

## Implementation Strategy 1.0: Wastewater Treatment Facilities

Although bacteria are found in fecal waste of all warm-blooded animals, it is the intent of the BIG to focus resources on bacteria from human sources.

In Texas, the level of bacteria loading from wastewater treatment facilities (WWTFs) is largely unknown because, until recently, their permits have not required them to test for bacteria, with the exception of facilities utilizing an ultraviolet disinfection system. However, non-compliant WWTFs were designated in the Clear Creek TMDL as one of the most probable sources of bacteria in the region's waterways.<sup>30</sup> Results from limited monitoring of bacteria in the BIG region suggests that while levels of indicator bacteria in effluent from individual WWTFs is typically low, at any given time approximately 5 percent to 10 percent of the facilities can be found to be exceeding the single-sample criterion for *E. coli*.<sup>31</sup>

As of October 1, 2010, the BIG region has 536 domestic WWTFs and 50 industrial WWTFs, most of which are permitted for less than 0.5 million gallons per day, or MGD. (See Table 4 and Figure 3.) When not dominated by storm water, flow in many of the region's waterways is dominated by wastewater effluent. Possible sources of bacteria from WWTFs include insufficiently treated effluent and unauthorized/accidental discharge, including sludge.

**Table 4: Domestic and Industrial WWTFs<sup>32</sup>**

Permitted Flow (MGD)	Number of Domestic WWTFs (% of Domestic Facilities)	Number of Industrial WWTFs (% of Industrial Facilities)
0 to less than 0.1	228 (43%)	43 (86%)
0.1 to less than 0.5	127 (24%)	4 (8%)
0.5 to less than 1	98 (18%)	1 (2%)
1 to less than 5	76 (14%)	2 (4%)
5 to less than 10	5 (1%)	0 (0%)
10 or greater	2 (0%)	0 (0%)

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<sup>30</sup> (TCEQ 2008b)

<sup>31</sup> (TCEQ 2009a)

<sup>32</sup> These numbers were extracted from a database, maintained by H-GAC, of permitted WWTF in the thirteen-county region.



## **Implementation Activity 1.1: Impose More Rigorous Bacteria Monitoring Requirements**

Until recently, WWTFs in Texas were not required to monitor for bacteria, with the exception of facilities using an ultraviolet disinfection system. However, the TCEQ recently came to an agreement with the EPA and adopted a new rule requiring that all domestic wastewater draft permits, for which Notice of Application and Preliminary Decision is published on or after January 1, 2010, be updated to include monitoring requirements for bacteria at a specified frequency (See Table 5).<sup>33</sup> It will take five years or more for renewals to be initiated for all domestic wastewater permits.

In order to move toward compliance with contact recreation standards in the region's waterways, it is imperative to have more information about WWTFs' operations. As such, the BIG recommends that the frequency of monitoring be increased over what is currently required by the TCEQ.

According to current regulations, 228 domestic WWTFs in the BIG project area are required to monitor bacteria quarterly and 127 domestic WWTFs are required to monitor monthly. Under this I-Plan, domestic WWTFs in the BIG project area will be required to monitor bacteria on frequencies similar to those for other parameters of their Texas Pollutant Discharge Elimination System (TPDES) permits, up to five times per week. If a domestic permit does not specify a sampling frequency for bacteria, the permittee should follow the frequencies set forth in Table 6. As of August 2010, the cost to run a bacteria sample is approximately \$50.

