Lake Granbury WPP Alternatives Analysis

1- TYPES OF MANAGEMENT MEASURES ANALYZED

Stakeholder Meeting
June 23, 2009

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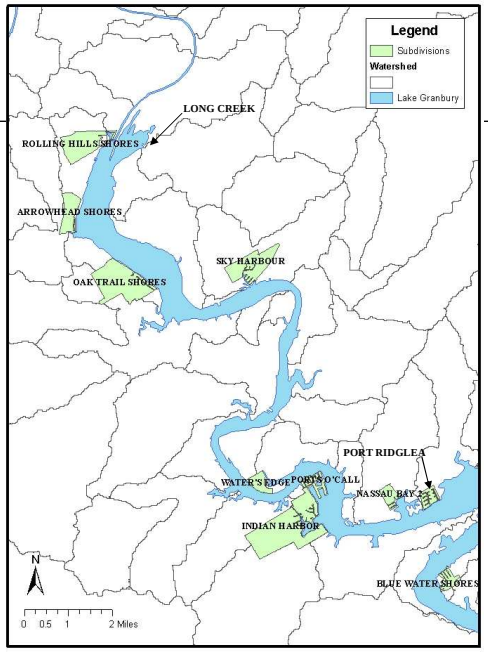
Today's Outline

- Item 1 – Review Alternative Management Measures
  - Objective: Identify appropriate management measures
  - General description of alternatives
- LUNCH
- Item 2 – Framework for Alternatives Analysis
  - Evaluation Criteria
  - Ranking system
- Item 3 - Site-specific example evaluating alternatives
  - Use evaluation criteria
  - Use a ranking system
  - Take steps to identify management measures
- Next steps

Watershed Protection Plan Focus Areas



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BMP Workgroup

The workgroup identified potential management measures ("Alternatives")

Location	Septic Maintenance and Education for Local and Neighboring Communities (including Graywater)	Septic Management (records, inspectors)	Urban Education on Fertilizer Application and Products	Pet Waste Education	Area Conservation Plan and Education for Ranchette/small acreage landowners	Livestock/Range Management Education	Feral Hog Education Program/ County-wide bounty program	Waterfowl Breeding Control Program/ Deter Bird Roosting Under Bridges	Waterfowl and Wildlife Feeding Ordinances and Education	Waterfowl Breeding Control Program	Collection System Sewage Lines-Maintenance and Repairs
Rolling Hills Shores	x	x	x		x			x			
Long Creek	x		x	x	x		x	x	x		
Oak Trail Shores	x	x	x					x			
Sky Harbor	x		x	x	x			x			
Nassau Bay II	x		x	x				x			
Waters Edge			x	x				x			
Indian Harbor	x		x	x				x			
Port Ridglea East	x		x	x	x			x			
Blue Water	x			x				x			x
Lake-Wide	x		x	x		x	x	x	x		

BMP Workgroup (cont'd)

Alternatives investigated to date

Location	Septic Cluster Systems	Septic System Replacement	Septic Maintenance Pump-out pilot program	Local Centralized Wastewater Treatment-Independent	Local Centralized Wastewater Treatment-Aggregate	Regional Wastewater Treatment	Cove Dyanmics: Dredge, Fill	Drainage Re-route	Cove Circulation Systems (Fountains, etc)	Catchment Basin	Property Buy Out	Filter Strips for Livestock
Rolling Hills Shores	x	x		x	x	x	x				x	
Long Creek	x	x		x	x	x						x
Oak Trail Shores	x	x		x	x	x	x	x				
Sky Harbor	+	+		x	x	x			x	x		
Nassau Bay II				x	x	x						
Waters Edge						x						
Indian Harbor				x	x	x			x			
Port Ridglea East	+	+	x	x	x	x			x			
Blue Water												
Lake-Wide						x						x

