



Agenda

CITY CLERK'S OFFICE

DATE 5.3.17 TIME 9:31am

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SANTA FE WATER CONSERVATION COMMITTEE MEETING

CITY HALL - 200 LINCOLN AVE.

CITY COUNCILORS' CONFERENCE ROOM

May 9, 2017

4:00 PM TO 6:00 PM

1. CALL TO ORDER
2. ROLL CALL
3. APPROVAL OF AGENDA
4. APPROVAL OF CONSENT AGENDA
5. APPROVAL OF MINUTES FROM THE APRIL 11, 2017 MEETING

CONSENT AGENDA

6. UPDATE ON CURRENT WATER SUPPLY STATUS (Christine Chavez)
7. MONTHLY OVERVIEW OF SCORECARD PROGRESS (Christine Chavez)
8. REGIONAL WATER AUTHORITY WHITE PAPER (Councilor Ives)

ACTION ITEMS:

9. NOMINATION TO FILL REMAINING VACANCY ON THE SANTA FE WATER CONSERVATION COMMITTEE (Bill Roth, 10 minutes)

INFORMATIONAL ITEMS:

10. SANTA FE WATER CHARTER PROJECT (David Groenfeldt, 20 minutes)
11. 2016 GPCD (Christine Chavez, 15 minutes)
12. STORMWATER FILTRATION AND CATCHMENT OBSTACLES AND OPPORTUNITIES (Aaron Kauffman, 30 minutes)
13. GROUP REPORTS FROM WATER CONSERVATION COMMITTEE WORKING GROUPS
 - A. GROUP 1 – Irrigation Subcommittee (Caryn Grosse, 5 minutes)
 - B. GROUP 2 – General Education Program (Christine Chavez, 5 minutes)
 - C. GROUP 3 – Marketing Outreach (Christine Chavez, 5 minutes)
 - D. GROUP 4 – Water Conservation Codes, Ordinances and Regulations (Doug, 5 minutes)
 - E. GROUP 5 – Grants (No update)

MATTERS FROM PUBLIC:

MATTERS FROM STAFF:

MATTERS FROM COMMITTEE:

NEXT MEETING – TUESDAY JUNE 13, 2017:

CAPTIONS: MAY 30, 2017 @ 3 PM.

PACKET MATERIAL: MAY 31, 2017 @ 3 PM.

ADJOURN.

Persons with disabilities in need of accommodations, contact the City Clerk's office at 955-6520, five (5) working days prior to meeting date.

SANTA FE WATER CONSERVATION COMMITTEE
MEETING INDEX
May 9, 2017

Item		Page
Call to Order	Councilor Ives, Chair of the Water Conservation Committee called the meeting to order at 4:04 p.m. at the Water Division Conference Room	1
Roll Call	A quorum was established at roll call.	1
Approval of Agenda	Ms. Randall moved to approve the agenda as presented with a second from Mr. Kauffman which passed by voice vote.	1
Approval of Consent Agenda	Ms. Randall moved to approve the consent agenda as amended with a second from Mr. Wiman which passed by voice vote.	1
Approval of Minutes from the April 11, 2017 Meeting	Mr. Coombe moved to approve the minutes as presented with a second from Ms. Randall which passed by voice vote.	2
CONSENT AGENDA: <ul style="list-style-type: none"> • Update on Current Water Supply Status • Monthly Overview of Scorecard Progress 	Discussion Only	2 2
ACTION ITEMS: <ul style="list-style-type: none"> • NOMINATIONS TO FILL TWO VACANCIES ON THE SANTA FE WATER CONSERVATION COMMITTEE 	Mr. Roth moved to nominate Mr. Scott Bunton to fill the vacancy on the Water Conservation Committee with a second from Mr. Wiman which passed by voice vote.	2
INFORMATIONAL ITEMS: <ul style="list-style-type: none"> • Regional Water Authority White Paper • Santa Fe Water Charter Project • 2016 GPCD • Stormwater Filtration and Catchment Obstacles and Opportunities • GROUP REPORTS FROM WATER CONSERVATION COMMITTEE WORKING GROUPS <ul style="list-style-type: none"> ○ GROUP A Irrigation Rebate and QWEL ○ GROUP B Expansion of the K-12 Education Program ○ GROUP C Scorecard ○ GROUP D Water Conservation Codes, Ordinances and Regulations 	Discussion Only	2 2,3 3 3,4 4
MATTERS FROM THE PUBLIC	Discussion Only	4
MATTERS FROM STAFF	Discussion Only	4
MATTERS FROM COMMITTEE	Discussion Only	4
NEXT MEETING: Tuesday June 13, 2017 Captions: May 30, 2017 @ 3:00 p.m. Packet Material: May 31, 2017 @ 3:00 p.m.	Discussion Only	5
ADJOURN	There being no further business to come before the Santa Fe Water Conservation Committee the meeting as adjourned at 6:07 p.m.	5
SIGNATURES		5

SANTA FE WATER CONSERVATION COMMITTEE MEETING

City Councilor's Conference Room

200 Lincoln Ave. Santa Fe, NM

May 9, 2017

4:00 p.m. to 6:00 p.m.

1. CALL TO ORDER

Councilor Ives, Chair of the Water Conservation Committee called the meeting to order at 4:04 p.m. at the Water Division Conference Room. A quorum was established at roll call.

2. ROLL CALL

PRESENT:

Councilor Peter Ives, Chair

Lisa Randall, Co-Chair

Aaron Kauffman

Tim Michael

Robert D. Coombe

Stephen K. Wiman

Ken Kirk

Doug Pushard

Justin Lyon

Bill Roth

NOT PRESENT/EXCUSED:

OTHERS PRESENT:

Christine Y. Chavez, City of Santa Fe Water Conservation Manager

Caryn Grosse, City of Santa Fe Water Conservation Specialist

Linda Vigil for Fran Lucero, Stenographer

David Groenfeldt, Water Culture Institute

Several members of the Santa Fe Art Institute

Andy Otto, Santa Fe Watershed Association

3. APPROVAL OF THE AGENDA

MOTION: Ms. Randall moved to approve the agenda as presented with a second from Mr. Kauffman which passed by voice vote.

4. APPROVAL OF THE CONSENT AGENDA

Mr. Michael would like to remove the Regional Water Authority White Paper from the consent agenda and have it as an item to discussion.

MOTION: Ms. Randall moved to approve the consent agenda as amended with a second from Mr. Wiman which passed by voice vote.

5. APPROVAL OF MINUTES FROM APRIL 11, 2017 MEETING

MOTION: Mr. Coombe moved to approve the minutes as presented with a second from Ms. Randall which passed by voice vote.

CONSENT AGENDA

6. UPDATE ON CURRENT WATER SUPPLY STATUS (*See Exhibit A*)

7. MONTHLY OVERVIEW OF SCORECARD PROGRESS

DISCUSSION

8. REGIONAL WATER AUTHORITY WHITE PAPER

Councilor Ives asked if all were able to review. (*See Exhibit B*) Mr. Michael appreciates the Committee moving it for discussion. Mr. Michael would like his statement that he disagrees with the statement that water is the limiting resource for development in the City.

A discussion was held about possibly changing the language to a limiting resource.

Councilor Ives is willing to take that information back to adjust it. Mr. Michael is not suggesting the language be changed, he merely wanted his statement on record. Ms. Chavez stated the document was already presented in the Public Works Committee.

Councilor Ives explained the initial interest in creating a regional water authority. Mr. Pushard asked if the meetings with the County have started. Councilor Ives stated they have not yet started meeting however the County would like to discuss more broad issues.

Mr. Kirk read the white paper and was shocked that it didn't show any future action about taking it further.

