Reclaimed Water – Issues & Funding

Water and Health

Presentation to:

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Overview of Issues and Funding

Key Issues & Funding Include:

Define Reclaimed Water as a "Need"

Comparison of Reclaimed Water Costs vs. Potable Water

Potential Funding Sources

Implementation Examples

Consider Factors Driving Reclaimed

South Florida Water Management District (SFWMD)

Are there potable water quantity problems

- 2007 has been severe drought year
- Lake Okeechobee water level 2nd lowest since 1931
- Growth by 2025 will increase water demand from 3,124 mgd to 4,136 mgd

Consider Factors Driving Reclaimed

Southwest Florida Water Management District (SWFWMD)

Are there potable water quantity problems

- 2007 "extremely abnormal, critically abnormal or severely abnormal rainfall deficits"
- Withlacoochee River stream flow in Nov. was 163 cfs vs. median historical of 830 cfs
- Peace River stream flow in Nov. was 75 cfs vs. median historical of 325 cfs

Consider Factors Driving Reclaimed

Saint Johns River Water Management District (SJRWMD)

Are there potable water quantity problems

Rate of groundwater withdrawal in certain areas is near maximum rate

Growth by 2025 will increase water demand from 1,490 mgd to 1,790 mgd

State Solutions to Water Needs

- Florida Legislature Created Water Protection & Sustainability Program
  - Water Management Districts' Mandates
    - Provide a Five-Year Water Resource Development Work Program
    - Provide an Alternative Water Supply Annual Report
  - State Provided Funds to Districts for Alternative Water Supply Projects (dollar for dollar match)

Alternative Water Supply Definition

- Saltwater and Brackish Water Projects
- Surface Water Captured During Wet-Weather Flows
- Sources Made Available with Addition of New Storage Capacity
- Stormwater (for use by a consumptive use permittee)
- Reclaimed Water

Florida Funding Program – Alternative Water Supply Reclaimed Water

- SFWMD – 40% Grants for Construction Costs
  - FY 2008 $36 million in grants
  - FY 2009 $40.5 million in grants
- SWFWMD – 50% Grants for Construction Costs
  - $25 million per year in grants
- SJRWMD – 20% Grants for Construction Costs
  - FY 2006, 2007, 2008 provided $112 million for all AWS projects

Additional Funding Sources

- Clean Water (SRF) Grants and Loans
- CDBG Grants
- Rural Development Grants & Loans
- Revenue Bonds
- Private Enterprise Cost Sharing
- Municipal/District Funding

Example: Reclaimed Water Costs

Residential/1,000 gal.:

Distribution	$2.14
Pumping	0.42
Transmission	2.70
Total	$5.26
Grant	- 2.63
Net Cost	$2.63
O&M	0.32
Total Cost	$2.95

Non-Residential/1,000 gal.:

Pumping	$ 0.42
Transmission	1.87
Total	$1.99
Grant	- 0.99
Net Cost	$1.00
O&M	0.32
Total Cost	$1.32

Water Treatment Costs – Alternatives ($/1,000 gal.)

New Plant Capital and O&M

	5 mgd	10 mgd	15 mgd	20 mgd
Micro/Ultrafiltration	$2.10	$1.57	$1.36	$1.22
High Service Pumping	0.15	0.12	0.11	0.10
Ground Storage	0.12	0.10	0.08	0.07
UV Disinfection	0.12	0.09	0.09	0.09
Total	**$2.49**	**$1.88**	**$1.64**	**$1.48**

Water Treatment Costs – Alternatives ($/1,000 gal.)

New Plant Capital and O&M

	5 mgd	10 mgd	15 mgd	20 mgd
Nanofiltration	$3.42	$2.34	$1.95	$1.75
High Service Pumping	0.15	0.12	0.11	0.10
Ground Storage	0.12	0.10	0.08	0.07
UV Disinfection	0.12	0.09	0.09	0.09
Total	**$3.81**	**$2.65**	**$2.23**	**$2.01**

Water Treatment Costs – Alternatives ($/1,000 gal.)

New Plant Capital and O&M

	5 mgd	10 mgd	15 mgd	20 mgd
Brackish Water RO - Groundwater	$4.41	$3.04	$2.65	$2.42
High Service Pumping	0.15	0.12	0.11	0.10
Ground Storage	0.12	0.10	0.08	0.07
UV Disinfection	0.12	0.09	0.09	0.09
Total	**$4.80**	**$3.35**	**$2.93**	**$2.68**

Water Treatment Costs – Alternatives ($/1,000 gal.)

New Plant Capital and O&M

	5 mgd	10 mgd	15 mgd	20 mgd
Brackish Water RO – Surface Water	$4.73	$3.13	$2.68	$2.43
High Service Pumping	0.15	0.12	0.11	0.10
Ground Storage	0.12	0.10	0.08	0.07
UV Disinfection	0.12	0.09	0.09	0.09
Total	**$5.12**	**$3.44**	**$2.96**	**$2.69**

Water Treatment Costs – Alternatives ($/1,000 gal.)

