the water source watershed

- ☐ Characterize the water supply setting
  - Identify locations of water treatment and supply facilities
  - Identify watershed boundaries
  - Identify and obtain past watershed plans in proximity to watershed
  - Gather and analyze existing water quality data
  - Gather data related to watershed health, including locations of potential contaminate sources
  - Compile information and create maps of potential contaminate sources

- ☐ Based on the Source Water Assessment and the water supply setting, determine boundaries for the source water protection area

Task II – Identify Steering Committee and Key Stakeholders

Water quality protection and proper land use planning are integral components of an effective source water protection plan. Understanding who all of the relevant, well-informed players are becomes vitally important in ensuring a balanced, inclusive and representative steering committee and plan. To formulate an effective strategy and plan, engage stakeholders whose interests are well represented throughout the watershed including, but not limited to, federal, state and county landowners and agencies; as well as local governmental authorities, established and respected nongovernmental organizations whose missions embrace watershed concerns and proactive citizens willing to aid and assist the planning process to the benefit of their communities.

- ☐ Identify key land use decision makers, landowners and planners and establish relationships. These may include representatives from:
  - Counties (including appropriate advisory boards)
  - Local governments (including municipalities, town, etc.)
  - Governmental Agencies (Federal, State and Local)
    - United States Forest Service (USFS)
    - Bureau of Land Management (BLM)
    - Environmental Protection Agency (EPA)
    - Colorado Parks and Wildlife (CPW)
    - Colorado Department of Public Health and Environment (CDPHE)
    - Water Conservancy Districts
  - Non-governmental Organizations
    - Existing watershed groups
    - Environmental groups (e.g. Trout Unlimited)

- ☐ Invite select stakeholders and decision makers to join the Steering Committee

- ☐ Invite other key stakeholders to participate in the Source Water Protection Planning process

Task III - Identify and Prioritize Source Water Priority Issues

One of the first activities for the Steering Committee should be to identify the potential threats and risks for the watershed. Contaminants of concern in the source water protection area may range from man-made pollution to naturally occurring hydro-geomorphic issues. Knowing and understanding the range of land use activities and natural processes within the watershed helps drive the identification of potential pollutants and contaminants. The identification of these areas of concern will help to drive the selection process for determining which areas should be addressed in the plan.

- ☐ Convene meetings with Steering Committee to identify source water priority issues

- ☐ Provide background to Steering Committee, including information complied in Task I (Characterize the Source Water Protection Area)

- ☐ The Steering Committee should ask the following questions to help identify source water priority issues
    - Is there significant industrial, commercial, residential or recreational development or activity, current or planned?
    - Are there landfills, above or underground gasoline storage tanks or chemical storage, treatment or manufacturing facilities?
    - Are there large scale agricultural operations or small hobby farms which could raise nitrate/nitrite levels?
    - Is there extensive fertilization application used for agricultural and/or residential properties?
    - Are there past or present mining or other resource extraction operations or activities that can impact or degrade water quality? If so, map these operations and identify the associated potential contaminants.
    - How are roads, both hard and soft surface, treated for maintenance, ice removal, dust suppression, and/or weed eradication?
    - Is there widespread use of pesticides, herbicides and/or tree spraying for mountain pine beetles and if so, who typically is responsible for using and applying these compounds?
    - Are there naturally occurring contaminants in the SWPA (e.g., uranium or soils naturally high in phosphorus)? Highly erodible soils? Etc.
    - What are the wildfire impacts; past fires and future high risk areas?
    - Does water quality data indicate a degradation of watershed health?

☐ Based on answers to questions above, identify topics and areas of interest relevant to source water protection

☐ Prioritize contaminants of concern and topic areas

Rankings of High, Medium and/or Low priority are objective and take into account a range of conditions and circumstances. For instance, an important concern or issue might be ranked as “Low” priority because there are other plans, procedures and/or regulations in place that effectively address the issue. This plan should refer to these issues rather than needing to address them directly. Also a topic might be ranked as “High” priority because its implementation and rewards and benefits are easier to achieve and access. The table below is an example of the priorities given to the source water priority issues in the Upper South Platte.

