

Lake Granbury WPP Alternatives Analysis

5 - ALTERNATIVES ANALYSIS

Stakeholder Meeting

August 18, 2009

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Topics for Today's Discussion

- Summary of Areas
- Process for incorporating stakeholder input
- Specific materials for additional Areas
- Summary Evaluation Matrices
 - Each Subdivision, with comments to-date
 - Including Educational Components
- Eliminate alternatives by consensus

Summary of Areas

- Rolling Hills Shores
- Oak Trail Shores
- Long Creek
- Sky Harbor
- Indian Harbor
- Nassau Bay II
- Port Ridglea East
- Blue Water Shores
- Walnut Creek

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Process for incorporating stakeholder input

Incorporating Stakeholder Inputs

- PROCESS
 - Deliver draft materials (DONE)
 - Gather input and comments (IN-PROGRESS)
 - Revise materials per input and comments (FUTURE)
- Final product: one evaluation matrix for each Area of interest
- **The goal of today's discussion is to gather as much input as necessary to create the final matrices.**

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Updates

- Education Programs
 - Added available information for education programs applicable to each Area of interest
 - Currently evaluating information related to percent reduction, life cycles and cost index.
- Additional Areas
 - Blue Water Shores
 - Cove Dynamics (Dredging)
 - Cove Circulation (Intake/Discharge)
 - Walnut Creek

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General Comments

- Evaluation Criteria
 - Comment: Include Long term sustainability
 - Resolution: Incorporated into life cycle costs
 - Comment: Evaluation criteria wording “Watershed % Reduction” not appropriate
 - Resolution: Change to “Bacteria % Reduction”
 - Comment: Can we determine what % reduction in each subdivision needs to be reached to meet stakeholder goals?
 - Resolution: Recognize significant constraints to this approach, bacteria are living organism with complex life cycles – difficult to predict accurate reductions in concentrations at specific locations
- Suggestion:
 - Prioritize areas and alternatives for implementation planning and funding outreach

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General Comments

- Weighting of evaluation criteria
 - All draft materials assume equal weighting for
 - Life cycle
 - Bacteria % reduction
 - Cost index
 - No comments on this yet
 - Is one factor more important than another?

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General Comments

On-site Sewage Facilities

- Septic Inspections
 - Comment: Hood County Health Dept. has limited staffing resources to perform detailed inspections for all subdivisions.
 - Only surficial inspections, snapshot in time
 - Resolution: Need to investigate enforcement of real estate inspections
- Life Span for Replacement of Septic Systems
 - Assumption: 25 yrs
 - Comments: 12 to 20 yrs to longer
 - Resolution: 20 years
- Terminology for Onsite Systems
 - Comments: Consistency between OWTS vs OSSF
 - Resolution: OSSF

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General Comments

Wastewater Collection Systems

- Power for wastewater collection systems
 - Assumption: 3-phase
 - Comments: May be optimistic for some areas.
 - Resolution: This assumption is fine.
 - Assumption: Cost \$0.11/kWh
 - Comment: Recently increased by 8%
 - Resolution: Continue with current assumption unless otherwise resolved.
- Time to Implement wastewater collections systems
 - Comment: Is time to implementation the same for all subdivisions?
 - Resolution: Reduce for Port Ridglea East and Nassau Bay II considering plans already underway.
- Number of connections
 - Assumption: Equals the number of lots based on subdivision parcels
 - Comments: Some subdivisions have residences with double lots
 - Resolution: Determine appropriate ratio for each subdivision based on stakeholder input