x Requested BMP Investigation
\+ Additional EC Analysis

Objective:
Identify management measures

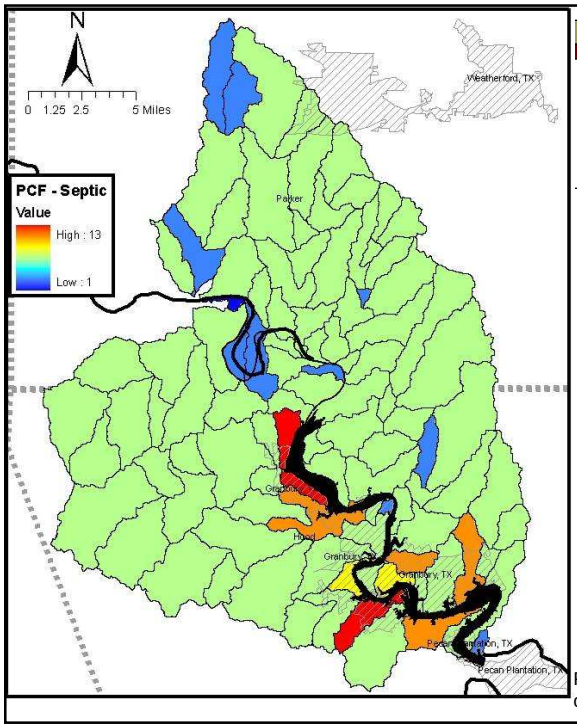
Objective:
Core Elements of EPA's WPPs

1. Identification of causes and sources of impairment
   Complete – Most likely potential sources have been identified
2. Expected load reductions
   In process – Depends on selected measures
3. Proposed management measures
   In process – Measures selection in-progress
4. Technical and financial assistance needs
   Will depends on selected measures
5. Information, education and public participation component
   Ongoing, In progress
6. Implementation schedule
7. Measureable milestones
8. Load reduction evaluation criteria
9. Monitoring component

Completed:
Identify potential sources

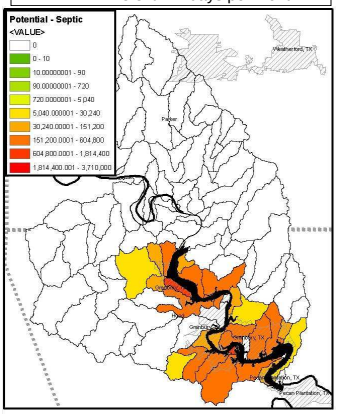
1. RECAP: Likely causes and sources of impairment

Subdivision	Most likely potential sources	
	Lake	Watershed
Rolling Hills Shores	Septic + NPS	Septic, Cattle, Dogs, Deer
Arrowhead Shores	Septic + NPS	Septic, Dogs, Deer
Oak Trail Shores	Septic + NPS	Septic, Dogs
Sky Harbor	NPS	Cattle, Septic, Dogs, Feral hogs
Nassau Bay II	Septic + NPS	Septic, Dogs, Feral hogs
Waters Edge	No problem exhibited; NPS	Very low potential; Dogs
Ports O' Call	Septic	Septic, Dogs
Indian Harbor Cove	Septic	Septic, Dogs
Indian Harbor Canal	Septic + NPS	Septic, Dogs
Port Ridglea East	Septic	Septic, Dogs
Blue Water Shores	Septic	Dogs
Lk Granbury nr Grnbry		



SEPTIC II - Assumptions

200 gallons per day per system
6.68 million e. coli MPN/100mL
Fecal concentration in sewage (EPA 2001)
Number of septic systems per area
Proportion of systems failing (Septic Index)
Risk Level 1 – 5%
Risk Level 2 – 10%
Risk Level 3 – 15%
Likelihood of systems failing on a given day
13.3% = 4 days per month



Potential = Potential Load in organisms per day per square meter

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Objective of Alternatives Evaluation:

Identify practicable management measures

- Detailed evaluation of ***all possible*** management measures to address these WPP elements:
  - 2. Estimate load reductions with each alternative
  - 3. Proposed management measures
  - 4. Technical and financial assistance needs

Description of Management Measures

Possible Management Measures

- Watershed Management and Education
- Septic replacement
- Collection systems
- Local treatment (package plants)
- Region treatment
- Cove dynamics
- Drainage pattern modifications
- Catchment basins
- Vegetated filter strips

Septic Management

- Education on Maintenance and Signs of Malfunction
- Enforcement of Regulations
  - Site Investigations
- Community Management Plans
- Pump-Out Pilot Program

Watershed Management

- Education
  - Fertilizers and Pesticide Applications
  - Waterfowl and Wildlife Feeding
  - Wildlife Control Programs
  - Small Acreage/ “Ranchette” Conservation Practices
  - Livestock/Range Management

Septic Replacement

- Avg. life span of Septic System = 20+ yrs
- Many of the subdivisions are 25+yrs
- Replacement of drainfield is likely required if not maintained properly over time (pumped every 3-5 yrs)
- Most designs would not meet current standards
  - Current standards apply to any repairs or permit revisions
  - The soil type in most areas surrounding the lake are not suitable for conventional systems

Local Collection Systems

- Gravity
  - Requires positive slope
  - Most efficient collection system
- Low Pressure
  - Grinder pump & small diameter pipes
  - Suitable for hilly terrain and areas with negligible slope
  - Water tight pipes minimize wet weather peak flows, ideal for development in floodplains, high water tables
  - Small diameter pipe at shallow depths minimize installation costs
  - Maximum total dynamic head allowable = 185 feet
- Mixed = Low Pressure & Gravity

Local Collection Systems

- Assumed wastewater discharge rate of 200 gallons per day
- Assumed 1 grinder pump per connection
- Collection and delivery lift stations and Waste Water Treatment Plants (WWTP) designed and permitted for peak design flows (TCEQ regulations)

Local Centralized Wastewater Treatment

- Package plants or mini-wastewater plants
  - Volume treated: up to 0.5 MGD
- Serves individual subdivisions or aggregation of subdivisions
- Located closer to subdivision(s) served
- Steel construction: less expensive, 20-year life
- Concrete construction: more expensive, longer life

