



Watershed Protection Development Review

Action Plan Items Related to EII Site Scores - Fiscal Year 2006

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Abstract

The Environmental Integrity Index (EII) was used to identify creek reaches with at least a 13% decrease in environmental health in using data collected in 2006 compared to initial conditions sampled in 1996 (phase I watersheds). City of Austin teams with the potential to reverse the recent degradation in five problem areas (aquatic life, habitat, nutrients plus bacteria, nutrients alone, and litter) through structural and non-structural BMPs were identified. Primary and secondary problem reach lists are provided for the teams.

Introduction

As a measure to address developing environmental problems, the Watershed Protection and Development Review Department (WPDRD) has initiated a process to identify watersheds with declining environmental health and recommend solutions to stop or reverse the observed degradation. Determination of degrading creeks conditions is based on EII scores, and is applied to EII scores from 1996 to 2006 (phase I watersheds).

The Development of Action Plans from Changes in EII Scores

In an effort to tie Department action plans to sites and watersheds which are exhibiting declines in environmental integrity as measured by the EII, the Watershed Protection and Development Review Department has proposed an annual plan:

- Identify creek reaches with decreasing health using the Environmental Integrity Index (EII) and documentation of the selection process.
- Isolate probable causes by comparing sub-index scores and raw data components.
- Identify opportunities for reversing/mitigating the decrease or partnering with other ongoing efforts to address specific causes of degradation.
- Develop plans for program, regulation, or CIP project to take advantage of opportunities within the watershed(s) of concern.

EII scores have been calculated for the 47 sampled watersheds. The initial EII sampling was conducted during 1996-1999. Following rounds have been completed every three years. Parameter values/scores from the initial EII samples were compared to those from the most recent sampling events completed in 2006. Only major changes, defined as a decline of > 12.5 points out of a possible 100 and equivalent to a change in EII category, were identified. City of Austin (COA) teams have been designated the responsibility to evaluate the recent degradation and recommend appropriate actions for remediation. The 5 problem areas which seemed most amenable to change are listed in Table 1. For each problem area, the primary reaches with major declines in all of the listed parameters/scores are identified for referral to the

specified team. Secondary problem reaches with major declines in one or more parameters/scores but without major declines in all parameters/scores are also identified.

Table 1. Problem Areas with Recent Declines in EII Parameters/Scores

Problem Area	Parameters/EII components Involved in Determination of Degradation	COA Team to Evaluate and Recommend Solution
Decline in aquatic life scores	Diatom and benthic macroinvertebrate scores	Surface Water Team
Declines in physical integrity and non-contact recreation EII sub-indices	Physical Integrity and Non-Contact Recreation EII sub-indices	Master Plan Committee
Nutrient levels and bacteria increased indicating potential sewer line problems	Nitrate, ammonia, orthophosphorus, and e-coli	Austin Clean Water Program
Nutrient levels increased but bacteria levels did not indicating potential fertilizer problems	Nitrate, ammonia, orthophosphorus	Community Education Team
Non-contact recreation litter scores decreased	Litter score	Keep Austin Beautiful

Initial year data for multiple sites within same reach averaged to yield a reach score. Five reaches sampled in 2006 could not be compared to initial scores because no sampling was conducted in those reaches in 1996 (BAR1, BAR3, LWA3, WLN4, WLN5).

Primary degradation sites and designated evaluation teams

A. EII sites with major (>12.5 points) decreases in both benthic macroinvertebrate and diatom scores for evaluation by the surface water team.

Table 2. EII sites with major decreases in both benthic macroinvertebrate (bug) and diatom scores.

There were no primary problem sites for aquatic life in 2006.

B. EII Sites with major decreases in both physical integrity and non-contact recreation scores for recommendation to the masterplan committee.

Table 3. EII sites with major decreases in both physical integrity (PI) and non-contact recreation (NCR) scores

EII Reach	COA Site #	Site Name	Change in NCR Score	Change in PI Score
EBO3*	121	East Bouldin Creek Downstream of pine Rd	-12	-21

**Note EBO3 slightly less than required -13 score change in NCR score for classification as primary problem.*

C. EII Sites where nutrient component scores decreased and bacteria scores decreased for recommendation to the ACWP.

Table 4. EII sites where nutrient scores decreased and bacteria scores decreased.

There were no primary problem sites for sewer line problems.

D. EII sites where both NO₃ and orthophosphorus scores decreased without substantial decrease in bacteria (potential fertilizer application problems).

Table 5. EII sites where both NO₃ and orthophosphorus scores decreased without substantial decrease in bacteria scores.

