Goals

• History of how the City has been proactive
  – Council actions (conservation & reuse)
  – Community commitment
  – Mandatory Water Adequacy Designation

• Looking to the future
  – Water Conservation & Reuse
  – Water Policy development
  – Supply augmentation
    • Economic analysis of alternatives
  – Land use
Moving Forward to Address the Challenges Identified in the Colorado River Basin Water Supply and Demand Study

In 2003 the Bureau of Reclamation, in partnership with the seven Colorado River Basin States (Basin States), published the most comprehensive study of future supplies and demands on the Colorado River ever undertaken. The Colorado River Basin Water Supply and Demand Study confirmed what most experts know: there are likely to be significant shortfalls between projected water supplies and demands in the Colorado River Basin (Basin) in coming decades.

Those that rely on the Colorado River and its tributaries are committed to approaching these future challenges with the same steadfastness that they have approached and overcome past challenges. Beginning today, following the call to action of the Study and as a first step in that commitment, all that rely on the Colorado River are taking such steps — working together — to identify positive solutions that can be implemented to meet the challenges ahead.

Phase 1: Stakeholder Teams
Working Together — Verifying Potentially Obstacles for Water Conservation, Reuse, Transfers, and Healthy River Flows

Groups representing Federal, State, Tribal, agricultural, municipal, hydropower, environmental, and recreational interests are all engaged in a coordinated way to examine in more detail both the challenges we face together and the potential solutions that will work in the Basin. This effort will require innovative thinking, integration of many viewpoints, and a commitment to work in a positive and collaborative spirit.

By working together, we will improve public understanding of the challenges faced in the Basin and identify the potential solutions that can help reduce future uncertainties and meet the significant challenges ahead.

This document sets out the framework for the first phase of action following publication of the Study and is intended to complement other State and Tribal efforts.

June 13 2013

City of Flagstaff – WRRC Closing the Gap

November 17, 2009

December 2003
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1983</td>
<td>1st direct delivery reclaimed water - Continental C.C.</td>
</tr>
<tr>
<td>Prior to 1988</td>
<td>Volunteer Water Conservation Committee</td>
</tr>
<tr>
<td>1988</td>
<td>Water Conservation Ordinance adopted</td>
</tr>
<tr>
<td>1991</td>
<td>Inverted Water Rate Structure &amp; Rebate Program</td>
</tr>
<tr>
<td>1993</td>
<td>Expanded direct delivery of reclaimed water construction of the Rio WRF</td>
</tr>
<tr>
<td>Since 1993</td>
<td>incidental recharge of reclaimed water</td>
</tr>
</tbody>
</table>
City of Flagstaff – WRRC Closing the Gap

25 miles transmission mains

2013

Peak Day: 2.6 MGD
20% of total water deliveries

City of Flagstaff Reclalm Distribution System with Reuse Sites

not to scale
• Incidental recharge ~66% of reclaimed water
  Exploring how to permit through ADWR

• Established **riparian areas** within Rio de Flag
  20 Year Agreement with environmental community &
  Az Game & Fish minimum *200 gpm* flow discharge
Conservation & Reuse Program History

2003  Amended Conservation Ordinance
       - Drought mitigation strategies / Water Schedule restrictions / Water Cops

2006  Updated Building Plumbing Code (voluntary)
       - Dual plumbing systems & Gray water systems

2009  Low Impact Development (LID) Ordinance

2010  Expanded direct delivery of reclaimed water - upgraded Wildcat Hill WWTP & tied into reclaimed system

2012  Rainwater Harvesting Ordinance

2013  Designation of Water Adequacy
Total GPCD
Community Commitment

Peaked at 186 in 1989

Decline of 41%

Low of 111 in 2013

Residential: 64
Non-Residential: 47
Low Impact Development
Guidance Manual for Site Design and Implementation

Adopted in 2009

• Retain 0.5” to 1.0” on-site
• Mimic natural forest run-off after development

• Developer required funding
• Site Planning Practices
• Engineered IMPs
• Design Fact sheets
• Maintenance Protocols

Principles of LID
• Conserve natural resources that provide valuable natural functions associated with controlling and filtering stormwater.
• Minimize and disconnect impervious functions.
• Use distributed small-scale controls or Integrated Management Practices (IMPs) to mimic the site’s pre-project hydrology.
• Direct runoff to natural and landscaped areas conducive to infiltration.

