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## LETTER OF TRANSMITTAL

**DATE:** 7 September 1999  
**TO:** Tres Rios Study Team  
**FROM:** Mike Ternak, P.E.  
**SUBJECT:** Tres Rios Feasibility Study

### ITEMS TRANSMITTED:

1 copy of the AFB Documentation Package for the subject study.

### COMMENTS:

The AFB Documentation package consists of the feasibility report and EIS, technical appendices and an F4 review comment compliance memorandum.

The attached AFB package is provided for your information, review and comment. This package summarizes the study findings and recommendations, to date, for the environmental restoration and flood control of the study area. If you have any written comments, please provide them to me at the above address.

**TRES RIOS, ARIZONA  
FEASIBILITY STUDY  
DRAFT F-4 DOCUMENTATION  
Technical Review Comments**

June 10, 1999

**Technical Reviewer: Kerry T. Casey (CESPL-ED-HH)**

1. Include an Executive Summary at beginning of main report.

**Response:** This will be added for the F5, Draft Report.

2. Include a list of acronyms and abbreviations at beginning of report.

**Response:** Concur, this has been incorporated into the main report.

3. What years are represented by Existing and Future Conditions?

**Response:** The project base year is 2006, and the future condition is 50 years from then (2056). This has been added to page II-1.

4. The Recommended Alternative; Alternative 3.5a (pg. V-36), includes a flood control levee, yet there is not enough information provided to show the levee is justified (also pg V-36). On page V-34, it says it is possible that the flood protection increment of any plan may not be economically justified. Shouldn't Alternative 3.5b be the Recommended Alternative and 3.5a be the Locally Preferred Alternative?

**Response:** Between F4 and AFB three levels of protection for the flood control levee were analyzed to determine the NED plan. The costs and benefits of the different levee sizes will be presented in the AFB document.

5. What are the local drainage issues associated with the recommended levee?

**Response:** Plan formulation since F4 has addressed interior drainage, and these issues are included in the AFB costs/design. These issues are addressed in the hydraulics appendices.

6. Where is residual flooding with the recommended levee?

**Response:** Response: Since the levee is designed to only contain flows up to a certain flow frequency, it is expected that flow frequencies greater than the design will overtop the levee. The water surface elevations associated with the flood events that breakout should be similar to the with-project, but without levee conditions.

**Technical Reviewer: Lois Goodman (CESPL-PD-RL)**

7. P. IV-1. Last complete paragraph, lines 3-4. This paragraph refers to chaparral and sage scrub communities. These communities occur primarily in California, and are not found in the study area. Riparian communities in the study area are more likely to occur within the various desert communities.

**Response:** Concur - this sentence now reads as follows:

“The majority of riparian areas in Arizona exist as narrow, linear strips within the more arid desert communities.”

8. P. IV-21. Table 4.9 and last paragraph. The table and last paragraph need to clarify which, if any (or all) of the substances listed under “Organic Chemicals” in the table are the “VOCs” discussed in the text.

**Response:** VOCs are not a problem in the study area. This section has been rewritten.

9. P. IV-30. First paragraph. A phreatophyte is a plant (normally a tree or shrub) that has the ability to tap ground water with a deep root system.

**Response:** Concur - this sentence now reads as follows:

“Salt cedar, a phreatophyte with the ability to tap ground water with a deep root system, has been identified as an invader species that has displaced native habitats by out-competing native species.”

10. P. IV-32. Constructed Wetlands. A more appropriate term for “introduced terrestrial plant species” may be “emergent aquatic plant species.” “Introduced” is typically used to describe plants not native to the area, and alkali bulrush and cattails are native, although planted in the created habitat. “Terrestrial” normally refers to upland species.

**Response:** Concur - these references have been changed as appropriate.

11. P. IV-33. Second paragraph. Indicate if the fish are stocked.

**Response:** This section has been modified to reflect that these fish are stocked.

12. P. IV-35. Middle of page. The statement “...no special-status plants, reptiles, or fish have been recorded in the study area...” is somewhat confusing because two of the species evaluated are reptiles. Further clarification is recommended.

**Response:** Concur - this statement has been deleted.

13. P. IV-37. First complete paragraph. Indicate why the habitat quality appears to be low, and if any saguaro or agave occurs in the study area.