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General Comments

Cove Dynamics and Circulation

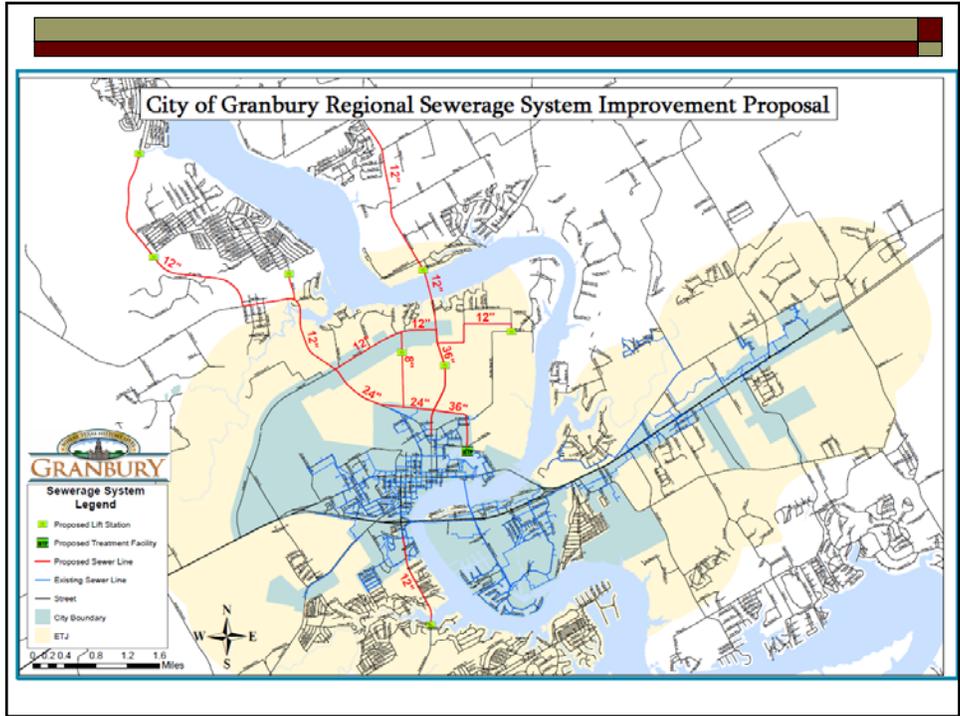
- ❑ Structures in coves and canals may constrain navigability
- ❑ Some of the water is too shallow to implement circulation features

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Areas Not Previously Presented

Decision Points



Nassau Bay II

Subdivision	BMP Alternative	% Reduction Bacteria	Time to Implement	Equivalent Annual Cost index	Score	Feasibility (Constraints/ Considerations)	Funding
Nassau Bay II	Local Centralized Wastewater Treatment - Independent	98%	5-2-5 yrs	3	0.28	2	10
	Local Centralized Wastewater Treatment - Aggregate	98%	5-5-10 yrs	2	0.28	2	9
	Regional Wastewater Treatment	98%	5-10-15 yrs	1			
	Septic Maintenance and Education		<1 yr	5			
	Urban Education on Fertilizer Application		1-2 yrs	4			
	Pet Waste Education		<1 yr	5			
	Waterfowl and Wildlife Feeding Ordinances		1-2 yrs	4			

- Wastewater collection systems
 - 123 connections = # of lots
- Aggregate collection system with Port Ridglea East

Water's Edge

Subdivision	BMP Alternative	Weighting ->		Time to Implement	Equivalent Annual Cost Index	Score	Feasibility (Constraints/ Considerations)	Funding
		% Reduction Bacteria	1					
Water's Edge	Urban Education on Fertilizer Application			1-2 yrs	4			Blue
	Pet Waste Education			<1 yr	5			
	Waterfowl and Wildlife Feeding Ordinances			1-2 yrs	4			

- How are we going to determine cost index for waterfowl control at Water's Edge?
- How many lots share the costs?

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Indian Harbor

Subdivision	BMP Alternative	Weighting ->		Time to Implement	Equivalent Annual Cost Index	Score	Feasibility (Constraints/ Considerations)	Funding
		% Reduction Bacteria	1					
Indian Harbor	Local Centralized Wastewater Treatment - Independent	100%	5	2-5 yrs	3	0.24	3	Blue
	Regional Wastewater Treatment	100%	5	10-15 yrs	1		5	
	Cove Circulation Systems (Fountains, etc)	33%	2	1-2 yrs	4	0.1	4	
	Septic Maintenance and Education			<1 yr	5			
	Urban Education on Fertilizer Application			1-2 yrs	4			
	Pet Waste Education			<1 yr	5			
	Waterfowl and Wildlife Feeding Ordinances			1-2 yrs	4			

- Wastewater Collection Systems
 - 1909 connections = # of lots

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Port Ridglea East

Subdivision	BMP Alternative	% Reduction Bacteria		Time to Implement		Equivalent Annual Cost index		Score	Feasibility (Constraints/ Considerations)	Funding
		1	2	1	2	1	2			
Port Ridglea East	Septic System Replacement	75%	4	<1 yr	5	0.45	1	10	Small lots, large number of homes with waterfront property	
	Septic Maintenance Pump-out pilot program	0%		<1 yr	5					
	Local Centralized Wastewater Treatment - Independent	100%		5/2-5 yrs	3	0.28	2	10		
	Local Centralized Wastewater Treatment - Aggregate	100%		5/5-10 yrs	2	0.28	2	9		
	Regional Wastewater Treatment	100%		5/10-15 yrs	1					
	Cove Circulation Systems (Fountains, etc)	30%	2	1-2 yrs	4	0.14	4	10		
	Septic Maintenance and Education			<1 yr	5					
	Urban Education on Fertilizer Application			1-2 yrs	4					
	Pet Waste Education			<1 yr	5					
	Area Conservation Plan and Education for small acreage land owners			2-5 yrs	3					
	Waterfowl and Wildlife Feeding Ordinances			1-2 yrs	4					