New Plant Capital and O&M

	5 mgd	10 mgd	15 mgd	20 mgd
Seawater RO – Co-located with Power Plant	$5.95	$4.77	$4.48	$4.18
High Service Pumping	0.15	0.12	0.11	0.10
Ground Storage	0.12	0.10	0.08	0.07
UV Disinfection	0.12	0.09	0.09	0.09
Total	**$6.34**	**$5.08**	**$4.76**	**$4.44**

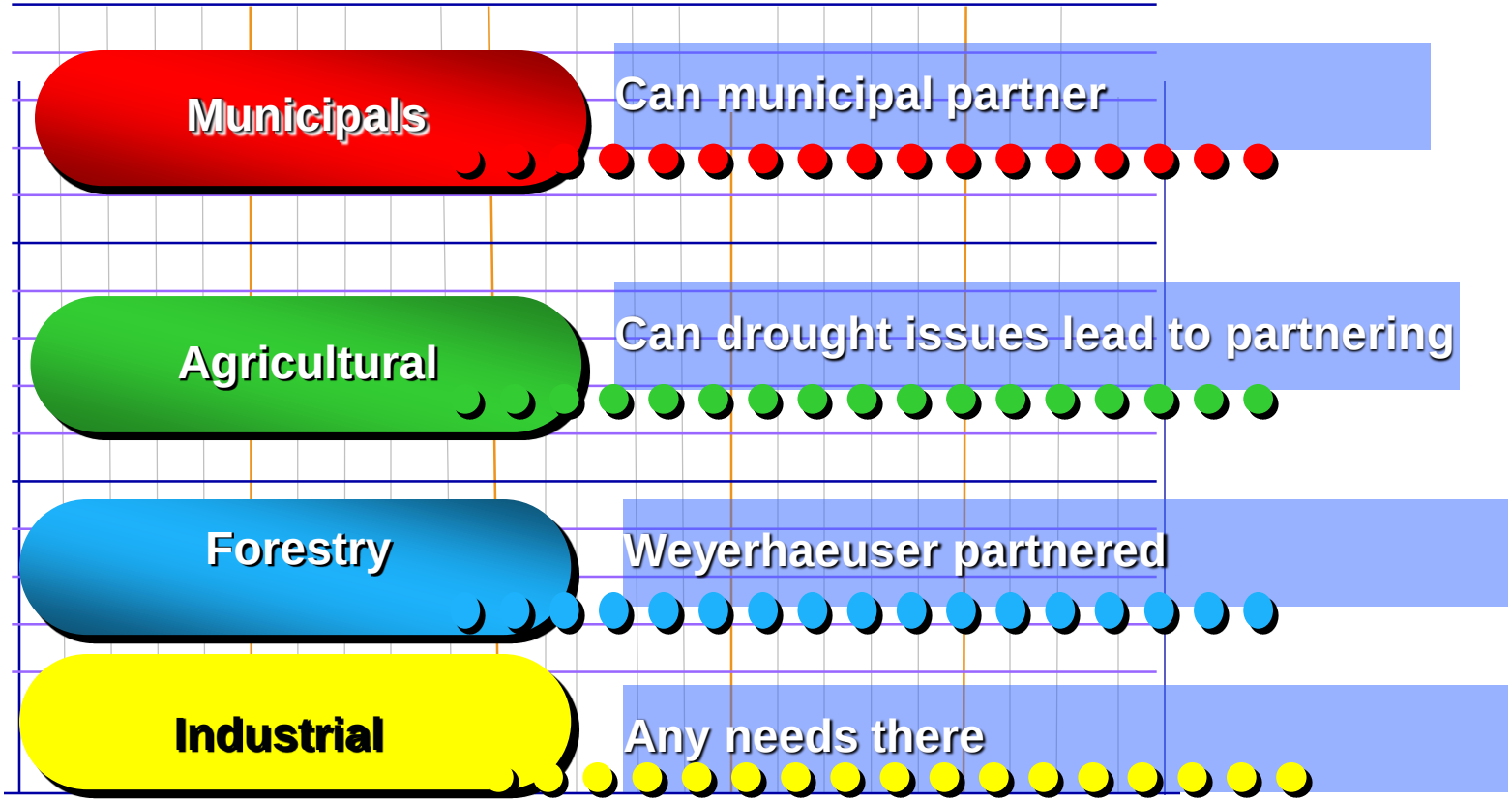
Potable Water Subsidy to Reclaimed Water ($/1,000 gal.)