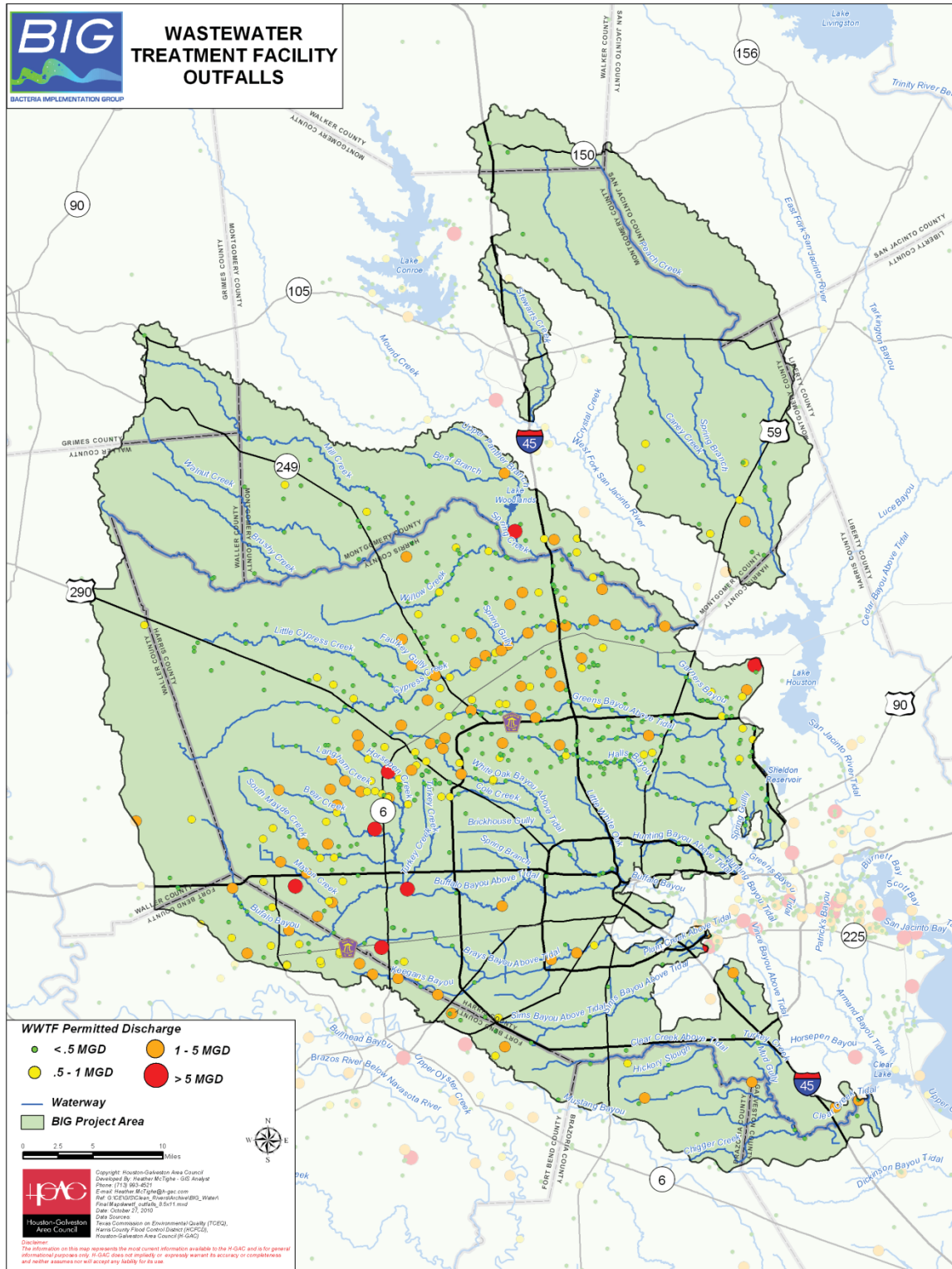
Larger flows have more frequent sampling requirements than small flows, as reflected in the current requirements in Texas for domestic WWTFs. Current requirements are shown in Table 5. Table 6 suggests increased sampling frequency for smaller flows to increase the operational database. Over time, the increased data will help operators understand the effects of variables such as rainfall and infiltration. In addition, the data could help improve load reduction because operators will have more information to use to adjust and control facilities to reduce bacteria levels. The additional data may also protect compliant WWTFs from more stringent regulations that could be imposed if receiving stream quality fails to improve. Frequencies shown in Table 6 could be increased, depending on WWTF performance, other site sampling frequencies, and the impairment of the receiving stream.

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<sup>33</sup> See 34 Tex. Reg. 3495 (2009), *adopted* 34 Tex. Reg. 8332 (2009) (codified as an amendment to 30 Tex. Admin. Code § 319.9(b))

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**Figure 3: Map of Wastewater Treatment Facility Outfalls**



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**Table 5: *Current* requirements in Texas for domestic WWTFs<sup>34</sup>**

Permitted Flow (MGD)	Chlorine systems	Ultraviolet systems	Natural systems
0 to less than 0.1	1/quarter	5/week	1/month
0.1 to less than 0.5	1/month	5/week	2/month
0.5 to less than 1	2/month	Daily	1/week
1 to less than 5	1/week	Daily	3/week
5 to less than 10	3/week	Daily	5/week
10 or greater	5/week	Daily	Daily

**Table 6: *Proposed* requirements for domestic WWTFs in the BIG Project Area**

Permitted Flow (MGD)	Chlorine systems	Ultraviolet systems	Natural systems
0 to less than 0.1	<b>1/week*</b>	5/week	<b>3/week*</b>
0.1 to less than 0.5	<b>1/week*</b>	5/week	<b>3/week*</b>
0.5 to less than 1	<b>3/week*</b>	Daily	<b>3/week*</b>
1 to less than 5	<b>3/week*</b>	Daily	3/week
5 to less than 10	<b>5/week*</b>	Daily	5/week
10 or greater	5/week	Daily	Daily

\*These *proposed* values differ from existing values.