ACTION ITEM

9. NOMINATION TO FILL REMAINING VACANCY ON THE SANTA FE WATER CONSERVATION COMMITTEE

Mr. Roth discussed the latest nomination for the Santa Fe Water Conservation Committee, they are honored to have Scott Bunton show an interest in becoming a member. He has an extensive background in public policy. Ms. Chavez explained Mr. Kirk has taken the place of the County member.

MOTION: Mr. Roth moved to nominate Mr. Scott Bunton to fill the vacancy on the Water Conservation Committee with a second from Mr. Wiman which passed by voice vote.

INFORMATIONAL ITEMS

10. SANTA FE WATER CHARTER PROJECT

Mr. Dave Groendfeldt from the Water Culture Institute, explained his work. Mr. Groenfeldt discussed his book on water ethics and the efforts to facilitate a water charter. He explained the conflicting values and making a statement of principles. The statement would be documentation on what the community can agree upon. The concept he is looking to draft it after is the Berlin Water Charter (See Exhibit C).

Mr. Groenfeldt is working on holding meetings with stakeholders and then focus groups. Based on what they discuss, they will develop a straw charter. Then they will have facilitated workshops. After it is developed they will present to the City and the County.

A brief discussion was held on water law. Mr. Groenfeldt introduced some members of the SF Art Institute who came with him this evening. Mr. Wiman mentioned the photography project that Mr. Groenfeldt is working on. Mr. Groenfeldt is also working on a water infrastructure project.

11. 2016 GPCD

Ms. Chavez updated the Committee on the data she collected and presented it on the overhead projector. The annual measurements will have the readings from the new meters.

Ms. Chavez explained that schools, state buildings, and churches were counted as residential. The Utilities Department has an inside knowledge of the data. On Friday Ms. Chavez worked with the data and reached a number that made sense.

Ms. Chavez showed a graph which showed the trend. She is still in the middle of adding the historical numbers going back to 1995. Councilor Ives asked to see a 2016 accounts breakdown.

Ms. Chavez discussed the numbers for single family residents and multi family. Mr. Roth asked if the landscape the irrigation go under a different category. Ms. Chavez explained the single family is captures both.

Ms. Chavez will still work on the data for outdoor use, perhaps they can have a pilot project where a sample of homes to track the real-time data.

A discussion was held about the disparity in the numbers. Mr. Pushard thanked her for adding the historical numbers as well.

Ms. Chavez explained the math formula used to determine the number. Councilor Ives would like to see the outdoor use for a portion of the year, it would be interesting to see the winter months.

Mr. Lyon would like to know the assumptions for housing occupancies. Councilor Ives explained there us the Affordable Housing Report available that may help.

Ms. Chavez stated she will continue to work on the data and will update the Committee.

12. STORMWATER FILTRATION AND CATCHMENT OBSTACLES AND OPPORTUNITIES

Mr. Kauffman presented a chart and list of ideas for catchment systems (See Exhibit D). Mr. Kauffman presented a slideshow with his ideas of opportunities for stormwater catchment. There is data from Ms. McDonalds report that is helpful. Councilor Ives mentioned the EPA grant matched by City funds to develop a new Stormwater plan.

Mr. Pushard would like to know the number of the impervious surfaces and rooftop catchment.

Mr. Wiman asked if any of the State statutes have changed. Mr. Kauffman stated there is an amount that can be captured.

A discussion was held about the City clause on roof catchment and the public right of way and how it can be reused.

Councilor Ives would like the legal department to speak about the clause and someone from the OSE as well perhaps at the next meeting.

Ms. Chavez discussed the recent rain gardens and how with the Sustainable Water Commission the water component will come in.

A brief discussion was held about the Santa Fe Watershed Association and the joint effort with the City.

13. GROUP REPORTS

- A. GROUP 1-Irrigation Subcommittee**
- B. GROUP 2- General Education Program**
- C. GROUP 3- Marketing Outreach**
- D. GROUP 4- Water Conservation Codes, Ordinances and Regulations**
- E. GROUP 5- Grants**

Councilor Ives would like the working groups to report early in the next meeting due to the lack of time.

14. MATTERS FROM THE PUBLIC

There were visitors from Long Island who just started a water conservation committee in their area. She would like to meet with Committee members to get information to take back with her. Councilor Ives is willing to meet with them.

15. MATTERS FROM STAFF

Ms. Chavez discussed the upcoming Water Summit. Committee members are welcome to attend however the classes will have a cost. The Green Expo is also coming up.

Ms. Chavez discussed Mr. Patricio Pacheco who was a temporary employee and received the Muchimas Gracias from the City was hired on full time. They are very excited to have him.

16. MATTERS FROM COMMITTEE

There were not any matters from the Committee.

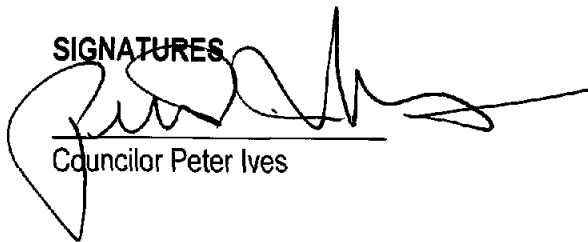
17. NEXT MEETING JUNE 13, 2017

The meeting will need to be rescheduled due to several conflicts. The date that has been decided will be June 8, 2017 it can be held at BDD.

18. ADJOURN

There being no further business to come before the Santa Fe Water Conservation Committee the meeting as adjourned at 6:07 p.m.

SIGNATURES



Councilor Peter Ives



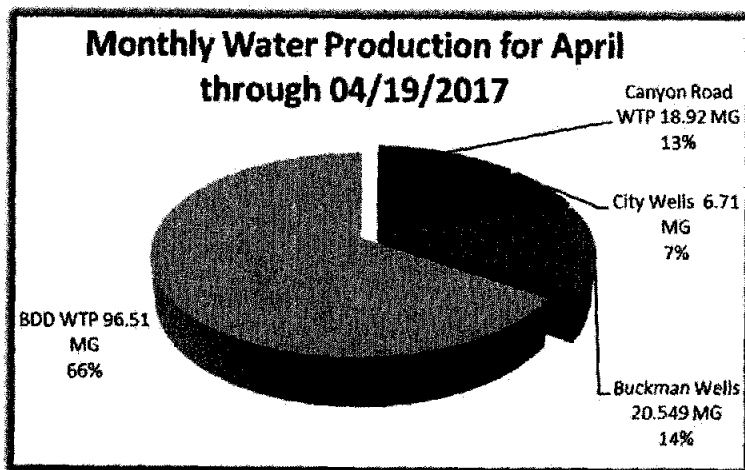
Linda Vigil for Fran Lucero, Stenographer

**City of Santa Fe, Source of Supply Section/Water Division
Water Production Update - through April 19, 2017
Public Utilities Committee Meeting
May 3, 2017**

Old Filter Plant Site

The Water Division met with the Parks and Recreation Division, the River and Trails Section and Canyon Road Neighborhood Association on March 13th to finalize the preferred trail route through the "Old Filter Plant" property and develop a revegetation scheme. Soil preparation, seeding and tree/shrub plantings at the site are expected to take place throughout April and May.