New Plant Capital and O&M

Residential Reclaimed Water Cost/1,000 gal. $2.95	WTP Costs		Reclaimed Water Subsidy		Potential Subsidized Reclaimed Water Rates	
Water Treatment Alternatives with Costs> Reclaimed	5 mgd	10 mgd	5 mgd	10 mgd	5 mgd	10 mgd
Nanofiltration	$3.81	-	($0.86)	-	$2.09	N/A
Brackish Water RO - Groundwater	$4.80	$3.35	($1.85)	($0.40)	$1.10	$2.55
Brackish Water RO - Surface Water	$5.12	$3.44	($2.17)	($0.49)	$0.78	$2.46
Seawater RO Co-located with Power Plant	$6.34	$5.08	($3.39)	($2.13)	N/A	$0.82

Are There Potential Partners

Mission: To Maximize Reclaimed Potential...



Are There Revenue Sources to be Tapped

Mission: To Maximize Reclaimed Potential...

Municipal Customer — Can municipal be charged

Golf Courses — Can golf courses be charged vs. well use

Cooling Towers or Industrial Uses — Are there customers available

Residential/ Commercial Irrigation — Are distribution systems feasible

Can Reclaimed System be Self-Sufficient

Mission: To Maximize Reclaimed Potential...

Mandatory Connection

Can residential connection be mandatory

Property Assessments

Can property assessments be used for distribution construction

Connection Fees

Consider connection fees as leverage for early connection

New Developments

Can ordinance require new developments to install reclaimed lines

Identify Repayment Sources

- Identify Potential Customers for Revenue
  - Charge Municipals for reclaimed water
  - Charge Golf Courses for reclaimed water
  - Charge residential/commercial customers for use
    - User fees – fixed monthly and/or metered gallonage
    - Connection fees
    - Assessments for capital costs
    - Mandatory or voluntary connection

Examples

- Stage 1 Approach
  - Venice, FL
    - Golf Course
    - New Development with reclaimed lines
    - Effective rate $0.05/1,000 gallons
  - Clearwater, FL
    - Identified residential and open space use
    - Analyzed cost of reclaimed versus potable water bills

Examples - Continued

- Stage 2 Approaches
  - Cape Coral, FL
    - Phased Approach
    - Assessment for capital costs
    - Flat monthly fee for residential customers
  - Brevard County, FL
    - Initial $5/month rate restraint
    - Subsidize to $5/month level
    - 3 Phases with 70% Voluntary Participation
  - Collier County, FL
    - Limited reclaimed water available
    - Existing agreements limit water availability
    - Enhance existing supply

Examples - Continued

- Cost Sharing Agreements
  - St. Pete Beach, FL
    - Urban reclaimed for 3 municipal governments
    - County is reclaimed water source
    - Detailed financial plan to share costs and funding sources

THE END

- Questions?

Venice, FL

- Urban reclaimed water for irrigation
  - Existing agreements – limit time frame for rate increases
  - Initially used to induce participation and reclaimed use needed to meet limited discharge requirements
- Golf Course
  - Non-pressurized line
  - Feed existing ponds – golf course provides pumping and storage capacity
  - Set rate at marginal cost of operating reclaimed water system
  - Rate must be competitive with existing well use costs
- New Development
  - Pressurized lines
  - Mandatory connection
  - Charged at marginal cost of operating system plus pumping costs
  - Set below potable rates

Venice, FL - Continued

- Subsequent Urban Reuse in Phases
  - 3 Phases planned
  - Conducted water balance modeling
    - Developed irrigation needs
    - Developed reuse water availability patterns
  - Connection
    - Mandatory in new developments with reclaimed lines
    - Voluntary in existing developments & need minimum of 50% participation
  - Financial Plan
    - Recapture capital costs in new phases
    - Averaged costs for 3 phases and by phase
    - Determined timing, availability of reuse per phase
    - Used varying levels of participation
    - Capital cost recovery includes costs greater than minimal treatment requirements – filtration, chlorine contact chamber, pump stations, storage & transmission facilities

Cape Coral, FL

- Identified phased service areas
- Reclaimed distribution system installed with potable distribution and sewer collection system
- Distribution system costs billed per property assessment program
- Operating costs plus repair and equipment plans charged in reuse rates
  - Single family – charged flat monthly fee
  - Multi-family – charged per square feet pervious area
  - Commercial with water meter < or = 1” – charged per square feet pervious area
  - Commercial with water meter > 1” – charged per metered use

Brevard County, FL

- Reclaimed water plan analyzed cost of system versus well use cost
  - Private well cost –
    - initial well & pump cost (deep and shallow wells)
    - pump replacement after 7 years
    - electrical costs for pumping
  - Reclaimed costs
    - capital costs
    - estimated average irrigable area per residence
    - application rate of 1” per week
    - cost per Equivalent Residential Unit (ERU) then calculated

Brevard County, FL - Continued

- 3 Phases in Plan
  - Phase 1 costs stand alone or averaged for 3 phases
  - Capital costs include
    - Transmission and distribution system
    - Storage
    - Service connections
    - High service and transfer pumping
    - Treatment upgrades – filtration, chlorine contact chamber
  - Operating costs estimated at $0.20 per 1,000 gallons
  - Capital costs per ERU range from $640 to $1,700
  - Evaluated impact of subsidizing to $5/month user fee level
    - Used a $250 connection fee, 70% participation, $3/month readiness-to-serve fee
    - Subsidy varied between $5,800/year with only Phase I and $822,000/year with all 3 phases.