**Response:** The statement indicating that habitat quality appears to be low has been deleted, as there is not sufficient information to support this statement.

14. P. IV-37. Bald Eagle. Fish are also important in the diet of the bald eagle.

**Response:** Concur - this has been added to this discussion.

15. P. IV-37. Cactus Ferruginous Pygmy Owl. This species has been federally listed as Endangered. The paragraph needs to be moved to the appropriate section. This species occurs in mesquite bosque habitat in addition to those named in the report.

**Response:** Concur - this section has been modified as appropriate.

16. P. V-21. Second paragraph from bottom. Second to last sentence. Multiplication of the HSI value by the number of acres establishes the number of Habitat Units, rather than a Habitat Unit.

**Response:** Concur - the text has been changed as appropriate.

17. Habitat Evaluation Appendix and EIS will be reviewed concurrently following the F4 Conference.

### **Comments on Preliminary Draft EIS**

18. Table ES-1 the table needs to be more specific than just indicating that there will be "changes" to a resource. At a minimum, the table should indicate if the impact is adverse or beneficial, and if adverse, whether the impact is significant or insignificant. Impacts of the No-Action Alternative should be included in the table. Second page of the table, Alternative 3.5b, the first item in the column is an impact, not a mitigation measure, and belongs on the previous page. The Mitigation Measure under Alternative 3.5c may belong under 3.5b. Third page - Compatibility with Land Use and Planning Policies does not appear to be an impact. 1 Fourth page - The mitigation measures listed for Short-Term Impacts to Biological Communities are actually mitigation for impacts to Endangered Species. Separate mitigation for impacts to Biological Communities and Endangered species should be listed.

**Response:** The table has been edited and updated to be consistent with the changes made elsewhere in the report.

19. Table 1.7-1. NEPA. The document is an EIS only, not an EIS/EIR. Fish and Wildlife Coordination Act. Indicate if a coordination Act Report will be included in the Draft EIS. National Historic Preservation Act. Summarize the requirements for compliance with this Act. Clean Water Act. Add Section 401 Water Quality Certification. Clean Air Act. Indicate for which pollutants the project area is in nonattainment. Wild and Scenic Rivers Act. The incorrect river is named. Replace with the correct rivers (Gila Salt, and Agua Fria). Verify that the 1992 inventory is the most recent. Migratory bird Treaty Act. This Act is listed twice. The

information needs to be consolidated under one listing. Executive Order 11990. "... the average of wetlands..." should probably be changed to "... the average of wetlands..." Executive Order 11988. The document indicates that the project probably will affect the floodplain (in a generally beneficial way).

**Response:** Table 1.7-1 has been revised.

20. P. 2.3 Constructed Wetlands. Indicate what would be planted in these wetlands. Indicate how these are distinguished from the "Open Water/Marsh" habitats described earlier, that would also be created. Clarify if the "Regulating wetlands" are a type of Constructed Wetlands or if they are existing, and define what is meant by "overbank wetlands."

**Response:** Revisions were made to this section to clarify the text describing constructed wetlands.

21. P. 2-9. Alternative I. Explain what is meant by "no land constraints."  
Table 2.4-1. See comments on Table ES-1.

**Response:** Revisions have been made as requested.

22. Figures 2.2-1 through 2.2-3. The shades are difficult to distinguish. Presumably, these figures will be in color and easier to interpret in the Draft EIS. The habitat legend includes sub-designations of habitat that are not discussed or explained in the text, such as Cottonwood-Willow II, Honey Mesquite V, etc. If these sub-designations are to be retained, they need to be clarified.

**Response:** Color figures will be provided in the public draft EIS.

23. P. 3.2-1. Introduction. The introduction states that the information in the section is based entirely on the two reports listed, but the Reference section includes four references. This appears to be a contradiction.

**Response:** The text has been revised.

24. P. 3.2.6. Sinuosity. Explain what is meant by a sinuosity of 1.08, or how sinuosity is measured.

**Response:** The text has been revised.

25. P. 3.3-1. Introduction. The introduction states that the information in the section is based entirely on the three reports listed, but the Reference section includes seven references. This appears to be a contradiction. The citation of the last report appears incomplete, or another report or reports may have been omitted.