- OSSF
 - Replace failing septic with aerobic tanks and drip emitter field
- Wastewater Collection Systems
 - 248 connections = # of lots
- Aggregate collection system with Nassau Bay II
- Cove Circulation
 - 4-day turn over

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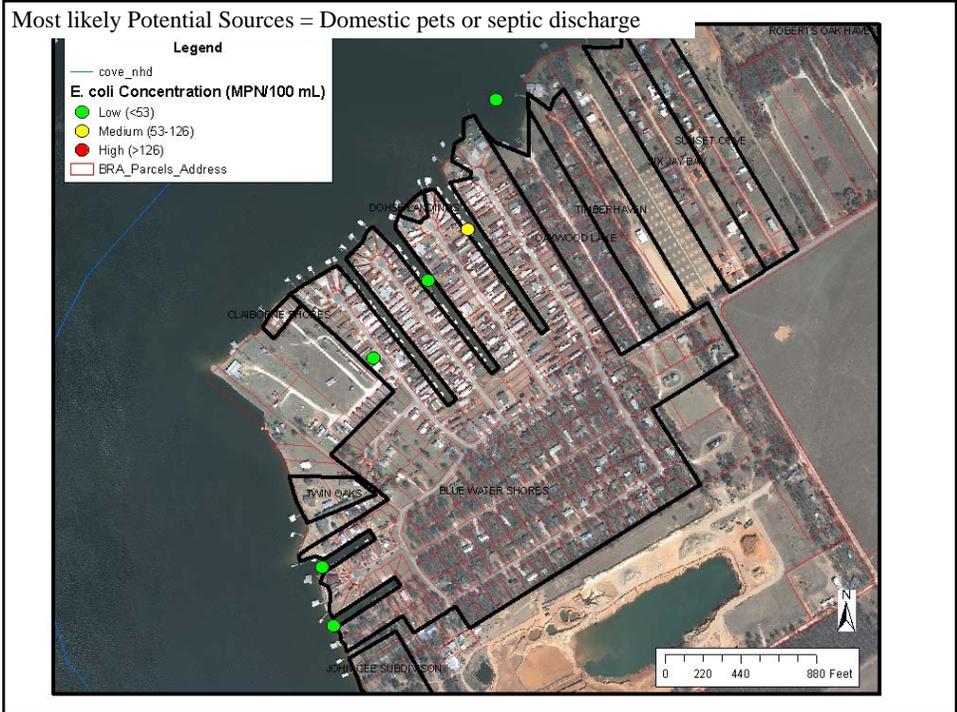
Site-specific development of Alternatives:

Blue Water Shores

Most likely Potential Sources = Domestic pets or septic discharge

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Blue Water Shores Subdivision

Cove Dynamics: Dredge

357 lots/residences in subdivision

- 6' depth
 - 5 year life cycle
 - Percent concentration reduction = 30%
 - Greater reduction if direct discharge source reduced
 - EAC Index = 0.98

- 8' depth
 - 10 year life cycle
 - Percent concentration reduction = 45%
 - Greater reduction if direct discharge source reduced
 - EAC Index = 1.0



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Blue Water Shores

Cove Circulation

Intake-Discharge Circulation System

- 4 day turnover rate
- 1 discharge point
- 357 lots in subdivision
- PVC pipe
 - 955 linear feet
 - 6" diameter
- 15 year life cycle
- Potential concentration reduction = 38%
- EAC index = 0.09



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Blue Water Shores

Subdivision	BMP Alternative	Weighting ->	% Reduction Bacteria		Time to Implement		Equivalent Annual Cost Index		Score	Feasibility (Constraints/Considerations)	Funding
			1	2	1	2	1	2			
Blue Water Shores	Dredge 6ft		30%	2	1-2 yrs	4	0.98	0	6		
	Dredge 8 ft		45%	3	1-2 yrs	4	1.00	0	7		
	Cove Circulation System: Intake/Discharge		38%	2	1-2 yrs	4	0.09	4	10		
	Septic Maintenance and Education (Neighboring Communities)				<1 yr		5				
	Pet Waste Education				<1 yr		5				
	Waterfowl and Wildlife Feeding Ordinances				1-2 yrs		4				
	Collection System Sewage Line - Maintenance				1-2 yrs		4				

