ATTACHMENT 1

Summary of Restoration, Minimization and Mitigation Actions
9/29/2010

San Marcos Springs System

1. Protection of Texas wild-rice (*Zizania texana*):
    a. Access and Exclusion Zones, to protect Texas Wild Rice from recreational impacts in parks at low flows
    b. Floating Vegetation Removal
    c. Sedimentation Removal
2. Prohibition of hazardous materials routes that cross the River, springs, or associated direct tributaries.
3. Stop or limit introductions of non-native species by aquarium "dumps".
4. Stop or limit introductions of non-native species by the use of non-native bait species.
5. Include private landowners (riverside and tributary) in riparian restoration.
6. Restoration of riparian zone with native vegetation (public lands)
7. Control of harmful non-natives:
    a. domestic waterfowl
    b. tilapia (*Oreochromis aureus*)
    c. nutria (*Myocastor coypus*)
    d. armored catfish (family Loricariidae, *Hypostomus* spp. and P*terygoplichthys* spp.)
    e. ramshorn (*Marisa cornuarietus*)
    f. Melanoides tuberculatus
    g. hydrilla (*Hydrilla verticillata*)
    h. hygrophila (*Hygrophila polysperma*)
    i. elephant ears (*Colocasia esculenta*)
    j. water hyacinth (*Eichhornia crassipes*).
8. Create emergency plan in case of dam failure.
9. Establishment of aggressive and frequent water quality monitoring that considers location, time of day, day of week, time of year, and all water quality parameters deemed significant.
    a. Surface
    b. Ground
    c. Stormwater
10. Implementation of Best Management Practices (BMPs) to address stormwater quality runoff in and around Spring System as well as discharging to the San Marcos River from Spring Lake down to the location of the City's wastewater discharge; could include stormwater retention ponds, water quality basins, rain gardens, wetlands, and storm sewer filters.
11. Replacement of invasive vegetation with Texas wild-rice in areas of suitable habitat with a goal of maintaining 1000 m^2 of Texas wild-rice.
12. Establish incentive program that promotes new low impact development and reduces the percentage of impervious cover.

13. Support the elimination of the use of coal tar sealants.[1]

Comal Springs System

1. Control of harmful non-natives:
    a. tilapia (*Oreochromis aureus*)
    b. armored catfish (family Loricariidae, *Hypostomus* spp. and *Pterygoplichthys* spp.)
    c. ramshorn (*Marisa cornuarietus*)
    d. *Melanoides tuberculatus*
2. Optimization of Fountain Darter (*Etheostoma fonticola*) Habitat in the Old/New Channel of the Comal River
3. Establishment of riparian zones and removal of sediment in select areas to promote beetle (*Heterelmis comalensis* and *Stygoparnus comalensis*) habitat
4. Prohibition of hazardous materials routes that cross the Comal River, springs, or associated direct tributaries.
5. Include private landowners (riverside and tributary) in riparian restoration.
6. Restoration of riparian zone with native vegetation (public lands)
7. Stop or limit introductions of non-native species by aquarium "dumps".
8. Stop or limit introductions of non-native species by the use of non-native bait species.
9. Implementation of Best Management Practices (BMPs) to address stormwater quality runoff in and around Landa Lake; could include stormwater retention ponds, water quality basins, rain gardens, wetlands, and storm sewer filters.
10. Development of permanent and one-day Household Hazardous Wastes (HHW) collection programs (including freon & drugs) along with increasing awareness about discarding HHW.
11. Implement an aerobic and anaerobic septic system registration, evaluation, and permitting program to prevent subsurface pollutant loadings from potentially being introduced to the spring ecosystem.
12. Establish incentive program that promotes new low impact development and reduces the percentage of impervious cover.
13. Establishment of aggressive and frequent water quality monitoring that considers location, time of day, day of week, time of year, and all water quality parameters deemed significant.
    a. Surface
    b. Ground
    c. Stormwater
14. Recreation management through an adaptive management program.
15. Support the elimination of the use of coal tar sealants.
16. Establish and maintain Environmental Restoration and Protection Areas (ERPAs) per the Bio-West proposal. The ERPAs shall be designed to maintain the esthetic and historic character of the surrounding Landa Park area.

National Fish Hatchery and Training Center Refugia

[1] The creation of Environmental Restoration and protection Areas in San Marcos Springs system was approved by the Steering Committee on September 24, 2010. However, we do not have a specific plan for implementing these areas or a cost estimate. I have elected not to include them on the list until we have obtained this information.

At the September 24, 2010 meeting, the Steering Committee established a Work Group to review and make recommendations regarding the proposal of the National Fish Hatchery and Training Center to operate and maintain refugia for the listed species at Fish and Wildlife Service's San Marcos, Uvalde, and Inks Dam facilities. Accordingly, the specifics and scope of this measures are not currently available.

Additional information regarding the restoration and mitigation actions recommended by the EARIP Ecosystem Restoration Subcommittee can be found at:

http://earip.tamu.edu/EARIPMeetings/Sep0910/09-03-10%20Attachment%205%20Ecosystem%20RestorationSubcommittee%20Final%20Report.ppt.pdf

Or from Ed Oborny's Environmental Restoration and Protection Areas at:

http://www.earip.org/EARIPMeetings/Jul2710/07-28-10%20ERPAs%20Presentation%20(Bio-West).pdf

or from the LID/Water Quality Work Group at:

http://earip.tamu.edu/EARIPMeetings/Sep0910/09-03-10%20Attachment%204_REPORT%20OF%20EARIP%20LID%20Subwork%20Group.pdf