**Response:** The text has been revised.

26. P. 3.3-5. Last sentence. If the water table has declined, the depth to groundwater would be expected to be greater than in the past. Is the depth to groundwater less than in the early 1900s or is it actually greater than in the early 1900s.

**Response:** The text has been revised to clarify the issue.

27. P. 3.4-3. The first three paragraphs on this page refer to major recreation trail systems and other major recreation facilities partially or completely within the study area. It is recommended that these be shown on a figure, since one of the major objectives of the study is to provide recreational opportunities similar to those provided by some of the existing recreation areas. The types of recreational opportunities offered should also be described in the text. The Casey Abbot Recreation Area, shown on Figure 3.4-2 is not discussed in the EIS. The second paragraph on this page reports that fishing was observed in the project area. Is fishing legal in these areas?

**Response:** Revisions have been made to the text and figures.

28. P. 3.4-13. Include the Tres Rios Greenway on any figure showing major recreation trail systems. See previous comment.

**Response:** Revisions have been made to the text and figures.

29. P. 3.-2. Third paragraph. This paragraph indicates that no special-status plants, reptiles, or fish have been recorded in or are expected to occur in the study area. Two of the sensitive wildlife species considered to potentially occur in the study area and evaluated in the report, the desert tortoise and the Mexican garter snake, are reptiles. This appears to be a contradiction and needs to be clarified or corrected.

**Response:** The text has been revised.

30. P. 3.5-5. Vegetation. A phreatophyte is a plant (normally a tree or shrub) that has the ability to tap ground water with a deep root system. A plant associated with surface water or very shallow ground water would not be considered a phreatophyte.

**Response:** The text has been revised.

31. Pp. 3.5-14 to 3.5-15. Lesser Long-Nosed Bat. Indicate if the food source (agave and/or saguaro) occurs in the study area.

**Response:** The text has been revised.

32. P. 3.5-15. Bald eagle. Bald eagles also forage for fish in streams and lakes.

**Response:** The text has been revised.

33. Table 3.5-3. Last page. Cactus ferruginous pygmy owl. The Federal status needs to be updated to Endangered. Mesquite bosque should be added to the habitat requirements. The spelling also needs to be corrected.

**Response:** The text has been revised.

34. Figure 3.5-1. Boundaries are difficult to see and to distinguish. The legend and sheets 1-4 include "structural types" that are not explained in the text.

**Response:** A new figure has been prepared for the biological resources section that replaces the figures previously used in this section.

35. P. 3.7-3 and Table 3.7-1. Explain what is meant by the levels of service (LOS) A, B, C, and D.

**Response:** Descriptions of traffic levels of service have been provided.

36. P. 3.9-1. A description of the general types and general locations of sensitive receptors within the study area is suggested.

**Response:** A description of sensitive receptors has been added to the text.

37. P. 4.3-3. Mitigation Measure H-2. Possibly add that these and/or other measures may be required as conditions for Water Quality Certification.

**Response:** The air quality impact section has been completed for the AFB version of this EIS.

38 P. 4.5-1. Last paragraph. The second sentence is incomplete.

**Response:** The text has been revised.

39. P. 4.5-2. Last paragraph. The last sentence appears to be incomplete.

**Response:** The text has been revised.

40. Table 4.5-1. The table includes sub-categories of habitats that are not discussed in the text. These sub-categories should either be discussed in the text or eliminated from the table.

**Response:** The text has been revised.

41. P. 4.7-3. First paragraph. Temporary signs and flagpersons would be considered mitigation and should be listed as such. These measures should also be added to the appropriate sections of tables ES-1 and 2.4-1.

**Response:** The text has been revised.

42. P. 4.7-8. The last paragraph is incomplete.

**Response:** The text has been revised.

43. P. 4.7-9. The reference citation does not include the year.

**Response:** The reference citation has been revised.

44. Pp. 4.8-5, 4.8-6, 4.8-8, and 4.8-9 Mitigation Measure: NOx-reducing Measures, and Pp. 4.8-6, 4.8-7, 4.8-8, and 4.8-9 Mitigation Measure: PM10-reducing measures. The text should refer back to Alternative 3, where the measures are listed.