- Cove Dynamics
 - Only dredge canal with high E. coli observations
- Cove Circulation
 - 4-day turn over

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Site-specific development of Alternatives:

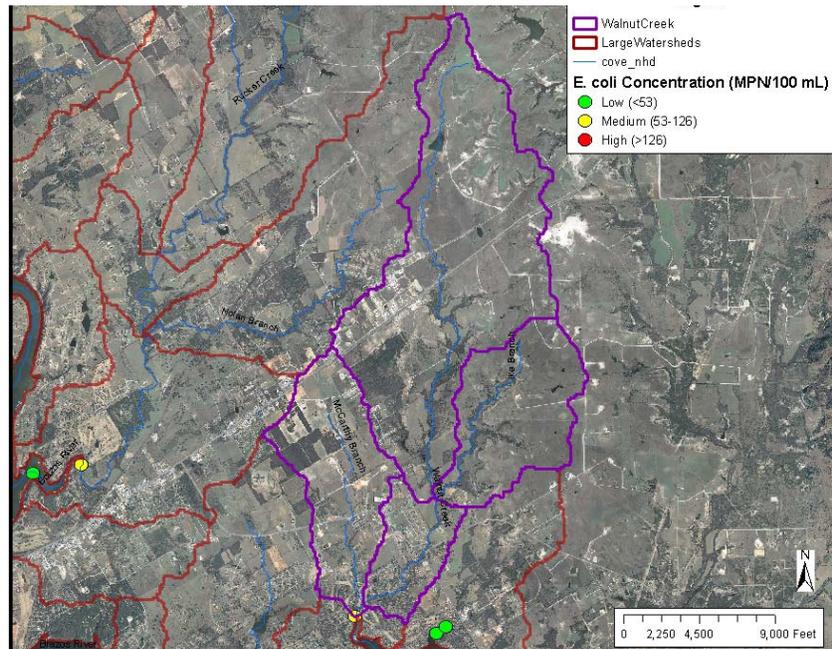
Walnut Creek

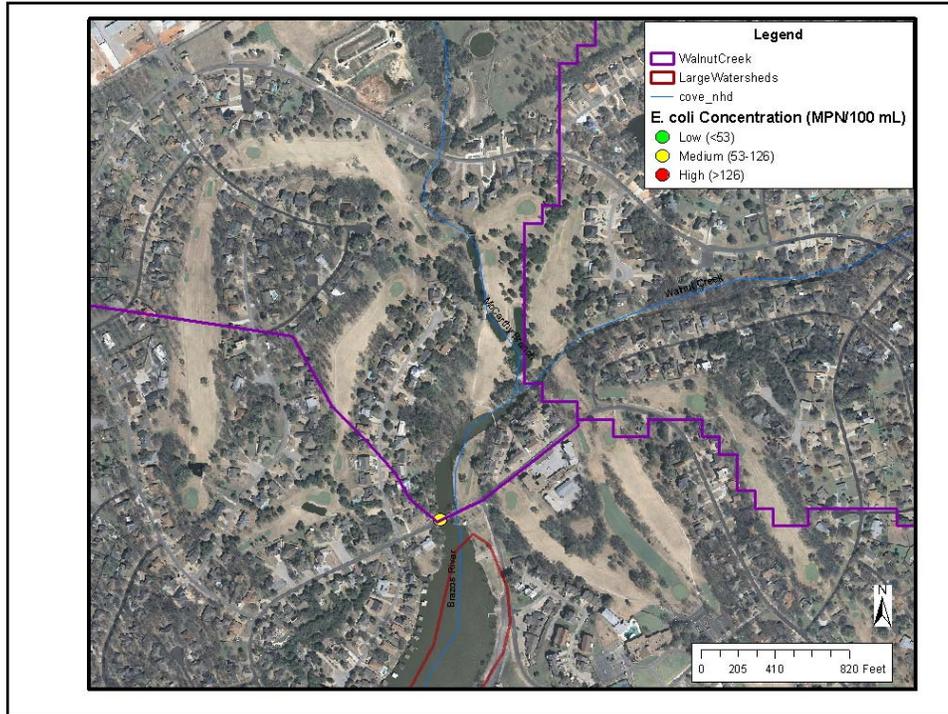
Most likely Potential Sources = Cattle, Pets, Feral hogs, Septic, Deer