Topic	High	Medium	Low
Wildfire and Forest Health	X		
Onsite Wastewater Treatment Systems	X	X	
Oil & Gas Development	X	X	
Uranium Development	X	X	
Natural Sources of Pollution Hydro-geomorphic Issues Mineral	 X		 X
Transportation Roads/Trails/Routes/Sediment Emergency Response/Spills/Impacts	 X X		
Agriculture	X		
Land Use/Development (Integrates into each topic area)	X		
Recreation	X		

Task IV – Conduct Stakeholder Meetings and Identify Best Management Practices for Source Water Priority Issues

Based on the ranking of source water priority issues from Task III, stakeholder meetings on the source water priority issues should be held. The stakeholder meetings bring in experts to present their view of the priority issues and to propose best management practices (BMPs). The following format worked well for the meetings in the Upper South Platte: have the Steering Committee meeting for an hour prior to the meeting to review BMPs from the previous topic. The experts were given two hours for their presentations and then BMPs for the watershed were developed in the final hour of the meeting. The following steps are guidelines for holding stakeholder meetings and developing BMPs.

- ☐ Identify experts who can present on the source water priority issues and recommend BMPs
- ☐ Schedule one or two meetings per priority issue for discussion with the Steering Committee, stakeholders, and experts
- ☐ Work with stakeholders, experts, and Steering Committee to develop BMPs for each priority issue
- ☐ Develop reasonable time-line for implementation of each BMP
- ☐ Identify entities responsible for implementation
- ☐ Determine costs for implementation and maintenance and identify potential funding sources

Task V – Prepare Source Water Protection Plan and Implement Best Management Practices

Once the stakeholder meetings on each of the source water priority issues are complete, it is important to document the source water protection planning process and the BMPs. The following steps outline how to document the protection phase of the planning process.

- ☐ Obtain the Source Water Protection Plan template from the CDPHE
- ☐ Complete Source Water Protection Plan and distribute to Steering Committee for review
- ☐ Revise Source Water Protection Plan and distribute to stakeholders

The following items relate to the implementation of the BMPs and are good guidelines for the implementation and protection phase of source water protection.

- ☐ Establish procedural processes to monitor local, state and federal development activities
- ☐ Develop effective communication strategies and collaborate with land use planners and engineers to provide comments, feedback and guidance to protect water quality on land use issues
- ☐ Establish an effective way to monitor updates to land use policies, land use agency plans and present source water protection planning concerns and planning BMPs
- ☐ Develop consistent language recognizing source water protection planning as an important community consideration and incorporate the language in Master Planning documents

SECTION TWO – BEST MANAGEMENT PRACTICES CHECKLISTS

The Steering Committee and other stakeholders developed the following Best Management Practices (BMPs) during the source water protection planning process. The intent of the BMPs is to improve source water quality in the watershed. The Steering Committee recognizes that not all of the BMPs can be immediately implemented and that some of the BMPs will take a number of years. The following checklist should be used to assist Denver Water staff and others invested in source water protection in performing their water quality protection duties.

ONSITE WASTEWATER TREATMENT SYSTEMS (OWTS)

Vast areas of the Upper South Platte River watershed are rural and remote. Many homes and communities in the watershed rely on residential septic systems rather than community sewers. The regions with community sewer are mainly located in the more densely populated northeastern region of the watershed. The Steering Committee understands that it is important to address contaminants of concern (including nutrients and trace organic pollutants) that come from OWTS discharges, failing septic systems, and residual contaminants from OWTS that could potentially impact local water quality. The Steering Committee recommends the following BMPs.