**Response:** The air quality impact section has been completed for the AFB review version of this EIS.

45. P. 4.8-6. Mitigation of Emissions from Recreationist Trips probably would not involve PM-10-reducing measures.

**Response:** The text has been revised.

46. P. 4.9-2. First complete paragraph and first mitigation measure. Have any sensitive receptors been identified within 1,000 feet of construction? Although noise levels would exceed ambient levels for the area, would they exceed 65 dBA, which is normally considered acceptable, or would other standards be exceeded?

**Response:** The text has been revised.

47. P. 4.12-1. Second paragraph. The potential impacts of leachate from the inactive landfill may also be a concern. Potential types of vector control should be identified. Some types of vector control are harmful to wildlife.

**Response:** Potential impacts related to leachate from the existing landfill were not added to the discussion because they are not directly related to the proposed action, but are a part of the existing baseline conditions. Additional information about vector control has been provided.

48. P. 4.12-5. No-action alternative. Last sentence. Information elsewhere in the EIS indicates that the County is considering vector control independent of the proposed action.

**Response:** Yes, the county currently performs vector control due to sources throughout the river area. Design considerations will be incorporated into the features to minimize vectors. In addition, vector control is included in the O&M costs.

49. P. 4.13-1, 4.13-2. Some of the benefits discussed, such as improved habitat values and increased biodiversity are more biological than esthetic. One major structural feature, the levee, will not be below ground. Will the levee be esthetically landscaped with native vegetation?

**Response:** A mitigation measure has been added requiring revegetation of the side slopes.

50. P. 4.13-3. Alternative 3.5b. Due to the absence of a levee, this aesthetic effects of this alternative would be different from the others.

**Response:** Alternative 3.5b is no longer being considered as an alternative.

51. Table B-1. The following corrections should be made:

Add "grass" after "Bermuda"

Change "Mexican palo verde" to "Palo verde"

Change "*Solarnum*" to "*Solanum*"

Change "*Sueda*" to "*Suaeda*"

Add "Knotweed" "*Polygonum* sp.

**Response:** The text has been revised.

#### **Comments on Technical Appendix F: Habitat Evaluation**

52. General. Explain why different Target Years were selected for "Without Project" conditions and for the Restoration Alternatives.

**Response:** Target years do not have to be the same for the with and without project conditions. Years were selected based on when change would be anticipated.

53. Appendix 1 (to Appendix F). General. Throughout the Appendix and in the table are references to habitat sub-categories such as Cottonwood-Willow II, Honey Mesquite V, etc. that are not described in the EIS or in the technical Appendix. If these sub-categories are to be used in the evaluation, they need to be described.

**Response:** These habitat types are defined and described in Anderson and Ohmart (1993) which the HEP Team used as the basis of values for the vegetation/habitat types. These will be described in the draft report version.

54. TY 20 values. If the stream below 115th Ave. is considered a gaining reach, what is the rationale for determining the loss of HV in this reach? Does the treatment plant water have a beneficial effect on this reach under existing conditions?

**Response:** The reach below 115th Avenue includes discharge from the 91st Ave WWTP and groundwater interception. The groundwater is of less quality than the WWTP discharges due to salinity and TDS. The treatment plant does have a beneficial effect on this reach because any decrease in WWTP discharges will have a negative impact on overall quality.

55. TY50 values. Why would the C/W habitat convert to cobble, rather than Salt cedar or a combination of the two?

**Response:** After 30 years of zero discharge from the plant, even drought tolerant vegetation such as salt cedar would decline in many areas.

**Technical Reviewer: Michael J. Hallisy (CESPL-PD-WE)**

Economics Analysis Report

56. p. 2. According to the report, there have been 5 floods with discharges greater than 100,000 cfs. This would correspond with a flood less frequent than a 10-year event. Given the fact that Table 3, page 9, shows 6 of the 8 reaches have minimally significant damage frequencies of 10-year or more frequent, presumably there should have been substantial damages during these floods. Please specify the estimated frequency of the 1980, 1983 and 1993 floods and indicate whether any damage estimates are available.

**Response:** Revised Q's developed since the last draft indicate that this discharge corresponds to approximately a 25 to 30 year event. Only damages incurred after 1987 were deemed relevant because the Holly Acres levee was completed in 1987, and any damages before that would not reflect the without project condition, which includes the levee. Data between 1987 and 1992 were not available, so emergency clean-up costs in the study area were only analyzed over the period 1992-1998, and were annualized based on the frequency of the event. Results are shown in table 12.