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Most likely Potential Sources = Cattle, Pets, Feral hogs, Septic, Deer





Walnut Creek – Possible Alternatives Matrix

Subdivision	BMP Alternative	Weighting ->	% Reduction Bacteria	Time to Implement	Equivalent Annual Cost Index	Score	Feasibility (Constraints/ Considerations)	Funding
Walnut Creek	Catchment Basin	1	1	2-5 yrs	3			
	Vegetative Filter Strips			<1 yr	5			
	Septic Maintenance and Education			<1 yr	5			
	Pet Waste Education			<1 yr	5			
	Area Conservation Plan and Education for small acreage land owners			2-5 yrs	3			
	Livestock/Range Management Education			1-2 yrs	4			
	Feral Hog Education Program/Bounty			2-5 yrs	3			

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Summary Evaluation Matrices by Area

Lake-wide measures

Subdivision	BMP Alternative	% Reduction Bacteria		Time to Implement		Equivalent Annual Cost index		Score	Feasibility (Constraints/ Considerations)	Funding
		1	0	1	1	1	1			
Lake Wide	Regional Wastewater Treatment	0%	0	10-15 yrs	1					Blue
	Vegetative Filter Strips			<1 yr	5	5	10			
	Septic Maintenance and Education			<1 yr	5					
	Urban Education on Fertilizer Application			1-2 yrs	4					
	Pet Waste Education			<1 yr	5					
	Livestock/Range Management Education			1-2 yrs	4					
	Feral Hog Education Program/Bounty			2-5 yrs	3					
	Waterfowl Breeding Control Program			1-2 yrs	4					
	Waterfowl and Wildlife Feeding Ordinances			1-2 yrs	4					

- Horse Farm Education (TSSWCB)

Rolling Hills Shores

Subdivision	BMP Alternative Weighting ->	% Reduction Bacteria		Time to Implement		Equivalent Annual Cost Index		Score	Feasibility (Constraints/ Considerations)	Funding
Rolling Hills Shores	Septic System Replacement along Cove	46%	3	<1 yr	5	0.32	2	10	future repairs, floodplain, limited to holding tanks	Blue
	Septic System Replacement Uphill	46%	3	<1 yr	5	0.22	3	11	future repairs	
	Wastewater Treatment - Independent	62%	4	2-5 yrs	3	0.30	2	9		
	Local Centralized Wastewater Treatment-Aggregate	62%	4	5-10 yrs	2	0.19	3	9		
	Regional Wastewater Treatment	62%	4	10-15 yrs	1					
	Property Buy-Out	62%	4	1-2 yrs	4	0.15	4	12	Public Opinion, Removal of Tanks	
	Fill	0%	0	1-2 yrs	4	0.30	2	6		
	Partial Fill	0%	0	1-2 yrs	4	0.25	3	7	Does not address source(s);	
	Dredge	4%	1	1-2 yrs	4	1.00	0	5	Flood storage, Property Rights	
	Partial Fill & Dredge	0%	0	2-5 yrs	3	0.73	0	3		
	Dredge, Partial Fill, Add Outlet	86%	5	2-5 yrs	3	0.76	0	8		
	Vegetative Filter Strips	5%	1	<1 yr	5	0.02	5	11		
	Septic Maintenance and Education			<1 yr	5					
	Septic Management (records, inspectors)			1-2 yrs	4					
	Pet Waste Education			<1 yr	5					
	Livestock/Range Management Education			1-2 yrs	4					
	Waterfowl Breeding Control Program			1-2 yrs	4					

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Rolling Hills Shores - Comments