Water Production for February (through 04/19/2017)



Total Production of System:

**Sum of Production through April 19th:
96.41 MG for 16 days**

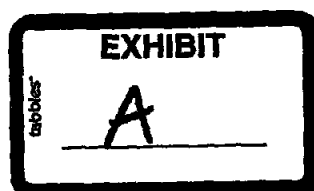
**Daily Average:
7.51 MGD (up from 6.025 MGD in March)**

Reservoir Storage Levels

**McClure: April - 481.63 MG or 44% of total reservoir storage
March - 285.2 MG**

**Nichols: April - 154.73 MG or 72% of total reservoir storage
March - 117.52 MG**

**Combined: April - 636.36 MG or 49% total combined reservoir storage
March - 402.72 MG**



2016 Santa Fe River Target Flow (Living River Bypass Flows)

Below Nichols Reservoir (Living River Bypass Flows)

Current: 2.0 cubic feet per second (cfs)

March: 0.30 cfs to 1.0 cfs

Per the River Commission's recommendation, the Santa Fe River target flows will continue until April 30th (instead of April 15th) to accommodate the final 740 acre-feet of bypass flows for 2016.

Above McClure Reservoir (Inflow to the Reservoir):

April 19th – 18.45 cubic feet per second (cfs) or 11.93 MGD

March - 11.16 cubic feet per second (cfs) or 6.01 MGD

2017 Santa Fe River Target Flow (Living River Bypass Flows)

Attached is the 2017 Santa Fe River Target Flow Hydrograph of 760 acre-feet for the year (please, see the attached graph), based upon the April 1st NRCS streamflow forecast of 76% of the 30 year average streamflow yield for the Santa Fe River. You will notice peaks in the hydrograph on May 15th, for the San Isidro River Blessing, and on September 21st, for the Jewish Tashlikh celebration.

Baca Street Well

The City continues to discuss the site with the New Mexico Environment Department's Petroleum Storage Tank Bureau as new information is generated and becomes available. NMED is requiring additional sampling by PNM contractor as a result of the first sampling investigation completed in 2016. Many wells still exhibiting high levels of nitrates and/or BTEX constituents, including benzene and free or "floating" product composed of degraded gasoline or diesel.

Source Water Protection Plan

The Source of Supply (SOS) Section has been working with the New Mexico Environment Department and their contractor, Daniel B. Stephens and Associates (DBSA), to develop a "Source Water Protection Plan (SWPP) to secure and protect all sources of supply from contamination and other threats. A draft Source Water Protection Plan was completed on 03/17/2017, by DBSA. This document was presented at the April 6th PUC meeting. SOS is in the process of assembling a Source Water Protection Team composed of internal and external stakeholders to provide review of the document and provide input on necessary revisions. The Water Division will hold a public meeting on a final draft of the plan for City residents and water consumers after meeting with these stakeholders and making necessary revisions.

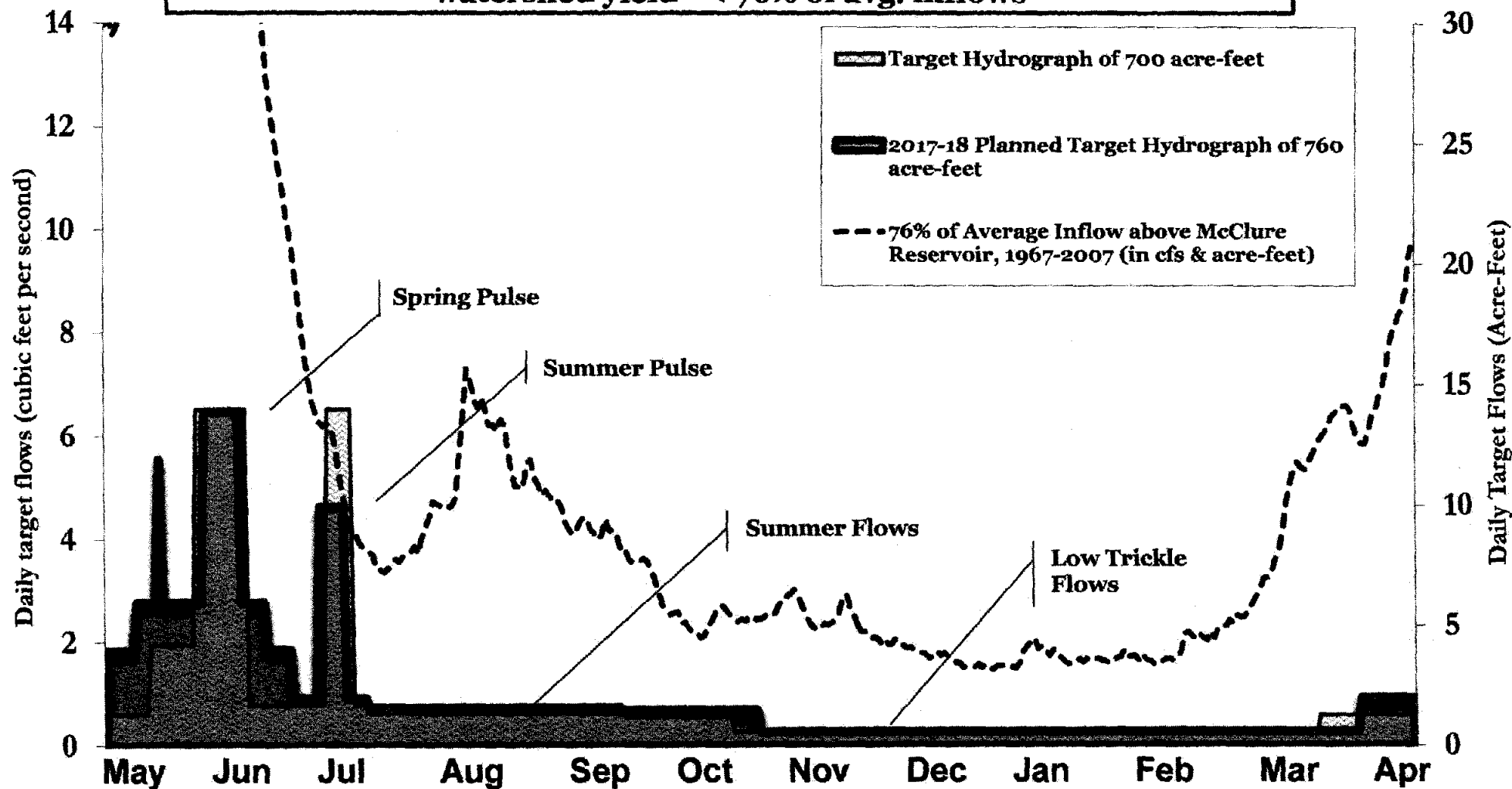
Drought/Monsoon, Storage, and ESA Update

NOAA has recently updated (3/10/17) ENSO (El Niño/La Niña) status to: **ENSO-neutral conditions are present. ENSO-neutral conditions are favored to continue through at least the Northern Hemisphere spring 2017, with increasing chances for El Niño development by late summer and fall.** Regional reservoir levels on the Rio Grande and Chama Rivers are still low, but rising. Upper Santa Fe River reservoirs are low so City draw down has been reduced accordingly, with a corresponding increase in BDD diversions from the Rio Grande, and moderate increases in groundwater well use. However, City reservoirs are rising rapidly. Preliminary estimates for 2017 are for an approximate 100% delivery of full firm-yield of San Juan-Chama Project (SJCP) water. There are no water-related Endangered Species Act (ESA) updates. Updates on ESA issues will be made as needed. Rio Grande Compact Article VII storage restrictions went back into effect 4/22/16, which means the City will not be allowed to impound "native" runoff into Nichols and McClure Reservoirs above the pre-Compact pool of 1,061 acre-feet (AF) (unless an exchange for water is made with the NMISC). However, Article VII restriction should be lifted any day now. Updates to this condition will be made as needed.