According to new bacteria monitoring regulations, in 30 Tex. Admin. Code § 319.9(b), a permittee that has at least twelve months of uninterrupted compliance with its bacteria limit may notify the commission of its compliance and request a less frequent measurement schedule. The same allowance and possible consequences for violation of the permit limit could apply in the project area.

TCEQ procedures specify that effluent limits and monitoring requirements for bacteria associated with industrial discharges will be determined on a case-by-case basis<sup>35</sup>. If the TCEQ elects to include bacteria limits or monitoring in a permit for an industrial facility, the BIG recommends that the TCEQ take into consideration the bacteria limits and monitoring guidelines specified by the BIG for domestic WWTF permits. The TCEQ shall also consider the characteristics of both the waste stream and the receiving water body, particularly when the stream is impaired for bacteria.

<sup>34</sup> See 30 Tex. Admin. Code § 319.9 (2011) (Table (b): Frequency of Bacteria Measurement)

<sup>35</sup> (TCEQ 2010g)

## **Implementation Activity 1.2: Impose Stricter Bacteria Limits for WWTF Effluent**

The TCEQ adopted a rule on November 4, 2009, requiring all TPDES domestic wastewater permits be updated to include bacteria limits for all WWTFs.<sup>36</sup> New regulations state that “by adopting bacteria limits, there will be a more direct and possibly more accurate measure of the level of disinfection achieved in domestic effluent discharged to both fresh and salt water.”<sup>37</sup> Current regulations have set the monthly geometric mean bacteria effluent limit and the daily maximum bacteria effluent limit at the most stringent contact recreation category level.<sup>38</sup>

However, if waterways are to meet contact recreation standards, effluent limits should be made more stringent for WWTFs discharging into bacteria-impaired watersheds. In fact, the approved Buffalo and Whiteoak Bayous TMDL<sup>39</sup> states, “if WWTFs were to discharge at the water quality criterion (126 MPN/100 mL), there would be no capacity to accommodate other loads and existing downstream discharges.”<sup>40</sup> Therefore, for domestic facilities releasing effluent into freshwater, the BIG resolves and recommends to the TCEQ that bacteria limits in domestic WWTF permits throughout the BIG project area be set at 63 MPN/100 mL for the geometric mean of the monthly samples<sup>41</sup> of *E. coli* effluent, using any method approved under 40 C.F.R. § 136, and 197 MPN/100 mL for the daily maximum *E. coli* effluent limit. The authority to set these stricter limits was given explicitly in the rule itself,<sup>42</sup> where it states “the commission may impose more stringent requirements in permits than those specified...on a case-by-case basis, where appropriate to maintain desired water quality levels or protect human

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<sup>36</sup> See 34 Tex. Reg. 3495 (2009), *adopted* 34 Tex. Reg. 8332 (2009) (codified as an amendment to 30 Tex. Admin. Code § 319.9(b))

<sup>37</sup> (TCEQ 2009c)

<sup>38</sup> See 30 Tex. Admin. Code § 309.3(h)(2) (2011) (Application of Effluent Sets)

<sup>39</sup> (TCEQ 2009a)

<sup>40</sup> The Buffalo and Whiteoak Bayous TMDL and other TMDLs proposed and anticipated in the BIG region specify that *E. coli* limits for WWTF effluent be one half of the water quality criterion, currently 63 MPN/100 mL, in calculations of the WWTF Waste Load Allocation. More stringent limits for Enterococci were not specified by the TMDLs.

<sup>41</sup> After identifying and rejecting outliers, consistent with ASTM E 178-80, "Standard Practice for Dealing With Outlying Observations" (Section 14.02, General Methods and Instrumentation - General Test Methods; Forensic Sciences: Terminology; Conformity Assessment: Statistical Methods).