Coordinate GIS overlays and mapping to identify sensitive areas

- ☐ Research best data source for approximating septic system density (currently using well information)

- ☐ Define criteria for and identify sensitive drinking water areas
    - Proximity to stream(s) (1000 foot buffer)
    - Soil type(s)
    - Density of systems
    - Age of development(s)

In sensitive areas, perform surface water monitoring for nutrients and other potential contaminants

- ☐ Develop a sampling plan that will provide data to increase understanding how OWTS effect water quality

- ☐ Collect and analyze data to determine if OWTS contribute to water quality issues

Using targeted public outreach, develop effective OWTS awareness to inform landowners and realtors of BMPs

- ☐ Educate property owners and residents in the USP watershed on issues related to OWTS. Outreach may include:
    - Online public meeting to provide information
    - Door knocking in sensitive areas
    - Direct mail flyers

- [ ] Rebates and incentives to residents may be used to encourage proper OWTS maintenance

- [ ] Provide information to the real estate industry regarding regulations related to:
    - Transfer of Title requirements
    - Inspections
    - Pumping
    - Repairs at time of sale

Review OWTS regulations and standards

- [ ] Review the OWTS regulations for each county

- [ ] Identify the county representative(s) that handle OWTS issues and establish a line of communication for reviewing future developments that may impact water quality

- [ ] Participate in next review of Regulation to ensure source water issues are addressed

Encourage OWTS inspections and record submittals on property transfers

- [ ] Examine new County regulations for all four counties (adopted June 30, 2014) regarding inspections at transfer of title

- [ ] If not in effect, recommend that counties incorporate OWTS inspections at time of transfer

AGRICULTURE PRACTICES

Ranching is a vital part of the rich history of the Upper South Platte Watershed as well as a vibrant industry in the region today. From large-scale ranching operations to small hobby farms, ranching thrives in the western portions of the watershed. Strong and active associations and organizations help ranchers understand state-of–the-art ranching techniques and best management practices.

Programs offered through the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) also provide outstanding resources and funding opportunities for the ranching communities. There is still much to be done to ensure consistent BMPs that preserve and protect the resources impacted by agricultural activities.

Identify sensitive drinking water areas adjacent to and downstream of agricultural operations

- ☐ Gather GIS data indicating land use for agricultural purposes
- ☐ Define sensitive drinking water areas
  - Proximity to stream (1000 foot buffer)
  - Soil type
  - Density of operations
- ☐ Coordinate with Colorado State University (CSU) Extension Services, NRCS, and Conservation Districts to identify and protect priority areas

Draft standardized language and policies for grazing contracts between large landowners, land use managers and ranchers

- ☐ Research example lease language (USDA, NRCS, Cattlemen's Association, Colorado State Extension)
- ☐ Draft example contract containing sample language. Encourage use of
  - Riparian buffers
  - Hardened water crossings for livestock
  - Off channel livestock watering
- ☐ Distribute document to stakeholders and refine it as needed

- ☐ Develop a stakeholder based approach to engage the entities in using the new template

Using targeted education tools, develop effective agricultural practices materials to inform landowners and real estate industry of BMPs

- ☐ Identify/generate "Rural Realities/Lifestyle" resources e.g. http://www.extension.colostate.edu/gilpin/natu/natu_docs/Mountain Livestock Brochure-GilpinNew reviewed.pdf ; http://www.co.teller.co.us/communications/rural.htm

- ☐ With input from partners, develop and distribute outreach materials

Identify and promote funding opportunities for landowners to improve agricultural practices

- ☐ Create a list of funding sources for agricultural practices and BMP's

- ☐ Research ways to implement off-channel livestock watering practices

- ☐ Determine best outreach organization and coordinate with them. Potential partners include: NRCS, Colorado Cattleman's association, USDA, USFS, BLM

- ☐ Research the potential of funding for BMPs through conservation easements. Potential partners include: Cattleman's Land Trust, Palmer Land Trust, Mountain Area Trust, Colorado Open Lands and Colorado Agricultural Leadership Foundation (CALF).