Most Current City of Santa Fe SJCP Reservoir Storage Amounts:

Heron:	5,029 AF (2016 deliveries were at about 95% of annual total.)
El Vado:	1,239 AF
Abiquiu:	9,815 AF (SJCP carry-over from previous years, no time limit to vacate due to storage agreement with ABCWUA)
TOTAL:	16,083 AF

2017-18 PLANNED HYDROGRAPH: 760 af Target Allocation, anticipated watershed yield = < 76% of avg. inflows





Water Conservation Office

Monthly Overview of Scorecard Progress – April 2017



Education Outreach:

Education Initiative:

- Model Presentation as part of Watershed Field Trip – Rio Grande Girls School - 23 participants
- Model Presentation as part of Watershed Field Trip – Wood Gormley - 25 participants
- Green Job Fair – ECO High School
- Attended SFPS Sustainability Task Force Meeting
- Earth Day Presentation at Sweeney Elementary

General Outreach:

Earth Day Event at the GCCC

Christian Women's Connection Luncheon – 28 participants



Communication and Customer Service:

Eye On Water Rollout:

2,033 signups as of 5/2/2017

Indoor Water Audits:

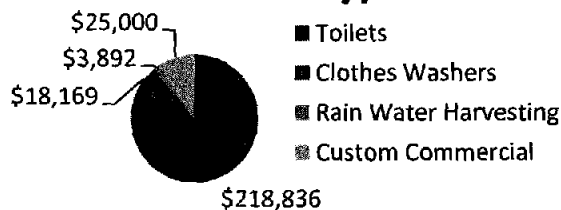
Residential and Commercial Rebates:

Remaining fund balance as of May 5, 2017: \$34,103.00

Rebate Fund



Rebate Amounts per Device Type



Rebates awarded FY-to-date:

- HET (all types) 1,498
- Clothes Washers (all types) 64
- Rain Water Harvesting (including rain barrels) 32
- Custom Commercial 1

Strategic Marketing Plan:

- Radio Show Guests (Tom Dominguez, Robert Wood, Councilor Ives, Customer Service)
- Update of complete PUC website underway – Conservation program charged with project
- New signage has been printed and is available – campaign being worked on to distribute
- Promotion of Next Generation Water Summit
- Campaign being developed to incentivize rest of rebate funding
- Campaign being developed for the high demand season focusing on eye on water and avoidance of Tier 2 rates

**Effective Program Management****Organizational Development:**

- Patricio Pacheco was just selected for the Water Conservation Education & Compliance Specialist

Water Conservation Committee:

- Ken Kirk was appointed to the Water Conservation Committee at Council on April 26, 2017

Integration with Water Resources:

- GPCD calculations are currently being reviewed.
- AWWA audit is in progress.
- Annual Water Report information is being gathered.
- Caryn Grosse assisting with the Long Range Water Supply Plan

**Stewardship and Conservation:****Regional Collaborations:**

- Lisa Noriega is serving on the NMWCA board.
- Caryn Grosse is working with the Xeriscape Council Conference Planning Committee.
- Christine Chavez is participating in the Next Generation Water Summit planning.
- Presented Program Scorecard at the Sustainable Santa Fe Meeting

City of Santa Fe, New Mexico

memo

DATE: 4.18.2017
TO: Public Utilities Committee
VIA: Shannon Jones, Acting Public Utilities Department Director *HK*
Rick Carpenter, Water Division Director *RC*
FROM: Andrew Erdmann, Water Resource Coordinator *AE*
RE: White Paper Concerning Regionalization of the Water Utility

The purpose of this white paper is to provide a City of Santa Fe (City) perspective on the topic of a regional water utility serving the City of Santa Fe and areas of Santa Fe County (County) near Santa Fe. The paper begins with a discussion of the background of this issue, includes some items to describe the contemporary context for the present debate about the issue, and concludes with a synopsis of the City Water Division's position.

Background

Historically the City water system was owned by the Public Service Company of New Mexico (PNM) and known as the Sangre de Cristo Water Company (SDCW). By 1979, City Council had recognized that water was a limitation on development and that expansion of the water system beyond the City was not necessarily in the best interests of the City. This concept is reflected in the franchise agreement under which PNM operated SDCW, the terms of which granted City Council veto power over any proposal to extend water service lines beyond the City limits.

In the 1980's, PNM operated SDCW with the oversight of the Metropolitan Water Board (MWB), an advisory group consisting of representatives from PNM, the City, and the County. The MWB commissioned a series of long range planning studies to evaluate various means of providing regional water service. One of the obstacles to creating a regional system which is identified in these reports is the presence of divergent views between the City and County concerning land use, growth, water resource management, and the impact of these issues on planning for regional water service.

In 1995, the City purchased the Sangre de Cristo Water Company from PNM and ownership and operation transitioned to the City over the next several years. Today, the City of Santa Fe Water Division is a part of the Public Utility Department which is governed by the Public Utility Committee (PUC), which is comprised of a subset of the City Councilors. Since the purchase of the utility from PNM, the City has invested heavily adding a new source of supply with a state of the art treatment facility, rebuilding both municipal reservoirs, taking a leadership role in the management of the municipal watershed, and becoming a national leader in per capita water use

EXHIBIT

B

even while accommodating many hundreds of thousands of tourists and commuters each year. The total cost of this investment is measured in hundreds of millions of dollars, a tremendous financial burden reflecting the high value that Santa Fe residents place on water security and sustainability.

The Albuquerque – Bernalillo County Water Utility Authority

In 2003 the State Legislature passed SD887 and created the Albuquerque/Bernalillo County Water Utility Authority (ABCWUA) which combined regional water and wastewater assets and liabilities between Albuquerque and Bernalillo County, the vast bulk of which had previously belonged to Albuquerque. This has become a leading model for regionalization in New Mexico including for a potential regional water authority in the Santa Fe area.

Unlike Bernalillo County, however, the portions of Santa Fe County that would likely be served by a regional utility do not share a watershed or a groundwater resource with the City and are not a unified population. In the unincorporated areas surrounding the City of Santa Fe development is characterized by dispersed homes on large properties of several acres sprawling from all sides of the City limits and mixed in with some small historic villages. The homes already existing in these areas are presently served water either by the County via the partially regionalized BDD treatment plant, or are on privately owned wells. This development pattern contrasts sharply with the City where development has occurred gradually, constrained until recent decades by available water from the Santa Fe River, in the form of densely-packed, small residential lots with very little outdoor watering.

The Buckman Direct Diversion

In 2009, the Buckman Direct Diversion (BDD) began diverting water to deliver to both City and County customers. The BDD operates through a sharing agreement between the City and County and is governed by a board consisting of an equal number of representatives from each entity. A lengthy negotiation concluded in December 2016 and resulted in an **Amended and Restated Water Resources Agreement between the City of Santa Fe and Santa Fe County** which outlines cost sharing, shortage sharing, and rates between the two entities with the intention of resolving recent conflicts over payments associated with the use of water from the facility. This facility is a regional project operated collaboratively by the City and County and undertaken to address regional shortages and improve system resiliency and shows the willingness and ability of the City and County to work together on water projects where the interests of the two parties coincide.

Solid Waste Management Agency

Another regional utility collaboration, though one unrelated to water service, is the Solid Waste Management Agency (SWMA). Formed in 1995, SWMA is responsible for the planning, operation, construction, and maintenance of the shared Caja del Rio Landfill and Buckman Road Recycling and Transfer station (BuRRT). The landfill was constructed with equal funding from all three participating entities – SWMA, the City, and the County. The Board consists of six members – three City Councilors and three County Commissioners – and has successfully governed a shared regional system which has made significant investments in assets as well as making improvements in recycling and service over the past 21 years.