EII Reach	COA Site #	Site Name	Change in NO3	Change in OP	Change in BacT
LWA4	838	Little Walnut Creek @ Golden Meadow Rd	-18	-19	1
WBO2	3854	West Bouldin Creek @ Oltorf Street	-19	-38	1

E. EII sites with major decreases in non-contact recreation litter scores for KAB.

Table 6. EII sites that have degrading (by more than one EII category) non-contact recreation litter scores

EII Reach	COA Site #	Site Name	Change in Litter
BAR2	51	Barton Creek Downstream of Lost Creek Blvd	-43
BAR4	48	Barton Creek @ Hwy 71 Below Little Barton	-15
BLU2	364	Blunn Creek Above Big Stacy Pool	-30
BMK3	3861	Buttermilk Creek @ Victory Christian Center	-40
BOG2	837	North Boggy Creek @ Nile Street	-25
EBO3	121	East Bouldin Creek Downstream of W. Alpine Rd	-25
HRP1	844	Harpers Branch Creek @ Woodland Ave	-14
JOH1	897	Johnson Creek @ Woodmont Avenue	-15
LWA4	838	Little Walnut Creek @ Golden Meadow Rd	-15
SHL3	117	Shoal Creek @ Shoal Edge Court (EII)	-40
SHL4	118	Shoal Creek Downstream of Crosscreek Drive	-20
WLN2	502	Walnut Creek @ Old Manor Road	-50
WLR1	38	Waller Creek Below Cesar Chavez	-20
WLR2	624	Waller Creek Upstream of 23rd Street	-40

Secondary Problem Sites

AA. EII sites with major decreases in either benthic macroinvertebrate or diatom scores

Table 7. EII sites with major decreases in either benthic macroinvertebrate (bug) or diatom scores

There were no secondary problem sites for aquatic life.

BB. EII Sites with major decreases in either physical integrity or non-contact recreation scores for recommendation to the masterplan committee.

Table 8. EII sites with major decreases in either physical integrity (PI) or non-contact recreation (NCR) scores

EII Reach	COA Site #	Site Name	NCR	PI
BMK1	851	Buttermilk Creek @ Little Walnut Creek	17	-13
EBO3	121	East Bouldin Creek Downstream of W. Alpine Rd	-12	-21
FOR1	123	Fort Branch Creek @ North Boggy Creek	-33	3
FOR3	125	Fort Branch Creek Above Manor Rd	16	-19
LWA2	3857	Little Walnut @ Cameron Rd	8	-22
TAN3	3858	Tannehill Creek @ Berkman Dr	25	-15
WCC1	1474	West Country Club @ Krieg Fields	-15	27
WLN2	502	Walnut Creek @ Old Manor Road	-15	30
WMS3	490	Williamson Creek @ Hwy 71 (EII)	9	-22

CC. EII sites with a major decrease in at least one nutrient component (NO₃, NH₃, orthophosphorus) and in the water quality bacteria score for recommendation to the ACWP.

Table 9 EII sites with a major decrease in at least one nutrient component (NO₃, NH₃, orthophosphorus) and in the water quality bacteria score.

EII Reach	COA Site #	Site Name	Change in NH3	Change in NO3	Change in OP	Change in BacT
BLU2	364	Blunn Creek Above Big Stacy Pool	43	-46	12	-65
BAR4	48	Barton Creek @ Hwy 71 Below Little Barton	0	10	-8	-34
BLU3	362	Blunn Creek @ Long Bow (Preserve at Little Bridge)	-31	23	8	-24

DD. EII sites with a major decrease in either orthophosphorus or NO₃ component scores without a major decrease in bacteria scores as a list of sites with potential fertilizer application problems.

Table 10. EII sites with a major decrease in nutrient scores with a major decrease in bacteria scores as potential fertilizer application problems.

EII Reach	COA Site #	Site Name	Change in NO3	Change in OP	Change in BacT
BAR2	51	Barton Creek Downstream of Lost Creek Blvd	-31	-9	22
BMK2	782	Buttermilk Creek @ Providence Ave	-51	17	9
EBO3	121	East Bouldin Creek Downstream of W. Alpine Rd	50	-22	18
FOR3	125	Fort Branch Creek Above Manor Rd	25	-14	18
LWA2	3857	Little Walnut @ Cameron Rd	-6	-31	43
SHL4	118	Shoal Creek Downstream of Crosscreek Drive	25	-31	34

Conclusion

EII data were used to identify degrading sites in Austin creeks for recommendation to designated teams for remediation. Although potential solutions have been identified for each group (Table 11), solution options must be continually evaluated and developed. Solution implementation must be documented, so that as additional EII data becomes available the effectiveness of solutions can be evaluated effectively.

Table 11. Potential solution options to identified degradation problems.

Problem	COA Team	Potential Solution
Aquatic Life Impairments	Surface Water Evaluation	Direct short-term monitoring to identify impairment source
Physical Integrity Decline	Stream Restoration Program	CIP structural BMP in problem area
Sewer Leaks	Austin Clean Water Program	Remove sewer line from creek
Fertilizer Application	Community Education Program – Grow Green	Targeted public education campaign
Litter	Keep Austin Beautiful	Volunteer creek clean-up efforts