- Possible Alternative Investigation
 - Terrace or catchment for upper watershed

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Oak Trail Shores

Subdivision	BMP Alternative	Weighting ->		% Reduction Bacteria	Time to Implement	Equivalent Annual Cost Index	Score	Feasibility (Constraints/ Considerations)	Funding	
		1	1							
Oak Trail Shores	Septic System Replacement									
	Section 1					0.17				
	Section 2					0.33				
	Section 3	41%	3	<1 yr	5	0.23	4	12		
	Local Centralized Wastewater Treatment - Independent	54%	3	2-5 yrs	3	0.16	4	10		
	Local Centralized Wastewater Treatment - Aggregate	54%	3	5-10 yrs	2	0.19	3	8		
	Regional Wastewater Treatment	54%	3	10-15 yrs	1					
	Cove Dynamics:	Fill	0%	0	1-2 yrs	4	0.01	5	9	Does not address source(s); Flood storage, Property Rights
		Partial Fill	0%	0	1-2 yrs	4	0.01	5	9	
		Dredge	30%	2	1-2 yrs	4	0.99	0	6	
	Drainage Re-route	Dredge, Add Outlet	65%	4	2-5 yrs	3	0.35	1	8	
			51%	3	<1 yr	5	0.03	5	13	
	Septic Maintenance and Education				1-2 yrs	4				
	Septic Management (records, inspectors)				<1 yr	5				
	Pet Waste Education				1-2 yrs	4				
Waterfowl and Wildlife Feeding Ordinances										

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Oak Trail Shores - Comments

- ❑ Alternatives to Investigate
 - Flush water through cove from offsite drainage
 - Flush more water through cove from pumping
- ❑ Number of Connections
 - Assumption: # of lots
 - Comment: Some are double lots
 - Resolution: Use number of parcels because of potential for future redevelopment

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Long Creek

Area	BMP Alternative Weighting ->	% Reduction Bacteria		Time to Implement		Equivalent Annual Cost index		Score	Feasibility (Constraints/ Considerations)	Funding
		1	4	1	5	1	1			
Long Creek	Septic System Replacement ¹	75%	4	<1 yr	5	0.36	1	10		Blue
	Local Centralized Wastewater Treatment - Independent ¹	100%	5	2-5 yrs	3	0.28	2	10		
	Regional Wastewater Treatment ¹	100%	5	5-10 yrs	2					
	Vegetative Filter Strips			<1 yr	5					
	Septic Maintenance and Education			<1 yr	5					
	Pet Waste Education			<1 yr	5					
	Area Conservation Plan and Education for small acreage land owners			2-5 yrs	3					
	Livestock/Range Management Education			1-2 yrs	4					
	Waterfowl Breeding Control Program			1-2 yrs	4					
	Waterfowl and Wildlife Feeding Ordinances			1-2 yrs	4					

¹ Long Creek Subdivision Only, does not consider upper watershed

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Long Creek - Comments

- ❑ Alternatives to Investigate
 - Watershed Management above monitoring point
 - ❑ Education should be top of priorities
 - ❑ Regional wastewater collection low priority because of remote location
- ❑ Other Comments:
 - 200-500 geese can be seen on the turf grass fields.
 - Septic systems are not a problem in this area
 - Slide 4 100% reduction refers to human sources in subdivision
 - Investigate septic pump-out and land application near Hwy 51.
 - Investigate turfgrass farm
 - ❑ use of compost/organic fertilizer?
 - Suggested that the Brazos Coalition sample at the creek outlet for comparison to current station.

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Sky Harbor

Subdivision	BMP Alternative	% Reduction Bacteria		Time to Implement		Equivalent Annual Cost Index		Score	Feasibility (Constraints/ Considerations)	Funding
		1	2	1	2	1	2			
Sky Harbor	Septic System Replacement	9%	1	<1 yr	5	0.26	3	9		0
	Local Centralized Wastewater Treatment - Independent		1	2-5 yrs	3	0.18	4	8	SW mixed	
	Regional Wastewater Treatment	13%	1	10-15 yrs	1					
	Cove Circulation Systems (Fountains, etc)	39%	2	1-2 yrs	4	0.11	4	10		
	Catchment Basin	65%	4	2-5 yrs	3	0.48	1	8		
	Septic Maintenance and Education			<1 yr	5					
	Pet Waste Education			<1 yr	5					
	Area Conservation Plan and Education for small acreage land owners			2-5 yrs	3					
	Livestock/Range Management Education			1-2 yrs	4					
	Waterfowl and Wildlife Feeding Ordinances			1-2 yrs	4					

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Sky Harbor - Comments

- ❑ Cove dynamics dredging option:
 - Assumption: 5 years until re-dredging
 - Comments: 5' sediment accumulation in 30 years
 - Resolution: 15 years to re-dredging (evaluate other subdivisions case-by-case)
- ❑ Number of connections
 - Assumption: Number of connections = # lots
 - Comment: Many residences use double lots
 - Resolution: Assume connections for 75% of lots

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Next Steps

- September Meeting
 - Finalize Evaluation Criteria
 - Discuss how to move forward – prioritize efforts
- October Meeting
 - Distribute revised materials, per input and comments
 - Decide alternatives to pursue

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Questions or Comments?

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