<sup>42</sup> See 30 Tex. Admin. Code § 309.3 (2011) (Application of Effluent Sets)

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health.”<sup>43</sup> As allowed for in the Buffalo and Whiteoak Bayou TMDL, the BIG resolves that the bacteria limit be set at a geometric mean of 126 MPN/100 mL for the monthly samples at a WWTF’s next permit renewal or major amendment and that the new limit be phased in, such that three years after the permit’s effective date the effluent limit shall be a geometric mean of 63 MPN/100 mL for the monthly samples.<sup>44</sup> This phased in approach would allow the WWTFs to implement *E. coli* monitoring while each plant plans and implements processes to address *E. coli* discharges.

The TCEQ has developed criteria for actual classified stream segment testing using *E. coli* as the indicator bacteria for freshwater and *Enterococci* for saltwater per Appendix A of 30 Tex. Admin. Code § 307.10 (1).<sup>45</sup> Fecal coliform can still be used as an alternative indicator during the transition to the new indicator bacteria, as specified in 30 Tex. Admin. Code § 307.7(b).<sup>46</sup> For domestic facilities where the TCEQ determines that *Enterococcus*, rather than *E. coli*, is the appropriate indicator bacteria, the BIG resolves that the Enterococcus effluent limit be set at 23 MPN/100 mL for the geometric mean of the monthly samples<sup>47</sup> and 57 MPN/100 mL for the daily maximum, using any method approved under 40 C.F.R. Part 136.

### **Implementation Activity 1.3: Increase Compliance and Enforcement by the TCEQ**

Stakeholders are concerned that there are insufficient quantities of investigations, reviews, and enforcement being performed by the TCEQ. The BIG recommends that the TCEQ conduct unannounced and focused inspections with a goal to have all facilities inspected every two years. There are multiple methods to address the low numbers of investigations and reviews performed. One method would be to increase the number of staff performing investigations, either through hiring additional TCEQ staff or through a contract with local programs. Another method would be to change TCEQ operating procedures.

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<sup>43</sup> (State of Texas 2009)

<sup>44</sup> After identifying and rejecting outliers, consistent with ASTM E 178-80, "Standard Practice for Dealing With Outlying Observations" (Section 14.02, General Methods and Instrumentation - General Test Methods; Forensic Sciences: Terminology; Conformity Assessment: Statistical Methods)

<sup>45</sup> See Appendix A of 30 Tex. Admin. Code § 307.10 (1) (2011) (Site-specific Uses and Criteria for Classified Segments)

<sup>46</sup> See 30 Tex. Admin. Code § 307.7(b) (2011) (Appropriate uses and criteria for site-specific standards)

<sup>47</sup> After identifying and rejecting outliers, consistent with ASTM E 178-80, "Standard Practice for Dealing With Outlying Observations" (Section 14.02, General Methods and Instrumentation - General Test Methods; Forensic Sciences: Terminology; Conformity Assessment: Statistical Methods)

***1.3.1: Allow unannounced inspections and focused investigations on all facilities, including sampling-only investigations***

Currently, unannounced inspections can be performed at WWTFs that have been designated as poor performers or in response to complaints and other similar situations. In the BIG region only one facility has been so designated. Unannounced inspections have been shown to increase compliance.<sup>48</sup> The BIG assumes that unannounced WWTF inspections would yield similar results.

In addition to the restrictions on whether inspections must be announced, there are restrictions on the types of investigations that may be performed. For example, Comprehensive Compliance Inspections are required for inspections of mandatory facilities and can take days to complete. This severely limits the number of inspections that can be performed. The TCEQ should allow for and conduct focused investigations including inspections that just collect samples at all facilities. An investigator could then conduct numerous inspections in a single day. Currently, focused investigations are permitted only at discretionary minor facilities, which, for the most part, have permitted discharge of less than one MGD.

For facilities that are not currently staffed, the BIG recommends that the TCEQ develop a procedure to facilitate these inspections and investigations. For example, the TCEQ could require access within a defined, restricted period of time after providing notice by telephone to a posted number.

***1.3.2: Consider increasing TCEQ staff or contract with local programs to increase inspections and reviews***

The TCEQ should perform a workload analysis to correlate recent increases in wastewater fees from the regulated community to the allocation of staff for inspections and enforcement. If that analysis concludes that more staff is necessary, the TCEQ should hire additional employees. An alternative to hiring additional TCEQ employees would be for the TCEQ to consider contracting with a local program, as is done by the TCEQ for its air quality and waste management programs. Increasing the TCEQ staff or contracting with local programs would help ensure all plans and specifications are reviewed, a greater number of WWTFs are inspected each year, and Discharge Monitoring Reports are reviewed on a more frequent basis for effluent violations, non-submittal, and other issues.