Regionalized Wastewater Treatment

- City of Granbury (2009)
  - Developing plans for 10 MGD plant north of Granbury
  - May extend trunk lines for independent area tie-in
- Acton Municipal Utility District (AMUD) (2009)
  - May extend trunk lines and provide services through existing plant (DeCordova)
  - Pending expansion with Clean Water State Revolving Fund (CWSRF)

Active Sewer Utilities in Hood County

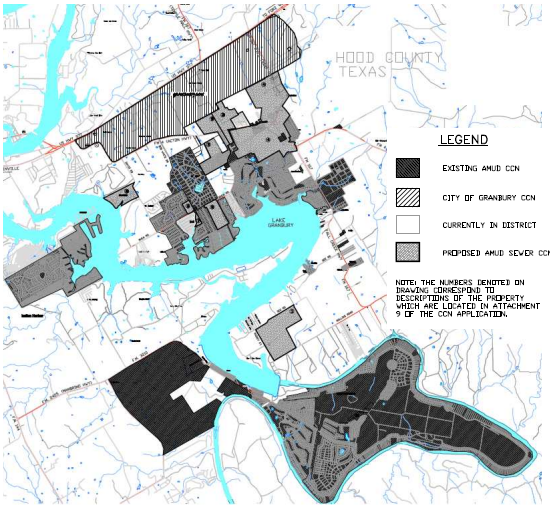
- Acton MUD
- Aqua Texas, Inc.
- City of Cresson (proposed)
- City of Granbury
- Fall Creek Utility Company, Inc.
- Laguna Vista LTD
- Texas H2O, Inc.

TCEQ June 22, 2009: http://www10.tceq.state.tx.us/iwud/util/index.cfm?fuseaction=ListUtilities&COMMAND=LIST

Active Sewer Utilities in Hood County

CCN map

Acton Municipal Utility District (AMUD)



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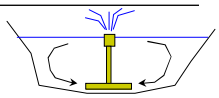
Cove Dynamics

- Goal is to improve water movement through coves
  - Decrease stagnant water
  - Encourage "flushing" of pollutants
  - Improve aesthetics
- "Fill" Option
  - Reduction in water frontage
  - Flood zone impacts should be considered per NFIP Rules
  - Fill must be compacted
  - Permitting-USACE 404 and TCEQ 401 Water Quality Certifications
- "Dredge" Option
  - Increase in depth or water frontage
  - Sediment removal - phosphate & nutrients
  - Consider maintenance cycles

irishwaterwayshistory.com/.../non-wi-workboats

Cove Circulation Systems

- Floating Fountain
  - Small area of circulation & only near lake surface
  - Provides beneficial oxygen but not flushing
- Aeration system
  - Compressor at bottom of lake creates air bubbles
  - Effective for increasing dissolved oxygen
- Water Intake-Discharge System
  - Intake from lake and discharge at head of canal/cove
  - Promotes circulation and flushing



Offsite Drainage Bypass

- Redirect runoff away from the canals and coves to prevent pollutant loading from pesticides, pet waste, etc.

www.jaxshells.org/829up.htm

Catchment Basin

- Structural BMP to "catch" runoff from watershed and treat before discharging to coves or lake
- Wet ponds can be highly effective if properly designed and maintained
- Wet ponds treat by settling solids and biological uptake from plants

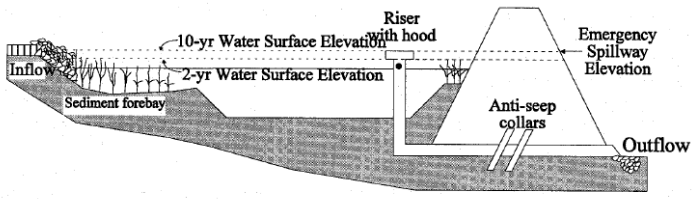
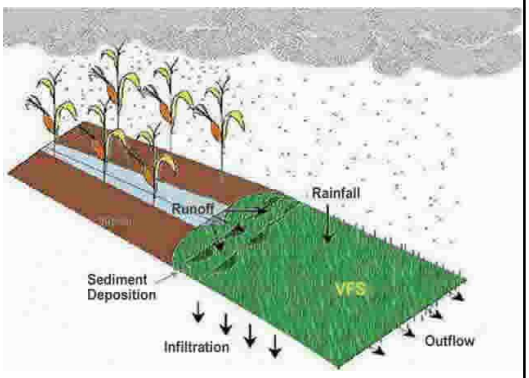


Figure 3-6 Schematic of a Wet Basin (Young et al., 1996)

http://www.tceq.state.tx.us/files/rg-348_chapter3.pdf_4443246.pdf

Vegetative Filter Strips

- Slows and filters runoff
  - Plant uptake of nutrients
  - Capture of bacteria and exposure to sunlight increases die-off rate



carpena.ifas.ufl.edu/vfsmod/

Questions?

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