Collier County, FL

- Urban Reuse
  - Evaluated costs and alternatives for expanding system with supply limitations
    - Supply limitations caused by
      - Agreements with contract quantities greatly exceeding actual demand
      - Over-watering in areas not metered per residence
      - High peak demands
    - Alternatives examined
      - Supply existing service area only
        - Supply 1” per week per residence
        - Peak demand to be supplied from existing private wells
      - Supply existing service area only
        - Supply 1” per week per residence
        - County to provide peak demand supply
      - Supply existing and expanded service area
        - County to provide peak demand supply

Collier County, FL - Continued

- Recommended Alternative
  - Supply existing service area only
    - Meet peak demand with ASR storage
    - Supplement supply with canal water
    - Interconnect North and South wastewater systems
  - Examined costs of service – 3 levels of service
    - Distribution system maintenance and pressurized lines – rate = $0.65 per 1,000 gallons
    - Pressurized lines, no distribution system maintenance – rate = $0.34 per 1,000 gallons
    - Non-pressurized lines, no distribution system maintenance – rate = $0.26 per 1,000 gallons

Clearwater, FL

- 3 Phase Implementation Plan
  - Identified residential and open space demand
  - Residential reuse estimated at 15,000 gal/mo. based on
    - 1” per week application rate
    - 1/3 acre lots
    - 40% pervious area
  - Various rate structures analyzed
    - With a $250 connection fee and user fee rates
    - With only user fee rates
    - With revenue bonds or SRF loans
  - Reclaimed costs versus potable irrigation costs analyzed
    - Reclaimed costs ranged from $8.80/month to $16.20/month
    - Potable irrigation costs were $15.45

St. Pete Beach, FL

- Cost Sharing Agreements
  - Urban Reclaimed System
    - St. Pete Beach – lead municipality
    - South Pasadena
    - Tierra Verde – a portion of the County
  - Reasons for reclaimed plan
    - Water use restrictions – limited irrigation possible
    - Irrigation sources – viewed as only alternative to shallow well irrigation
    - Assumes that reclaimed will serve to recharge shallow groundwaters

St. Pete Beach, FL - Continued

- Demand Projections
  - Potable use was taken from water billing records
  - Permeable acreage was estimated at 50% of total acreage for single family residences
  - Permeable acreage was estimated at 45% of total acreage for duplex residences
  - Permeable acreage was estimated at 40% of total acreage for multi-family residences
  - Residential application rate was estimated at 1”/wk.
  - Public use and large commercial customer demand was estimated per site using an application rate of 1.5”/wk.
  - 20 year planning horizon with 50% participation estimated for initial year, escalating by 3% annually to 75%

St. Pete Beach, FL - Continued

- Financial Plan
  - Outlined share of costs according to benefit
    - Capacity of transmission pipeline basis for that system's cost allocation
    - Distribution pipeline calculated independently per entity (includes cost of box for irrigation or hose bib connection and restoration of private property)
  - Funding sources were joint agreements
    - Grant (local water district paid for 50% of transmission lines) and SRF loans (funded balance) were jointly shared based upon portion of system financed and cost allocation

St. Pete Beach, FL - Continued

- St. Pete Beach Loan Repayment Plan
  - Alternatives Analysis
    - Use of connection fees
    - Property assessment option
    - Varying participation percents (50% to 100%)
  - Final Plan
    - $225 connection fee
    - Connection fee waived if connect in 1st year
    - No property assessments
    - Existing wastewater funds used to equate user fee to fee calculated at 100% participation
    - Water use not metered
      - Residential flat fee = $11.26 per month
      - Commercial use based on charge per permeable acre

Applying Above Lessons

Consider Factors Driving Reclaimed – Water Quality & Quantity

Are there revenue sources to be tapped?

Are there potential partners?

Can reclaimed system be self-sufficient?

Are there growth issues?

Determine Key Issues

- Interactive Elements
  - Wastewater upgrade increased costs

  versus

  - Water expansion costs

  And/or

  - Decrease in potable water revenue
- Set Goals in Advance
  - Identify Relative Importance of Above Factors
  - Consider Interdependency of Above Factors