Research the availability of augmentation water or regulatory alternatives for off channel livestock watering

OIL & GAS EXPLORATION

Oil and gas resource exploration and extraction in Colorado have been taking place since the mid-twentieth century. The majority of active extraction currently occurs in the northern part of the state, but areas within the Upper South Platte watershed have been identified as viable sources for exploration. This is a complex and potentially controversial issue. Matters of surface land ownership versus mineral rights and the vast areas of land involved in drilling can further complicate the issue. It is important to understand the many ways in which water can be impacted ranging from the intensive use of water for resource extraction to the impacts on water quality caused by drilling and extraction operations, as well as reinjection or water disposal.

The Colorado Oil and Gas Conservation Commission (COGCC), a division of the Colorado Department of Natural Resources is the agency that interfaces with the Colorado Oil and Gas Association (COGA) and the industry in regulatory and compliance issues. After presentations from COGCC and COGA, the Steering Committee recommended the following BMPs.

Participate in the BLM Master Leasing Plan process and the Pike and San Isabel National Forests Oil and Gas Leasing process

- ☐ Work with key agencies in BLM Master Leasing Plan process (Royal Gorge BLM, RMP, Pike San Isabel Oil and Gas Leasing Plan)
  - BLM (Statewide draft water stipulations for surface protection, NSO Municipal wells, etc. – get copies)
  - Park County (has regulations related to oil and gas development)
  - Colorado Department of Public Health and Environment (CDPHE)
  - COGA
  - COGCC
  - USFS

- ☐ Provide GIS layers as requested

- ☐ Attend planning meetings and provide comments relevant to source water protection

- ☐ Determine and define setbacks around reservoirs, perennial streams, wells, diversion points, and other sensitive areas

Work with other counties to raise awareness of BMPs for oil and gas development

- ☐ Identify environmentally sensitive areas for all of Upper South Platte watershed
- ☐ Contact local designee for each county, establish a relationship with them and inform them of recommendation of BLM Master Leasing Program
- ☐ Develop consistent language recognizing source water protection planning as an important community consideration and include language in Memorandum of Understanding with counties

Monitor oil and gas leasing on Denver Water properties

- ☐ Check COGCC permit application information on a regular basis
- ☐ Form working relationships with State Land Board personnel
- ☐ Provide guidance on suggested BMPs to local designee for each county

TRANSPORTATION: Roads and Maintenance

Multi-modal transportation corridors in the Upper South Platte Watershed range from social trails established over decades of recreational use to well-traveled State highways. The four State highways (285, 24, 67 and 9) that crisscross the watershed carry residents, commuters, tourists and commercial users throughout the watershed, and also connect them to major metropolitan and recreational destinations. The Steering Committee recommends the following BMPs related to roads and trails.

Identify sensitive areas and sediment transport/deposition potential occurring in proximity to these areas

- ☐ Review previous sediment impact assessments for sensitive area analysis
- ☐ Form a committee of experts to discuss this issue and assess priority areas
- ☐ Define criteria for sensitive areas (e.g., roads in close proximity to drinking water infrastructure, hazardous material trucking routes, etc.)

Identify maintenance entities that work in sensitive areas and provide maps of sensitive areas

- ☐ Identify who owns roads and maintains roads in the watershed. Likely parties include:
  - USFS
  - BLM
  - Counties
  - Private land owner and home owners associations
  - USFS
  - Colorado Department of Transportation (CDOT)
  - Denver Water
- ☐ Review county(s) BMPs – consolidate for road maintenance education at all levels (including targeted subdivisions/private ownership)
  - Integrate BMP training into existing annual organizational internal training events
  - Attend appropriate staff meetings for educational purposes

- ☐ Establish connections for weed spraying activities, share the sensitive areas near streams with them

Coordinate with road owners and trade organizations that deal with grading roads to do coordinated outreach and training of operators