57. p. 3. Second para. refers to a 404 permit. Specify what a 404 permit is.

**Response:** Concur – definition was added.

58. p. 6. The Base Year is defined as 2000. Given the fact that it is now June 1999, is this assumption reasonable?

**Response:** Base Year changed to 2006 per study manager.

59. p. 6. Note that more recent FEMA depth-damage curves are available (than 1995).

**Response:** Most recent FEMA curves incorporated

60. p. 8. Please explain what is meant by a reference cross section.

**Response:** Explanation added.

61. p. 10. Please explain basis for R&U parameter standard deviations in Table 4. Note that the EM 1110-2-1619, p. 6-7 specifies a standard deviation of error of 1.5 feet for 5-foot

contour maps. Since 4-foot contours were used in the Tres Rios study, it would seem logical that the standard error would be less.

**Response:** Concur – actual value of 1.25 feet was used in calculations – typo error corrected.

62. p. 10. Last paragraph: Please spell out "approximately". Also, "... content to structure RATIOS (not ration).

**Response:** Concur – corrections made.

63. p. 11. Please spell check.

**Response:** Okay - spell checked.

64. p. 12. Please explain that structure inventory does not correspond with a specific floodplain, but rather a large area greater than the 100-year floodplain was surveyed, since 500-year overflow boundaries were not available at the time of the survey.

**Response:** Concur – explanation added in section 6, part A.

65. p.12. Last para refers to Appendix A. Not provided with report for review.

**Response:** Reference deleted.

66. p. 13. Last para. -- indicate why acreages were quantified for the 100-year event and not a floodplain for a less frequent event (see Comment #9). Also, why were the agricultural acreages not expanded beyond the 100-year floodplain, as was done for the structure inventory? Were damages at least held constant and entered for the 500-year event?

**Response:** Floodplain delineations for events between the 100 and 500 year event were not provided, but the 500 year floodplain was estimated based on the topography and the 500 year WSE. Thus, although more structures are included in the 500 year floodplain, damages for the 500 year event (structural and agricultural) were computed based on the 100 year WSE .

67. p. 15. Please verify that the latest (FY99) normalized crop prices were used.

**Response:** Concur – latest prices used

68. p. 17. Emergency and cleanup costs should be based upon frequency, not an average over a five year period.

**Response:** Only damages incurred after 1987 were deemed relevant because the Holly Acres levee was completed in 1987, and any damages before that would not reflect the without project condition, which includes the levee. Data between 1987 and 1992 were not available, so

emergency clean-up costs in the study area were only analyzed over the period 1992-1998, and were annualized based on the frequency of the event. Results are shown in table 12.

69. p. 17. Incorrect table reference. Also, Summary of W/O Project Damages should be Section E.

**Response:** Corrections made.

70. p. 18. Adding a levee is an alternative and should be given an alternative number (not "without project condition plus levee").

**Response:** Corrected throughout report.

71. p. 18. Reference Hydrology & Hydraulics Section (not Hydraulics Section).

**Response:** Corrected.

72. p. 18. For the alternatives with levees, was an engineering analysis conducted to determine the probable failure and non-failure heights for the levees?

**Response:** No engineering analysis of probable failure height was conducted.

73. p. 18. Considering the fact that an EAD run was completed for without project agricultural damages, the program should be rerun with the with-project level of protection to determine residual damages and benefits. Benefits should not be based on a percentage of total benefits or damages.

**Response:** Concur – residual agricultural damages and benefits shall be computed based on with project vs. without project conditions.

74. pp. 18-20. It appears that the alternatives without levee features provide a small amount of flood damage reduction benefits. Please explain how the proposed features impact flood conveyance

**Response:** Concur – discussion added

75. General: Why was only a 100-year levee considered? The NED plan must be determined by optimizing for level of protection. Also, doesn't the 100-year levee also provide the additional benefit of reduced flood insurance administrative costs?

**Response:** Concur – NED plan is now optimized by analyzing three different levels of protection. Flood insurance administrative costs were not calculated due to the relatively low level of these benefits.