Water Utilities in the Santa Fe Region

Finally, another relevant factor is the experience of other projects in the region designed to bring a centralized water utility to existing rural homes in the area. Two such projects have been undertaken in the Santa Fe area in recent times – one a local initiative in Eldorado and another a federal project in the Nambe-Pojoaque-Tesuque region. Despite the differences between the communities in which the projects were located, and the differences in scale between a federal and local project, both the Eldorado water utility and the Nambe-Pojoaque-Tesuque system have been largely unsuccessful at attracting customers from among existing homes served by privately owned water wells, a pattern which is likely to repeat with any attempt at bringing centralized water service to residents who have traditionally been autonomous. The fact that a shared water utility would likely require a higher rate structure to meet the additional costs associated with delivering water in rural areas and in areas beyond the Santa Fe watershed is likely to exacerbate this issue.

Conclusions

Within the City, it is generally recognized that water is the limiting resource to development and that planning for the allocation of water is the best manner in which to assure that the region will be able to continue to support the population who live there. The City has expended vast resources – close to a half billion dollars – over the past 20 years to purchase the SDCW, to become a national leader in water conservation, and to improve the City's water rights and infrastructure resilience in order to be prepared to continue to deliver clean, safe drinking water to City residents despite threats such as climate change and wildfire. The creation of a regional system along the lines of the ABCWUA could reverse progress toward municipal water autonomy and diminish the City of Santa Fe's ability to determine its own water future.

17 Principles for Water-Wise Cities

International Water Association, 2016¹

LEVEL 1 - REGENERATIVE WATER SERVICES

The main goal is to ensure public health and satisfy all current needs while protecting the quality and quantity of water resources for future generations by efficient production and use of water, energy and materials.

1. REPLENISH water bodies and their ecosystems within the basin by taking from or discharging to them only what can be given or absorbed by the natural environment. Reduce water intakes to match quantities that the natural environment is able to renew, and protect the quality of water sources from wastewater and urban run-off so that it is fit for ecosystems and for use with minimal treatment requirements.

2. REDUCE the amount of water and energy used. Minimise the amount of water used in accordance with storage capacities. Minimise the energy used in moving and treating urban waters, including rainwater.

3. REUSE and use diverse sources of water with treatment that matches the use, applying the “fit for purpose” water quality approach and Integrated Water Resources Management (IWRM⁵); **RECOVER** energy from water whether through heat, organic energy or hydraulic energy; **RECYCLE** and recognise the value of “upcycled” materials, such as nutrients or organic matter;

4. Use a SYSTEMIC APPROACH integrated with other urban services. Consider the different parts of a water system and other services such as waste or energy as a whole, to enable solutions that reduce and reuse while improving services costs efficiently.

5. INCREASE THE MODULARITY and ensure there are multiple resource, treatment, storage and conveyance options available throughout the system for ensuring service levels and resilience of urban water systems in the face of either gradual or sudden changes.

LEVEL 2 - WATER SENSITIVE URBAN DESIGN

6. PLAN AND IMPLEMENT URBAN DESIGN ENABLING REGENERATIVE WATER SERVICES. Design domestic and industrial precincts and buildings in ways that enables regenerative water services. This reduces the water, energy and carbon footprint of housing, contributing to its affordability through lower monthly bills. It also leads to cleaner waterways, benefiting ecosystems and people, while also improving social and urban amenities. It includes building green infrastructure to capture and treat stormwater for a range of co-benefits.

¹ www.iwa-network.org/wp-content/uploads/2016/08/IWA_Principles_Water_Wise_Cities.pdf

7. DESIGN URBAN SPACES TO REDUCE FLOOD RISKS. Increase resilience to flood risks by developing urban drainage solutions, integrated with urban infrastructure design so that safe flooding spaces are provided and the city acts as a “sponge”, limiting surges and releasing rainwater as a resource. Plan vital infrastructure to enable quick disaster recovery.

8. ENHANCE LIVEABILITY WITH VISIBLE WATER from roadside green infrastructure to major blue-green corridors as opportunities for recreation, inclusive public space, economic development and transportation, creating multi-purpose spaces and infrastructure. Urban water services are essential for ensuring sustainable irrigation of parks and gardens, providing shade and mitigation of heat islands.

9. MODIFY AND ADAPT URBAN MATERIALS TO MINIMISE THEIR IMPACT ON WATER POLLUTION: The urban materials of roofs, walls, surfaces, roads, and urban furniture [as well as agro-chemicals used for gardens, landscaping, and urban agriculture,] ought to be carefully selected to prevent the release of pollutants.

LEVEL 3 - BASIN CONNECTED CITIES

The city is intrinsically connected and dependent on the basin it is part of, and which interacts with neighbouring basins. By proactively taking part in basin management, the city secures water, food and energy resources, reduces flood risk and enhances activities contributing to its economic health.

10. SECURE THE WATER RESOURCE and plan for drought mitigation strategies by sharing the water resource with other users in the basin, namely agriculture, industry and energy sectors, and other cities who all contribute to the basin's and city's economy.

11. PROTECT THE QUALITY of the water resource together with the other basin stakeholders, to ensure high quality drinking water achieved with minimal treatment and energy requirements, and ecosystems services (e.g. forest catchment areas, wetlands).

12. PREPARE FOR EXTREME EVENTS, such as storms and heavy rains, by managing flow regimes in rivers, by maintaining adequate vegetation in the basin to minimise flash floods. Invest in coastal storm risks mitigation and flood warning systems.

LEVEL 4 - WATER-WISE COMMUNITIES

13. CITIZENS involved in the sustainable urban water vision. Water-wise citizens can drive urban planning and design with their understanding of the risks (flooding, scarcity) and opportunities (resource recovery, reducing dependency on uncertain future resources, increased well-being). Water-wise citizens will also adapt their behaviour. They will develop their acceptance to solutions, enabling regenerative water services, and their willingness to pay for such services while mandating their officials to ensure affordability.

14. PROFESSIONALS WITH VARIOUS EXPERTISE (FINANCE, TECHNICAL, SOCIAL) who understand the co-benefits across urban sectors so that they may plan and implement the best solutions for urban dwellers and businesses. Synergies and dependencies exist between water and urban planning, architecture, landscaping, and energy, waste and transport services: water services require energy but conversely urban water can be used to produce energy locally; green urban space requires water that can be provided by collecting rainwater or reusing water from treated effluent to recycle nutrients in vegetated areas. Professionals, realising the market and non-market value of the co-benefits associated to an integrated urban agenda, will enable innovative sustainable solutions.

15. TRANSDISCIPLINARY PLANNING AND OPERATION TEAMS integrating water in city planning. All waters (freshwater supply, rain, rivers, seas and wastewater) are interconnected with each other and other urban systems (parks, roads, energy and waste) so that efficiencies and synergies arise from a coordinated approach. A city planning organisation recognising these inter-relations and bridging individual departments is needed to enable urban professionals to implement sustainable urban water.

16. POLICY MAKERS enable the implementation of the Principles for regenerative water services, water sensitive urban design, and basin-connected cities. Water-wise policy makers establish policies and financing mechanisms (tariffs, partnerships, that are responsive and adaptive to future changes) to drive and enable sustainable urban water through incentivising and rewarding innovative solutions. They phase out the existing subsidies and tax advantages that are environmentally harmful. They monitor, evaluate and adjust the policies based on future needs as they change over time.

17. LEADERS provide the progressive vision and a governance structure to coordinate work at 4 scales (catchment, metro, neighbourhood and building) and across disciplines. The people governing at the national and local levels can enable sustainable urban water through coordination and integration, leveraging “effective and efficient governance enhancing trust and engagement”⁷.