- ☐ Identify existing projects that employ BMPs to use as project review sites for county maintenance crews – possibly develop a video tour or workshops
- ☐ Create “cheat sheet” with BMPs for road maintenance operators
- ☐ In sensitive areas, consider signage for blade operators (e.g., tilt left here)
- ☐ Consider presenting BMPs at APWA local annual conference
- ☐ Provide road maintenance training for Denver Water operators

Review USFS Road Construction Best Management Practices and integrate where appropriate

TRANSPORTATION: Emergency Response and Hazardous Waste

Effective emergency spill responses depend on excellent communication and quick actions by relatively few individuals, including emergency responders and water supply managers. Maintaining adequate water supply during floods, forest fires, windstorms, or manmade disasters is a matter of good planning to protect water supplies and power to operate treatment and supply facilities.

Roads and highways can contaminate water sources through spills, dust, and road treatments including salts, sands, and other chemicals for snow and ice. Additionally, fuels, oils, and other contaminates carried by vehicles can be released slowly onto roads and highways. Rapid and coordinated response and communication during all phases of Emergency Response is critical for the health and safety of area residents and their water supply.

Identify and raise awareness to sensitive areas and the potentially hazardous activities occurring in proximity

- ☐ Form a committee of experts to discuss this issue and assess priority areas
- ☐ Define criteria for sensitive areas (e.g., roads in close proximity to drinking water infrastructure, hazardous material trucking routes, etc.)
- ☐ Consider signage on the side of the road indicating that motorists are entering a sensitive source water protection area

Outreach to emergency responders and dispatchers to help them understand the potential impacts of spills and hazardous waste to source water quality

- ☐ Create and provide a laminated info card and dashboard stickers to emergency responders with
  - Colorado Spill Hotline Info: **1-877-518-5608**
  - Sensitive areas map
  - Denver Water and other agency contact information
- ☐ Distribute laminated card and dashboard stickers with hotline info to emergency responders

Conduct a spill kit inventory and provide spill kits to emergency responders in sensitive areas

- ☐ Do an inventory analysis of which emergency responders have spill kits and who is trained to use to use them

- ☐ Consider adding additional spill kits in emergency response vehicles – oil spill kits, hazmat kits (for car accidents, etc.)

- ☐ Provide kits to emergency responders who operate in sensitive areas and do not have kits

Encourage development of hazardous waste disposal and recycling programs in watershed

- ☐ Reach out to counties to see if they have existing programs

- ☐ Research ways and funding opportunities to develop programs. Potential focus areas should include:
    - Prescription take back programs
    - Electronics recycling
    - Habitat for Humanity paint recycling
    - Pesticide and herbicide disposal

- ☐ Coordinate with counties and other stakeholders to develop and promote hazardous waste disposal and recycling programs

FOREST HEALTH

The Upper South Platte Watershed has seen some of Colorado's most devastating wildfires. The 2002 Hayman Fire burned over 136,000 acres and is still ranked as the largest wildfire in Colorado history. In response to wildfires, many regional agencies and organizations have become experts at not only dealing with post-fire recovery, but have learned the importance of prevention through mitigation. Bringing a heavily forested watershed into a state of balanced vigor demands an ongoing and proactive approach to forestland management.

It is important to understand emerging, state-of-the-art, and innovative mitigation and treatment technologies. It is essential that Denver Water continue its vital leadership role in collaborative and cooperative planning and implementation processes such as the Front Range Roundtable that address these issues. The Steering Committee recommends the following BMPs.

Define setbacks and firebreaks for critical infrastructure and resources to coordinate emergency response

- ☐ Review existing reports for risk assessments for critical areas
- ☐ Make sure assessments include up-to-date information about drinking water infrastructure including reservoirs, water treatment facilities, and key water diversions
- ☐ Work with USFS and other stakeholders to define the setbacks required to protect infrastructure
- ☐ Share setbacks and critical areas with cooperating agencies through sharing of GIS data and pre-fire meetings
- ☐ Develop strategies for emergency response including, identification of key responders, development of protocols for rapid response, and coordination with Denver Waters Emergency Response Team.