## **Implementation Activity 1.4: Improved Design and Operation Criteria for New Plants**

Much of the existing design and operation criteria for WWTFs was improved in 2008 when 30 Tex. Admin. Code § 217 (2011) (Design Criteria for Domestic Wastewater Systems) (formerly § 317) was adopted. As a greater understanding of how plant design impacts bacteria outputs from plants is

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<sup>48</sup> (Texas Department of State Health Services 2007)

achieved, the BIG recommends local governments reopen discussion of design criteria in the near future and consider whether adopting stricter requirements within their jurisdiction would be appropriate.

### **Implementation Activity 1.5: Upgrade Facilities**

Bacteria monitoring may reveal WWTFs that are not meeting effluent limits. Upgrades or repairs, as appropriate, will be the responsibility of each individual facility in order to comply with individual permits. Some types of facilities may have more trouble than others in meeting bacteria standards. These facilities may need to undertake an intensive redesign. Grants, although generally not great in size, may be available. Possible sources of funding include:

- EPA via the Texas Water Development Board, Clean Water State Revolving Fund Program
- U.S. Department of Commerce, Economic Development Grants for Public Works and Development Facilities
- U.S. Department of Agriculture, Rural Utilities Service Water and Waste Disposal Program
- U.S. Department of Housing and Urban Development, State Community Development Block Grant Program

### **Implementation Activity 1.6: Consider Regionalization of WWTFs**

Notwithstanding TCEQ and local enforcement authority, WWTFs that are chronically or severely out of compliance with the bacteria limits set in their TPDES permit shall be encouraged to address the problems through operational improvements and/or capital improvements. If the facility continues violating bacteria limits set in their TPDES permit, the BIG encourages the TCEQ or any local government with jurisdictional authority to require the WWTF to evaluate facility regionalization and implement as appropriate. If regionalization is not a viable alternative, the facility should be required to be modified to meet higher design and monitoring standards.

### **Implementation Activity 1.7: Use Treated Effluent for Facility Irrigation**

Many domestic WWTFs currently do not use their effluent for purposes of irrigation of facility grounds. Using effluent for facility irrigation will allow the water to trickle through the grass and soil, filtering out additional pollutants. Each domestic WWTF is required to consider the use of treated effluent for facility irrigation purposes and is encouraged to incorporate its use as appropriate prior to the next renewal of its permit.



## **Appendix J: Load Reduction Value Information**

Due to the large number of TMDLs covered by this I-Plan and the imprecise bacteria loading values from various sources, estimated load reductions more specific than those given in the following sections could not be determined. Load reductions for each source will vary from segment to segment based on a variety of factors including, but not limited to, the existing land uses in the watersheds and the current loadings from each source.

These load reduction percentages are not based on results of any direct, peer-reviewed, or technically supported studies performed on pathogens or fecal indicators in waterways in the greater Houston area. Many of the estimated reductions are presumptions based on the broad application of the referenced pollutant studies and behavior predictions, some of which are not specifically water related. Also, as this is only a presumed reduction in fecal load; it is still undetermined how this estimated reduction in fecal load would translate to reduction in fecal indicators or the level of pathogens in the water body. Given the untested nature of this information in our area, these estimated potential load reduction percentages should be considered as broad approximations based on limited information and subject to a large margin of error. More due diligence and validation should be required prior to obligating resources based on them.

Although the load reductions presented in the following sections may be less than the load reductions required by the TMDLs, the BIG intends that greater load reductions may be achieved through the iterative process of implementation. The ultimate goal of this I-Plan is continued progress toward greatly reduced bacteria levels.

### **Implementation Strategy 1.0: Wastewater Treatment Facilities (IS1)**

#### *10 percent-20 percent reduction in load assigned to WWTFs*

The estimated load reductions for the seven main activities within IS1 range from zero to 45 percent of the load assigned to WWTF. Based on studies of compliance and enforcement in other fields, the hypothesis is that the strategy with the greatest potential for reducing loads would be improved compliance and enforcement, although concerns exist that resources available are insufficient to attain the full reduction estimate. Over 25 years these seven activities could result in a reduction of up to 20 percent in the load assigned to WWTF.