Stormwater and Water Conservation benefit
Rain Water Harvesting
Ordinance adopted 2012

Active RWH
- Mandatory for Commercial only
  
  capture first 1” off rooftops
  
  Exempt if development uses native plants

Passive RWH
- Not mandatory, Single Family guidance
- Driveways tilted to landscaping
- Roof downspouts to landscaping
  (not into streets)
In 2013 City of Flagstaff received a Designation of Adequate Water Supply

Mandatory Water Adequacy Ordinance: (2008)
Clarkdale
Patagonia
Cochise County
Yuma County

Hydrologic/Physical Availability:
Flagstaff (2013)
Taylor (2011)
Goals

- History of how the City has been proactive
  - Council actions (conservation & reuse)
  - Community commitment
  - Mandatory Water Adequacy Designation

- Looking to the future
  - Water Conservation & Reuse
  - Water Policy development
  - Supply augmentation
    - Economic analysis of alternatives
  - Land use
## Water Resources Master Plan

draft 2011

Future Water Supply Alternatives & Preliminary Economic Analysis over a 10-year period

△ **12,000 AF/ year at build-out**

<table>
<thead>
<tr>
<th>Water Conservation</th>
<th>Volume</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active RWH new residential</td>
<td>232 AF/yr</td>
<td>$5,500/AF</td>
</tr>
<tr>
<td>Incinerating Toilets</td>
<td>588 AF/yr</td>
<td>$1,290/AF</td>
</tr>
<tr>
<td>Replace with HET Toilets</td>
<td>311 AF/yr</td>
<td>$25/AF</td>
</tr>
<tr>
<td>Turf removal</td>
<td>1,499 AF/yr</td>
<td>$297/AF</td>
</tr>
</tbody>
</table>

### Other Options

<table>
<thead>
<tr>
<th>Other Options</th>
<th>Volume</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Gap Ranch</td>
<td>12,000 AF/yr</td>
<td>$3,857/AF</td>
</tr>
<tr>
<td>Indirect Reclaimed Reuse*</td>
<td>4,480 AF/yr</td>
<td>$1,307/AF</td>
</tr>
<tr>
<td>(includes Advanced Treatment)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>new Direct Reclaimed Reuse</td>
<td>3,647 AF/yr</td>
<td>$587/AF</td>
</tr>
</tbody>
</table>
Alternative Water Conservation, land use & Reuse?

Water Conservation alternatives

Increase water rates?
- current Top Tier >11,700 gal - - - $11.64/1000 gal
- current Mid Tier > 6,400 gal - - - $6.27/1000 gal

Update to General Plan vote in 2014
- Land use changes to increase density

Reuse
- invest additional $3.5M to access supply from Wildcat Hill WWTP (pumps, piping, etc)
New WATER POLICIES

A. Finance
B. Water Resource Management
C. Reclaimed Water
D. Water Conservation
E. Stormwater
F. Infrastructure
G. Master Planning
H. Regional Leadership
I. Security

Started discussions in 2008 with citizens Water Commission and then with Council in 2012 adopted in April 1, 2014
Our Future is Now – Closing the Gap between Water Supply & Demand

Supply Augmentation

Red Gap Ranch

Purchased in 2005
40 miles east of Flagstaff
Drilled 12 wells on the ranch
Signed Stipulation with Navajo Nation for 8,000 AF/year
Negotiating with ADOT for I-40 Right-of-Way
Questions?

Water buffalo – northern Arizonicus