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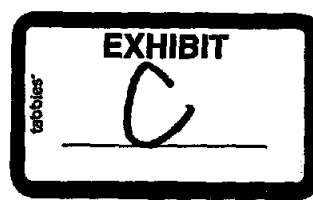
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Berlin Water Charter

Draft - 05.09.2013

Preface

Remunicipalisation of Berliner Wasserbetriebe (BWB) is just around the corner. In the first instance, this means return of the company, which has been part-privatised for well over a decade, to the ownership of the State of Berlin. We wish to take this further and democratise both Berliner Wasserbetriebe and water policy as a whole, and so achieve transparent, socially just and environmentally sustainable domestic water management in Berlin. To this end, the Berliner Wassertisch has drawn up a draft water charter for Berlin with reference to a number of international role models. Our intention to develop this draft further by means of a broadly-based debate within society. We wish to bring together all the different areas of expertise on the subject of water in our city, and to invite Berlin's population to actively participate. Finally, the Berlin water charter is intended to be a basis for statutory regulations and to act as a guide for Berliner Wasserbetriebe.



Preamble

All the people of the City of Berlin bear shared responsibility for the democratic and transparent, socially just and environmentally sustainable use of water. A high quality drinking water supply and sewerage system for the City is equally important, along with the protection of nature and natural resources and appropriate groundwater management. The following principles form the framework for this.

1. General and political principles

- a) Berliner Wasserbetriebe serves the common good. Access to clean water and basic sanitation must be guaranteed to all citizens of Berlin as a human right.
- b) Water must be affordable for all citizens of Berlin. Berlin's population has a right to obtain high quality water subject to socially appropriate charges and conditions.
- c) The provision of water, which is essential to life, and its disposal rank among the highest priority tasks of the State. There must be no privatisation or part-privatisation of the drinking water supply and sewerage system, not even in the context of so-called public-private partnerships or similar models.
- d) Berlin's domestic water management must be democratically organised, i.e. with the democratic participation of the citizens of Berlin. Water management must be transparent. Direct democratic participation in Berliner Wasserbetriebe by the citizens of Berlin is guaranteed.

2. Economic principles

- a) Berliner Wasserbetriebe is not run for profit. It may levy charges that cover the costs of facilities and to make provision for economic and technical development.
- b) No companies that are not associated with water may be integrated into Berliner Wasserbetriebe.
- c) Berliner Wasserbetriebe supplies the City entirely with drinking water from its own groundwater resources and the bank filtrate drawn off to the groundwater from the Spree and Havel rivers. Water from Berlin's groundwater and bank filtrate should be available in at least the same high quality to the current and all subsequent generations. To this end, the technical equipment associated with the drinking water supply and sewerage system must meet the latest scientific and technical standards. Alternative water management, such as the use of service water, must be increasingly incorporated into the planning. The investment in Berliner Wasserbetriebe must be sufficient to meet these requirements.
- d) Berliner Wasserbetriebe remains expressly open to cooperation across river basins, municipalities, Federal States and to international cooperation in the context of publically-run domestic water management. Berliner Wasserbetriebe actively participates in the model of public-public cooperation, with the common good as its guiding principle. A profit-oriented approach to inter-regional cooperation will be rejected on principle.
- e) The working conditions and wages for employees subject to the terms of collective agreements and staff members of Berliner Wasserbetriebe must not fall below existing levels after the remunicipalisation. All employees are paid according to the principle of "Equivalent pay for equivalent work". The existing right to codetermination of workers and staff members of Berliner

Wasserbetriebe will be further extended, and not simply guaranteed.

- f) The State of Berlin provides, to a reasonable extent, resources to allow democratic participation in, for example, citizens' councils, employee councils, and for water-related research.

3. Environmental principles

- a) Berliner Wasserbetriebe and the State of Berlin work together to ensure a high quality of water, as essential to life, in order to preclude any risk to the sustainable quality of Berlin's water.
- b) The work of Berliner Wasserbetriebe and the orientation of Berlin's policy is characterised by the desire to protect resources. Berlin's environmental balance must not deteriorate, and should be constantly improved.
- c) The State and Berliner Wasserbetriebe implement the standards of the EU Water Framework Directive (WFD) of 2000.
- d) Water protection areas are to be maintained. They may not be redesignated as speculative building land.
- e) Water extraction is limited to the extent that is environmentally compatible. No effort shall be made to export water.
- f) Groundwater management is incumbent upon the State of Berlin.
- g) Healthy mixed forests are the guarantor of healthy woodland and a sustainable water supply. The Berlin Senate promotes close-to-nature development of green spaces aimed at protecting the soil and thus the groundwater. Such green spaces include native mixed woodland. Berliner Wasserbetriebe assumes overall responsibility for the urban water supply, and so must also champion the retention of Berlin's green spaces of all types (uncultivated ground, parks, street greening, allotments, urban gardens, etc.)
- h) The priority is given to soil conservation. The soil management is oriented towards protecting the ground and surface water and running water. Further "sealing" of the soil should therefore be avoided; the quantity, quality and structure of unsealed soils are to be retained.
- i) Organic agriculture is to be encouraged in order to protect water resources and reduce contamination of the groundwater.
- j) Hydraulic fracturing to obtain crude oil and natural gas (known as "fracking") is to be ruled out for all time. The State also advocates a Germany-wide ban.
- k) The underground storage of separated CO₂ is banned in Berlin. The State also advocates a Germany-wide ban.
- l) Berliner Wasserbetriebe and the Berlin Senate shall work across Federal State boundaries - with Brandenburg and Saxony - to limit, reduce and quickly end contamination of the Spree from the Lausitz brown coal mining region (SO₄ contamination). The State of Berlin shall work to quickly and permanently ban the exploitation of fossil fuels (brown coal, crude oil, etc) in order to prevent contamination of the water by such fuels.
- m) Berliner Wasserbetriebe does everything that is necessary to keep substances that are harmful to people and nature out of the water or to clean such substances from the water. A high quality effluent treatment process must be guaranteed at all times.

4. Legal principles

- a) Berliner Wasserbetriebe is required fulfill the standards of the EU Water Framework Directive (WFD) of 2000. This Directive aims to improve the aquatic environment in the European Community. Since today's effluent is our drinking water of tomorrow, priority must be given to compliance with the WFD standards.
- b) The principles of this Berlin water charter are to be taken into account when framing existing laws, statutory regulations and other rules that are applicable to the operational structure and actions of Berliner Wasserbetriebe and to the measures by the State of Berlin of relevance to water policy. New laws, statutory regulations or other rules that concern Berliner Wasserbetriebe or Berlin's water policy should accord with this Berlin water charter.

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Santa Fe Water Charter Initiative

What are the best ways to use Santa Fe's scarce water resources? What principles should guide decision-making about water policies and investments? Whose views should be considered, and how?

We can say with certainty that our future, like our past, will depend upon water. As our climate continues to change, our growing population will face the constraints of less and less predictable precipitation and river flows. How should we respond? What new technologies, institutions, and ideas should we adopt to ensure that the water decisions we take today are truly in the best long-term interests of all of us?



Our premise is that since everyone depends on water, everyone's views are important and everyone should have a voice in how our local water is used and managed.

The initiative to develop a Water Charter for Santa Fe will catalyze a community engagement process, through interviews, focus groups, and workshops, to identify the core principles about water that everyone can agree on. Those principles on which consensus can



be reached, will be written into a Water Charter detailing not only our shared economic and environmental values, but also as many social and cultural values for water that can be agreed on, as well as common principles about how and by whom water should be governed.

To guard against any single interest being overly influential, the draft Charter will be submitted to both the City Council and County Commission for endorsement by our elected representatives. And to provide an outlet for viewpoints outside the consensus, there will be provision for minority positions to be expressed in annexes to the charter.

The purpose of the Water Charter will be to clarify principles about how water should be used and managed, for which there is overall community consensus, and also to highlight principles which are important to some but not all stakeholders. Both sets of principles can be useful in developing new policies, or planning new water investments.