*Implementation Activity 1.1: Impose More Rigorous Bacteria Monitoring Requirements* is expected to reduce the waste load allocation assigned to WWTFs by 2-4 percent. The hypothesis is that this action will function in a manner similar to mass communication to change public behavior, which is typically

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about 2 percent for public health campaigns.<sup>145</sup> In this instance, the behavior changes are mandated by permits, and so participation is expected to be greater than for campaigns directed at the general public.

*Implementation Activity 1.3: Increase Compliance and Enforcement by the TCEQ* is expected to reduce the waste load allocation assigned to WWTFs by up to 45 percent. In a study of random unannounced inspections of tobacco retailers over seven years regarding underage sales, compliance increased to approximately 90 percent when compliance began at 33 percent.<sup>146</sup> Targeted inspections at WWTFs may not show such a marked increase in compliance because they go after the repeat offenders and will start to leave out those consistently in compliance. Additionally, WWTF inspections look at numerous regulations as opposed to the one considered in the tobacco studies, which results in a greater opportunity for noncompliance. If only compliance with bacteria limits were considered for when measuring compliance trends would likely behave closer to the tobacco study results than otherwise.

*Implementation Activity 1.5: Upgrade Facilities* is expected to reduce the waste load allocation assigned to WWTFs by 12 percent. TCEQ data indicates that, at any one time, samples from 5-10 percent of select WWTFs in the BIG area do not meet the single grab sample limit of 197 *E. coli*/100 mL. This estimate of a 12 percent reduction, as a result of the implementation of 1.5, was based on a 6 percent non-compliance rate for WWTFs and the average concentration of *E. coli* samples during sampling of WWTFs between 2001 and 2006 in the Buffalo and Whiteoak Bayou watersheds.<sup>147</sup> In actuality, the loading from many plants would not be reduced at all by updates, while for some WWTFs, the load reduction from making updates would be far more substantial than 12 percent. Load reductions will probably not be 12 percent for any individual plant.

*Implementation Activity 1.6: Consider Regionalization of WWTFs* is estimated to produce no reduction in the waste load allocation assigned to WWTFs except in segments where chronically non-compliant WWTFs are identified and subsequently made compliant or regionalized. In these particular segments the reduction will be estimated after identification of the chronically non-compliant facilities is complete.

## **Implementation Strategy 2.0: Sanitary Sewer Systems (IS2)**

### *75 percent reduction of calculated load from reported SSOs*

The estimated load reduction for the six main activities within IS2 range from zero to 75 percent of the load from reported SSOs. Based on staff estimates, UAMP may substantially reduce the number of SSOs

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<sup>145</sup> (Abroms and Maibach 2008)

<sup>146</sup> (Lally 2000)

<sup>147</sup> (TCEQ 2009a)

**Appendix K: I-Plan Matrix Comparing Implementation Activities to the Nine Elements of a Watershed Protection Plan** <sup>153</sup>