76. p. 22. Table 15 shows total "expected annual damages/costs". Since there apparently is not any increases in future development or discharges in the study area, equivalent annual damages were not computed.

**Response:** This shall be clarified

77. p. 22. Specify how cleanup costs were calculated.

**Response:** Only damages incurred after 1987 were deemed relevant because the Holly Acres levee was completed in 1987, and any damages before that would not reflect the without project condition, which includes the levee. Data between 1987 and 1992 were not available, so emergency clean-up costs in the study area were only analyzed over the period 1992-1998, and were annualized based on the frequency of the event. Results are shown in the table below, and indicate that a 50 year event caused about \$100,000 in cleanup and utility repair costs, and a 20 year event caused about \$10,000 in cleanup and utility repair costs. Amortizing and averaging these costs gives average equivalent annual cleanup costs of about \$6,500 under without project conditions. Because these costs are a very small portion of the total, with project costs were estimated based on the ratio of the cleanup costs to the total damage costs calculated for without project conditions.

78. p. 22. Please add title for Table 16. Also, some tables need descriptions along with table numbers.

**Response:** Corrected.

79. p. 22. Annual Damages column does not include all damage categories. Also, add Benefit/Cost Ratio column.

**Response:** Table referred to is structural damage only. Tables immediately following show all damage categories.

80. p. 22. Costs must be segregated between flood control, environmental restoration and recreation. It appears that the primary costs in Alternatives 3B-4D are related to environmental restoration. Therefore, it is not appropriate to include these costs in the benefit/cost analysis. Restoration costs need to be related to the restoration outputs, which apparently appears in Appendix G. The general approach that should be followed, is that an NED analysis should be performed, with the NED plan identified. Then an Incremental Cost Analysis should be conducted for the restoration alternatives, and the NER plan identified. If these plans result in reductions in NED benefits, these costs would be included in the incremental cost analysis. Finally, if there are tradeoffs between NED and NER outputs, the Optimal Trade-off Plan should be identified. All of these steps should be included in the F4 and not F5 document, especially since the primary purpose of this study appears to be environmental restoration.

**Response:** Concur – complete, independent analysis of all the NER and NED benefit categories and the properly allocated costs shall be presented and plans clearly identified.

However, no separable recreation features were included in the design and cost data, and so no benefits were quantified for this analysis.

81. p. 23. Last paragraph states that recreation and environmental benefit evaluations will be analyzed in the F4 document. However, such analysis is actually contained in Appendix G and H of the F4 document

**Response:** Concur – Some data from App G and H have been included and placed into Econ app with brief discussion. Analysis now includes evaluation of environmental restoration benefits.

82. p. 22. Table of costs needs to be included which details Total First Cost, including Contingency, Interest During Construction, Gross Investment, Annualized Gross Investment, and O&M Costs. Also, costs for 3B and 4B differ slightly from the figures in Appendix D.

**Response:** Concur – changes and additions made.

83. Please verify per HEC-FDA input files that discharges increase from 10cfs in the 2 year event to about 20,000 cfs in the 5-year event.

**Response:** Discharge for the 2 year event is actually not defined, however, some small non-zero number was required by the HEC-FDA program for the 2 year event discharge to prevent "blowup" mathematical operations which crash the program. This number has no significant impact on any damages.

84. Please verify per the HEC-FDA input files that the stage-discharge error of one foot applies to all alternatives.

**Response:** Verified – actually the s-d error reaches its maximum value of one foot at the 100 year event for all alternatives ; it is less for more frequent events.

85. Please explain why the levee heights for each reach (for the alternatives with levees) correspond with water surface elevations for frequencies less frequent than the 500-year event. Note that this has the impact of virtually eliminating damages in these reaches. Why aren't the levee heights equal to the 100-year WSE.

**Response:** This comment rendered moot by new analysis which utilizes three new levee designs.

86. What is the "other" economic damage category, for which all floodplain structures are associated with an additional \$17k of property susceptible to 100% damage at one foot of depth?

**Response:** Please indicate where comment refers to.

87. Report states that FFE standard error used was 1.5 feet. HEC-FDA input files show 1.25'.

**Response:** Typographical error indicating 1.5 feet corrected. Actual value used is 1.25 feet.

88. I will finalize my comments on the Economic Appendix once I have had a chance to review the HEC-FDA input and output files.