The Water Charter is intended to serve as non-binding guidance for water-related decision-making by both local governmental bodies and

private businesses and organizations. If the Charter is perceived as broadly reflective of the community's values about water, then there will be a motivation for both public and private agencies/organizations to pay attention to the Charter's guidance.



Monitoring compliance with the Water Charter will be done through an annual assessment presented and discussed at a "State of Our Waters" symposium to be held each December, beginning in December 2017 (exact date TBD).

Purpose:

To develop a community-driven statement of principles about how local water resources should be used, and how local water ecosystems (Rio Grande reach from Cochiti to Buckman, Santa Fe River, arroyos, wetlands, and aquifers) should be managed. The principles would be written into a Charter and submitted to both City Council and SF County Commissioners for their endorsement.

Approach:

1. Identify key stakeholders (e.g., Pueblos of Chochiti, Tesuque, and Kewa; Chamber of Commerce and other business groups, Environmental groups, Faith-based groups, etc.)
2. Elicit, through individual and group interviews, the core water values of diverse

stakeholders pertaining to five value categories: environmental values, economic values, social values, cultural values, and governance values.

3. Prepare a rough draft charter document showing principle agreements and disagreements regarding these values, and then convene stakeholder representatives in a workshop to discuss the provisional charter.
4. Conduct one or more follow-up workshops to reach consensus and clarify areas of disagreement.
5. Prepare a revised draft charter incorporating suggestions from the workshop(s).
6. [Optional] One more follow-up workshop to finalize the charter;



7. Take the Charter to City and County for endorsement;
8. Convene annual "State of the Waters" half-day conference to review compliance with the Charter, and trouble-shoot any discrepancies.

For more information, or to get involved, contact David Groenfeldt (WCI Director) at dgroenfeldt@waterculture.org, or visit the waterculture.org website and click on Programs.

Water Ethics Charter - Draft 2.0

(Abridged Version)¹

Part 1. Introduction

A. General Statement

This Charter establishes the moral and ethical foundations to guide decision-making around the use of water and the protection of water resources and water-reliant ecosystems. The intent of this Charter is to engender water policies and practices that are environmentally sustainable, economically responsible, socially just, respectful of cultural diversity and which will help safeguard the welfare of future generations.

B. Purpose of this Charter

The aim of this Charter is (1) to educate water policy makers, water users, and the public at large about their moral responsibilities in making choices which involve water directly or indirectly, (2) to foster an ethical attitude towards water bodies, and in so doing, (3) to improve water management and governance.

C. Scope and Structure of this Charter

The Charter is a moral statement intended to inform and guide water policies. The Charter is structured around five dimensions: (1) Environmental, (2) Economic, (3) Social, (4) Cultural, and (5) Governance.

D. General Principles

- *Precautionary Principle:* We should approach decisions which might affect water resources with an attitude of humility and adopt the fundamental principle of precaution to guide our management interventions.
- *Water as a commons:* Water is inherently a common resource. We all depend on water and we all have a shared responsibility for its management.
- *Intergenerational Justice:* Water connects all of us through the generations. We have a responsibility to all future generations to be good stewards of their water today.

Part 2. Environmental Issues

We need to transition to a world in which human demands are attuned to what is possible within a healthy environment. We need an environmental ethic which will safeguard the integrity of water ecosystems in the face of unprecedented human pressures and climate change.

¹ This is a shortened version of the draft (v.2.0) Global Water Ethics Charter which has been developed by an international Steering Committee advised by expert reviewers representing diverse perspectives. The full version can be found at: <http://waterethics.org/the-water-ethics-charter/>

A. General Concepts

Water ecosystems have inherent rights, and intrinsic value over and above their utilitarian value to people. The resilience of freshwater ecosystems to sustainably support basic ecological functions (e.g., environmental flows of reasonably clean water) must be held as a fundamental priority. It is our moral responsibility to adjust human demands for water to accommodate healthy ecological functions. In cases where unsustainable levels of water demand are deemed necessary for meeting urgent and basic human needs, this should be done as a temporary measure, to be replaced by a sustainable water management strategy as soon as possible.

B. Operational Principles

The complex physical inter-linkages between water-ecosystems and the rest of nature, as well as the complex inter-linkages with socio-cultural systems render interventions inherently unpredictable. The principle of precaution should be applied when taking decisions which will, or which reasonably could, have severe and long-lasting negative impacts. Other guiding operational principles are the following:

- maintaining and improving the health of natural water ecosystems, or at least:
- “no net loss from current conditions” or where local impacts are unavoidable:
- offsetting environmental destruction with reasonably equivalent environmental restoration.

Educational activities related to water have ethical importance beyond behavioral change (e.g., promoting water conservation), for example, in fostering awareness about the intrinsic value of water, or promoting research and debate about the meaning of “healthy conditions.”

Part 3. Economic Issues

Water has an inherent economic dimension in all its uses, and economic principles are essential for comparing impacts and benefits from proposed water investments or interventions. Economic thinking is not limited to questions of monetary value, but applies equally (though with far less precision) in considering tradeoffs and opportunities related to non-economic values (e.g., social and environmental).

A. General Concepts:

Water use should be reasonable and frugal, using only as much as needed for a given purpose. The re-use of water should be favored over extracting fresh water from nature. Existing water stocks should be maintained and their resilience and sustainability protected (e.g., in the management of aquifers and lakes). Given the inherent nature of water as a commons (both globally and locally), private ownership of water must be balanced with accountability to the larger society.

B. Operational Principles

Water for basic human needs (e.g., the right to water and sanitation) should be effectively free, whereas water used in economic activities should have a market cost. The operational principle is that water markets can be important tools for good management but must be subject to higher order ethical principles including:

- User-pay and polluter-pay principles;
- Principle of cost-recovery for water services ;
- principle of fair and transparent financing arrangements for water investments;
- Principle of open information about the status of water quality and quantity.

Part 4. Social Principles

Water is intimately connected to society, forming a socio-ecological system that addresses social needs and provides opportunities. Social arrangements are instrumental for both socially just and economically effective water management.

A. General Concepts:

Water should be explicitly recognized as a central feature of life for individuals and the larger society. Water is a common good which belongs to everyone, under the principles of fairness, equity, solidarity, and social justice. Everyone has a right to safe water to meet basic needs (UN Resolution) and to sanitation (which protects water quality and promotes good health). There is a further moral "right" to a healthy water environment, including clean water and ecologically healthy water ecosystems.

B. Operational Principles

Promote universal access to safe water and sanitation, ensure water security, and "water justice" for all segments of society, including youth, women, minorities, and most especially future generations. The principle of *water justice* includes access to water and healthy water ecosystems for meeting economic and livelihood needs, as well as aesthetic, spiritual, and psychological needs.

Part 5. Cultural and Spiritual Principles

Water and water ecosystems provide cultural and spiritual meaning of fundamental importance. Since these values are intangible (though often represented in architectural monuments and other artistic expressions) they are easily overlooked.

A. General Concepts

Cultural diversity, and the rights of indigenous and traditional peoples to live according to their cultural traditions, is a fundamental right, articulated in the UN Declaration on the Rights of Indigenous Peoples. Cultural traditions related to water include basic economic livelihood strategies such as fishing, as well as religious ceremonies which revolve around water bodies or particular forms of water use.

B. Operational Principles

Water infrastructure development (e.g., dams, levees, river diversions, etc.) should accommodate customary cultural uses as a matter of priority. Rather than pursuing a strategy of compensation for cultural impacts which are incommensurable with monetized settlements, the preferred strategy would be to adjust the infrastructure design to meet cultural parameters. Proposals for water development, particularly when they originate

outside the local cultural context, should be subject to the "free prior and informed consent" of the local stakeholders.