**Table 21: Implementation Strategy 1.0: Wastewater Treatment Facilities**

(a) Causes/ Sources	(b) Implementation Activities and Targeted Critical Areas	(c) Estimated Potential Load Reduction	(d) Technical and Financial Assistance Needed for Each Activity	(e) Education Component for Each Activity	(f) Schedule of Implementation for Each Activity	(g) Interim, Measureable Milestones for Each Activity	(h) Indicators to Measure Progress	(i) Monitoring Component	(j) Responsible Entity
Wastewater Treatment Facility Effluent	Implementation Activity 1.1 (IA 1.1): Impose more rigorous bacteria monitoring requirements	IA 1.1 is expected to reduce the waste load allocation assigned to WWTFs by 2-4%.	<u>Technical:</u> None <u>Financial:</u> Existing local funding. Current cost estimates for a bacteria sample are \$50. The largest increase in sampling expenditures would be experienced by the smallest facilities. Expenditures for a WWTF with a permitted flow of less than 0.1 MGD would increase from \$200 to \$2,600.	Inform WWTF owners and operators that more rigorous monitoring requirements will be included in their permits.	As permits come up for renewal or as new permits are written, TCEQ will include the new requirements for WWTF permits, including any grace period approved by regulatory agencies.	Within five years, all of the permits should have had renewals initiated	The number of permits which include more rigorous bacteria monitoring requirements  The level of indicator bacteria in the receiving streams	H-GAC will monitor the number of permits renewed and new permits issued each year in the BIG area and which contain more rigorous monitoring requirements  Ambient water quality monitoring, as described in section 9.1	TCEQ: include requirements in permits. Inform WWTF owners of more stringent requirements.  WWTF owners and operators: abide by the permit requirements  H-GAC: Monitor and report on updated permits, provide annual report to BIG  BIG: Evaluate progress
Wastewater Treatment Facility Effluent	Implementation Activity 1.2 (IA 1.2): Impose stricter bacteria limits for WWTF effluent	IA 1.2 is expected to reduce the waste load allocation assigned to WWTFs by up to 2%.	<u>Technical:</u> None <u>Financial:</u> Existing local funding. If changes are needed by the facility to meet standards, additional local funds, loans or grant funds may be required.	Inform WWTF owners and operators that more stringent bacteria limits will be included in their permits.	As permits come up for renewal or major amendments or as new permits are written, TCEQ will include the new requirements WWTF permits.	Within five years, all of the permits should have had renewals initiated	The number of domestic permits which include more stringent bacteria limits	H-GAC will monitor the number of new, amended, and renewed permits issued each year in the BIG area and which contain more stringent bacteria limits	TCEQ: include lower limits in permits. Inform WWTF owners of more stringent requirements.  WWTF owners and operators: meet the lower limits  H-GAC: Monitor and report on updated permits and compliance, provide annual report to BIG  BIG: Evaluate progress

<sup>153</sup> The load reduction percentages presented in these tables are not based on results of any direct, peer-reviewed, or technically supported studies performed on pathogens or fecal indicators in waterways in the Greater Houston area and may not relate well to the level of fecal indicator reductions. More information about how these estimates were generated can be found in Appendix J: Load Reduction Value Information.

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(a) Causes/ Sources	(b) Implementation Activities and Targeted Critical Areas	(c) Estimated Potential Load Reduction	(d) Technical and Financial Assistance Needed for Each Activity	(e) Education Component for Each Activity	(f) Schedule of Implementation for Each Activity	(g) Interim, Measurable Milestones for Each Activity	(h) Indicators to Measure Progress	(i) Monitoring Component	(j) Responsible Entity
Wastewater Treatment Facility Effluent	Implementation Activity 1.3 (IA 1.3): Increase compliance and enforcement by TCEQ	IA 1.3 is expected to reduce the waste load allocation assigned to WWTFs by up to 45%.	<u>Technical:</u> None  <u>Financial:</u> State funding for additional staff or support of a local program to perform additional inspections and reviews.	New TCEQ staff or local programs conducting new activities will need to be trained.	Year One: TCEQ will allow for additional types of investigations at all WWTFs and determine the number of staff needed to perform inspections/investigations at each WWTF every two years. Year Two and on: TCEQ will hire additional staff or contract with local programs to perform inspections and reviews.	An increase each year in: - The number of unannounced inspections conducted each year - The number of focused sampling investigation each year - The percent of plans and specifications reviewed - The percent of DMRs reviewed - The number of other investigations conducted - The ability of TCEQ to conduct focused sampling investigations	The number of unannounced inspections each year  The number of focused sampling investigations each year  The percent of plans and specifications reviewed each year  The percent of DMRs reviewed each year	H-GAC will collect reports from TCEQ including the number and types of inspections conducted, and the number of plans and specifications and DMRs reviewed	TCEQ: conduct a workload analysis to determine the necessary number of staff, allow for focused sampling investigations and unannounced inspections at all WWTFs, consider contracting with a local program to perform additional inspections and reviews  H-GAC: collect information concerning the number of inspections and reviews conducted each year, provide annual report to BIG  BIG: review the collected information and evaluate progress
Wastewater Treatment Facility Effluent	Implementation Activity 1.4 (IA 1.4): Improved design and operation criteria for new plants	IA 1.4 is expected to reduce the waste load allocation assigned to WWTFs by up to 10-20% over the life of the I-Plan if significant deficiencies are found in existing design and operation criteria.	<u>Technical:</u> Stakeholders, such as representatives of local governments and facility operators and engineers will need to assess the ability of WWTFs to remove bacteria from wastewater and determine appropriate changes to the design and operation criteria for new WWTFs  <u>Financial:</u> Existing local funding	None	Year Six: Stakeholders, such as representatives of local governments and facility operators and engineers will begin to reopen the discussion of the design and operation criteria for new plants and consider whether stricter requirements should be adopted	Every five years 20% of local governments will have considered whether to adopt stricter requirements or not	The percent of local governments that have considered whether or not to adopt stricter requirements as reported by local governments	Reports collected from stakeholders.	WWTF owners and operators: Assess the ability of various WWTFs to remove bacteria, make suggestions of needed changes to the design and operation criteria for new plants based on the findings  H-GAC: facilitate discussion between stakeholders as appropriate, collect reports  BIG: participate in assessments and in making suggestions