Identify funding resources for forest health projects

- ☐ Identify potential funding agencies including governmental and non-governmental programs

- ☐ Create a funding resource guide including a calendar of funding deadlines, eligibility requirements, and other relevant information

- ☐ Prepare for funding cycles by identifying and prioritizing potential projects. This may include:
    - Identifying appropriate project partners
    - Identifying project needs
    - Developing project budgets

Participate in research and outreach related to forest health topics

- ☐ Foster relationships with researchers including those at Colorado State University, the Water Research Foundation, and other groups funding forest health research

- ☐ Participate in local watershed activities related to forest health

- ☐ Promote forest health education related to prescribed burns, forest treatments, and potential legislation related to forest health

MINE DRAINAGE AND URANIUM DEVELOPMENT

Colorado's history is, in large part, built on mining. The promise of wealth from mining brought many people to the area in the mid-1800's and for decades was a major economic driver within the state. Mineral mining still thrives in the state and impacts related to past and abandoned mining activities still pose issues throughout the watershed.

Uranium was first discovered in the United States in Colorado. While the highest concentration of active uranium projects are in the southwest region of the state, there is a long history of uranium mining in Park County. Since this is a heavily regulated and monitored industry, it is important to be aware of updates to related regulations, stipulations and laws.

Research and partner with groups and agencies already working on abandoned mine issues

- ☐ Check in with the Colorado Abandoned Mine Team whose members include participants from USFS, USFWS, DRMS, CDPHE, EPA, CUSP, and local counties

- ☐ Work with the BLM to establish and draft a cooperative agency agreement and to update their Resource Management Plan

Develop a method to monitor and track mine permit applications

- ☐ Develop an internal Denver Water tracking process for mine permit applications that defines:
  - Who at Denver Water gets notified during the permitting processes
  - How Denver Water staff coordinates and communicates with counties and DRMS

- ☐ Review permits for potential impacts to source water quality and provide input to the counties and DRMS as needed

Define setbacks from water sources and critical infrastructure

- ☐ Work with partners and stakeholders to provide input on creating setbacks that are protective of source water quality

- ☐ Participate in BLM's Master Leasing Plan and provide recommendations on setback distances

- ☐ Consider requiring setbacks under Colorado's Rule 317(b) which provides a setback distance and additional BMPs and containments up to a ½ mile upstream of water intakes

HYDRO-GEOMORPHIC ISSUES

The hydro-geomorphology of the region is critical to understanding impacts on source water. Knowing the material makeup of the river bank, as well as its stability is important in preparing for and preventing river bank erosion. In addition, understanding the top- and sub-soil makeup aids in preparing for additional sediment transport to the river through both the saturated and unsaturated zones.

Identify and map existing Watershed Assessment of River Stability and Sediment Supply (WARSSS) and similar type studies and reports within the watershed

- ☐ Implement WARSS Rapid Assessments in areas with no data

- ☐ Get involved and participate in Basin Implementation Plans and river basin roundtables
    - How do they tie to WARSSS and other assessments
    - What is the relationship between the water quantity and water quality
    - Is funding available for assessments from the roundtables

- ☐ Identify high priority projects
    - Identify partners
    - Identify funding sources as needed

MONITORING

Monitoring the progress of the SWPP is vital to its overall success. Monitoring helps identify areas in which the plan has not been followed or is behind schedule and can bring the project back on task. In addition, it allows for critique of the plan and implementation of changes as issues inevitably arise.