Part 6. Water Governance

The arrangements by which water is managed, and particularly the ways in which local stakeholders are involved in water decisions, can contribute to a wider democratization process. In so doing, the manner of water governance can enhance civil society's awareness in water and the environment more generally, leading to better decisions about natural resources management.

A. General Concepts

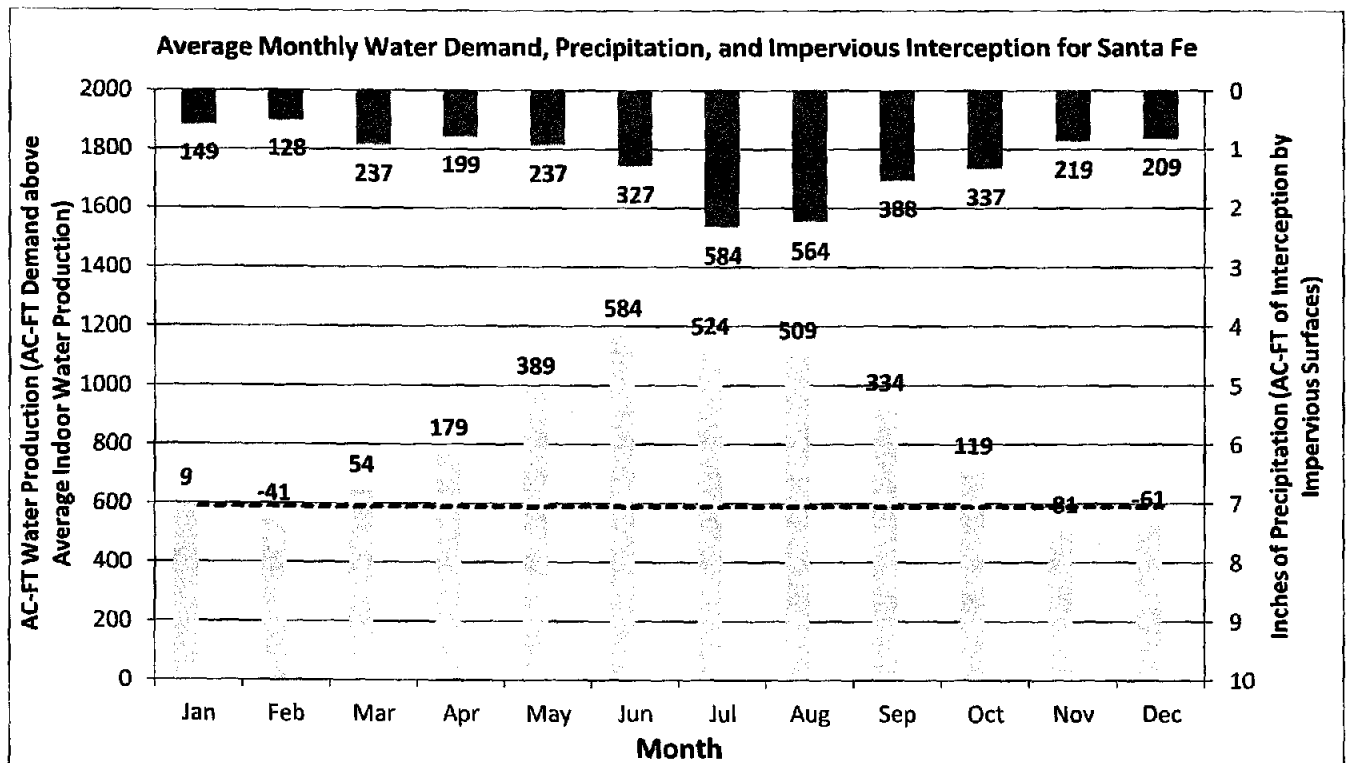
Water systems are closely integrated socio-ecological systems and water governance needs to reflect both of these dimensions, by (1) adopting a broad ecological frame to incorporate whole watersheds, aquifers, and interactions between freshwater and marine ecosystems, and (2) reflecting the interests of all stakeholders, with particular emphasis on those groups who have the least political power. Key governance principles include:

- The principle of "subsidiarity" (management at the lowest practical level) should be favored where feasible;
- Water utilities, and all water users, whether corporate, governmental, or individual, have certain social and environmental responsibilities.

B. Operational Principles

The principles of transparency, accountability, and stakeholder participation in water decisions are central to good water governance. Water governance is a shared responsibility of both public institutions and stakeholder groups. Informal water systems that may co-exist with public systems also need to be accommodated. Finally, water conflict mechanisms need to be designed into the governance arrangements.

Stormwater Filtration and Catchment: Obstacles and Opportunities



3,578 AC-FT/year falls on impervious surfaces in Santa Fe (730 million gallons on roofs, 435 million on streets/parking)

- McDonald, M., L. Pacheco. 2016. An infiltration model for enhanced stormwater management. 2016. River, Watershed, and Trails Division. City of Santa Fe. Pp. 24.
[http://www.santafenm.gov/media/archive_center/An Infiltration Model for Enhanced Stormwater Management - PW.pdf](http://www.santafenm.gov/media/archive_center/An%20Infiltration%20Model%20for%20Enhanced%20Stormwater%20Management%20-%20PW.pdf)

Stormwater captured as passive irrigation in rain gardens could probably offset potable water use for growing shrubs and trees in urban settings.

- Kauffman, A. T., C. L. Stropki, A. V. Mundt. 2017. Stormwater Irrigation-A comparison of soil moisture at curb cuts with and without rain gardens. Stormwater: The Journal for Surface Water Quality Professionals, 18(3): 24-27.
<http://foresternetwork.com/stormwater-magazine/sw-water/sw-stormwater-drainage/stormwater-irrigation/>



Green Infrastructure Design (e.g. Bio-retention basins, rain gardens, etc)

- EPA: What is Green Infrastructure?
<https://www.epa.gov/green-infrastructure/what-green-infrastructure>
- MacAdam, J. 2010. Green Infrastructure for Southwestern Neighborhoods. Watershed Management Group, Tucson, Arizona. Pp. 50
https://wrrc.arizona.edu/sites/wrrc.arizona.edu/files/WMG_Green%20Infrastructure%20for%20Southwestern%20Neighborhoods.pdf
- Lancaster, B. and J. Marshall. 2008. Rainwater harvesting for drylands and beyond (Vol. 1). Tucson: Rainsource Press. Pp. 304
<http://www.harvestingrainwater.com/>

Obstacles

- EPA: Overcoming barriers to Green Infrastructure
<https://www.epa.gov/green-infrastructure/overcoming-barriers-green-infrastructure>
- US Water Alliance: Barriers and gateways to Green Infrastructure
<http://uswateralliance.org/sites/uswateralliance.org/files/publications/Barriers-and-Gateways-to-Green-Infrastructure.pdf>

Opportunities

- Gallet, D. and J. Grant. 2010. The value of green infrastructure: A guide to recognizing its economic, environmental and social benefits. Center for Neighborhood Technology. pp. 74
http://www.cnt.org/sites/default/files/publications/CNT_Value-of-Green-Infrastructure.pdf
- Odefey, J., S. Detwiler, K. Rousseau, A. Trice, R. Blackwell, K. O'Hera, M. Buckley, T. Souhlas, S. Brown, and P. Raviprakash. 2012. Banking on green: A look at how green infrastructure can save municipalities money and provide economic benefits community-wide. American Rivers, the Water Environment Federation, the American Society of Landscape Architects and ECONorthwest, Portland, OR.
https://www.asla.org/uploadedFiles/CMS/Government_Affairs/Federal_Government_Affairs/Banking%20on%20Green%20HighRes.pdf