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(a) Causes/ Sources	(b) Implementation Activities and Targeted Critical Areas	(c) Estimated Potential Load Reduction	(d) Technical and Financial Assistance Needed for Each Activity	(e) Education Component for Each Activity	(f) Schedule of Implementation for Each Activity	(g) Interim, Measureable Milestones for Each Activity	(h) Indicators to Measure Progress	(i) Monitoring Component	(j) Responsible Entity
Wastewater Treatment Facility Effluent	Implementation Activity 1.5 (IA 1.5): Upgrade plants	An estimated 12% of the load from WWTFs can be expected from implementation of IA 1.5.	<u>Technical:</u> engineering or other specialized technical help will be necessary  <u>Financial:</u> grant funding, loans, and existing local funding as available	Operators will need to be trained in the operations of any new components at the WWTF.	Beginning immediately, as individual WWTFs are found to be inadequate at bacteria removal	Over twenty-five years all facilities requiring upgrades in order to meet bacteria limits in their permit will have been upgraded.	The number of non-compliant WWTFs upgraded.	Reports from TCEQ to determine compliance rates with bacteria limits	WWTF owners and operators: monitoring compliance with bacteria limits and making appropriate upgrades  H-GAC: monitor compliance rates, provide annual report to BIG  BIG: evaluate progress
Wastewater Treatment Facility Effluent	Implementation Activity 1.6 (IA 1.6): Consider regionalization of WWTFs	It is estimated that no reduction in the waste load allocation assigned to WWTFs will be achieved from implementation of IA 1.6 except in segments where chronically non-compliant WWTFs are identified and subsequently made compliant or regionalized. In these particular segments the reduction will be estimated after identification of the chronically non-compliant facilities is complete.	<u>Technical:</u> engineering, legal, or other specialized technical help may be necessary  <u>Financial:</u> grant funding, loans, and existing local funding as available	TCEQ compliance and enforcement staff and local government staff with jurisdictional authority will need to be trained regarding new protocols.	Beginning immediately, TCEQ and local governments with jurisdictional authority will identify WWTFs that are chronically non-compliant for bacteria. Stakeholders will evaluate regionalization, modification, or operational cessation of any WWTFs that are chronically non-compliant for bacteria	Develop a process for targeting WWTFs that are chronically non-compliant for bacteria	The number of WWTFs that are chronically non-compliant for bacteria that have been required to evaluate regionalization  The number of WWTFs that are chronically non-compliant for bacteria that have regionalized, modified, or ceased operations	Reports from TCEQ or other local governments regarding the regionalization, modification, or operational cessation of any WWTFs that were chronically non-compliant for bacteria	TCEQ and stakeholders: Develop a process for targeting WWTF that are chronically non-compliant for bacteria; encourage WWTF that are chronically non-compliant for bacteria to regionalize, modify to meet higher design or monitoring standards, or cease operations; report activities  H-GAC: collect progress reports, which may be in the form of existing reports, provide annual report to BIG  BIG: evaluate progress
Wastewater Treatment Facility Effluent	Implementation Activity 1.7 (IA 1.7): Use treated effluent for plant irrigation	An estimated 1% reduction of the waste load allocation assigned to WWTFs can be expected.	<u>Technical:</u> professional engineers, operators, sanitarians, and licensed irrigators may need to be consulted regarding design, installation, and operation of appropriate systems  <u>Financial:</u> grant funding and existing local funding as appropriate	Operators will need to be trained in the operations of any new components at the WWTF.	Beginning immediately as appropriate, WWTF owners or operators will consider the use of treated effluent for plant irrigation	One WWTF shall install and use a new irrigation system, utilizing treated effluent, every five years	The number of WWTFs using treated effluent for plant irrigation	Reports from WWTF owners and/or operators	WWTF owners, operators, and engineers: consider the use of effluent for plant irrigation  H-GAC: collect progress reports, provide annual report to BIG  BIG: evaluate progress