Increase monitoring of source water priority constituents with special monitoring projects

- ☐ Identify areas in plan that would benefit from specific monitoring
  - Existing/ongoing
  - New monitoring projects

- ☐ Attend DW fall monitoring meeting to discuss needs for the source water plan
  - First go over the existing monitoring program/strategy to understand what DW is currently doing
  - Outline needs for out-of-house monitoring
  - Get broader group together to define monitoring projects

- ☐ Prioritize contaminants

- ☐ Develop monitoring plan for source water; identify specific needs that would become special projects with DW and/or outside partners

- ☐ Cohesive monitoring plan – assess existing data and process; reevaluate the monitoring strategy and modify to meet the needs of the source water plan

GIS/MAPPING

GIS and mapping are the tools that tie the plan together. They provide the picture of where source water points exist in the watershed as well as the proximity of activity to those points. Effectively using GIS can be a complex process and requires cooperation from many stakeholders. Hosting the large amounts of information needed to create functional products is a challenge that requires identifying both needs and products as well as existing information and gaps in needed information.

Create an online GIS tool to share information related to source water protection with stakeholders

- ☐ Identify each plan area that requires GIS, layers and mapping components

- ☐ Identify audience(s). This will inform what layers are needed
    - Internal Denver Water use
    - Small fire districts, water providers
    - Public use

- ☐ Based on the targeted audience, identify the type of functionality required
    - ArcGIS
    - Online tools

- ☐ Identify applications/data/systems hosting options
    - Secured/unsecured (data security criteria)
    - Develop a list of what data is shared with stakeholders vs. public
        - Secured for identified stakeholders
        - Unsecured for public access
    - ESRI

- ☐ Data gaps analysis for required layers for the plan
    - Identify what entities will have the information,
        - Counties
        - USFS
        - DW
        - BLM, etc.

- ☐ Analyze value/benefits of more resource-intensive GIS tools

OUTREACH & EDUCATION

Effective outreach and education is critical to the planning process and ensuring that clear information and tools get to the entities and people who need them. Developing a structure and platform for information dissemination is vital to the plan implementation. Messaging must be cohesive, consistent and targeted.

Create an outreach and education campaign to inform stakeholders about source water protection priority issues

- ☐ Identify each plan area that requires outreach and education
  - Determine the strategies that best fit each area
  - Identify existing educational materials
    - Reach out to entitles that have good educational resources and inform them of the SWPP and ask for their help in getting info regarding source water out to their constituents
    - Use and link these materials before developing new material
  - Determine new materials that need to be developed

- ☐ Work with Denver Water's Public Affairs department to integrate messaging related to source water protection into Denver Water's existing messaging program

- ☐ Develop additional outreach and educational materials as needed. Be sure to consider the following:
  - Who is the audience?
  - What do they need?
  - How can the information be share effectively?

Enter into a Memorandum of Understanding regarding source water protection

- ☐ Draft Memorandum of Understanding (MOU) with input from Steering Committee

- ☐ Reach out to staff from the counties who have participated in the source water protection planning effort to determine how to introduce the MOU to County Commissioners

- ☐ Present MOU to County Commissioners and sign MOU

INTERN

As part of the grant from CDPHE, a portion of the funds must be used for implementation of the BMPs. The Steering Committee decided that a good use of those funds would be to hire an intern to get started on some of the high priority BMPs. The Upper South Platte Watershed Source Water Intern will work on projects to protect the water quality of the Upper South Platte Watershed. The following steps outline the process for hiring the intern and the tasks the intern should work on.

Hire a Source Water Intern to assist with the implementation of BMPs

- ☐ Write job description for the internship

- ☐ Submit a letter indicating intent to spend implementation funds to CDPHE on Source Water Intern

- ☐ Work with CUSP to hire intern
  - Post job announcement
  - Screen candidates
  - Interview candidates
  - Select intern

- ☐ Work with interns to implement BMPs. Projects may include:
  - Developing educational and reference materials for professionals and the public on topics such as septic system best practices, agricultural management, road maintenance, hazardous spills response, forest health, mining, and erosion mitigation as they relate to protecting water quality
  - Creating inventories of existing resources, such as spill kit availability for hazardous spill response and funding sources for landowners to make water quality improvements on their property
  - Connecting residents in the Upper South Platte Watershed with existing resources for protecting water quality in their area
  - Coordinating with other organizations to develop or disseminate resources and plan projects
  - Attending conference call meetings with the larger source water protection team