**Response:** Files transmitted 6/29

89. Appendix F: Tables 1 and 2: It would be useful to show the average annual habitat units based upon the habitat values for the various target years. Also, suggest showing the increase in average annual habitat units provided by Alternatives 3 & 4 relative to the without project condition.

**Response:** For Alternatives 3 and 4, only the expected habitat values at PY 30-50 were used in the incremental cost analysis. Comparison to the without project condition at 50 years is included.

90. Appendix G: Was the incremental cost analysis based upon average annual costs and average annual habitat units, or total costs and total habitat units (over 50 years)? Suggest using average annual figures, with costs including annualized first cost, IDC and O&M, and habitat units reflecting average annual increases over without project.

**Response:** For Alternatives 3 and 4, the ICA of the project features was based upon first costs and the expected HU's at PY's 30-50. For Alternative 3.5, three ICA models were performed for the alternative features and they were based upon first costs and and expected Hu's at PY1, PY 20 and PY50. Average annual figures have been included for alternatives 3, 4 and 3.5 for the alternatives as a whole, however the model was not run using average annual values for the various features that comprise the alternatives.

91. Appendix G: It was difficult to understand what was being evaluated and how, in terms of the transition from Appendix F (which contains the HEP analysis) to Appendix G (which contains the incremental cost analysis). Additional documentation suggested to assist reader in determining exactly what was done.

**Response:** Additional documentation will be included in Appendix g to assist the reader in better understanding the process.

92. Appendix H: Make sure that features of the proposed recreation plan comply with Corps guidance, in terms of cost-sharable features. Suggest reviewing Rio Salado Feasibility Study comments, responses and resolutions relating to its recreation plan.

**Response:** Concur – however, sponsor may want to include a recreation and environmental education plan that exceeds 10% of the project cost and exceeds cost sharing limitations. Certain features may be considered a locally preferred plan at 100% non-Federal cost.

93. Appendix H: Average annual recreation value should be project by multiplying visitation projections by UDV projections, calculating the NPV and annualizing over 50 years.

**Response:** This will be performed by the F5 Draft Report.

94. Appendix H: Recreation analysis does not show FY 99 dollar value corresponding with point values.

**Response:** This will be performed by the F5 Draft Report.

95. Appendix H: Visitation projections must account for potential transfers of recreation activity to the proposed site from other competing recreation sources.

**Response:** Concur – however, no nearby similar recreation areas exist.

96. Appendix H: Cost estimates should be expanded (see Economic Appendix, Comment #27). Also, it appears that the recreation cost estimate exceeds Corps cost-sharing limits, in terms of increasing the Federal share by more than 10%.

**Response:** Concur – however, sponsor desires to include a recreation and environmental education plan that exceeds 10% of the project cost and exceeds cost sharing limitations. Certain features may be considered a locally preferred plan at 100% non-Federal cost.

97. Main Report: p. IV-46: Main Report states that population is projected to increase, resulting in replacement of farmland with urban development. Is this anticipated to impact the expected annual damages to structures and agricultural lands over the period of analysis?

**Response:** This statement refers more to the general demographics of the metropolitan region. The specific study area demographics are not expected to change significantly over the project life.

98. Main Report: p. V-23: Table 5.3 does not include Interest During Construction or O&M costs.

**Response:** Corrections made.

**Technical Reviewer: Anthony J. Risko (CESPL-PD-CN)**

99. P. IV-9 (Table 4.3). Specify if alternative analysis will be based on current plant flow rate or current plant flow rate plus planned expansion flow rate.

**Response:** The total plant flow used in plan formulation included the planned expansion flow rate. This has been added to the text.

100. P. IV-15. Show net flow and label each inflow/outflow arrow with accompanied source/sink.

**Response:** All exterior sources and sinks are labeled. The net change in aquifer storage is +31,200 acre-feet per year.

101. P. IV-17. Specify if water budget includes projected flows.

**Response:** All assumptions and projections are described in the preceding sections and in the Water Budget Appendix.

102. P. IV-26. Identify landfill class/category. Type of landfill could provide indication if there is a potential contaminate leachate problem.

**Response:** Little is known of this landfill. It is thought to be inert construction debris. This landfill was covered soon after being created and no investigation has occurred to determine the exact contents.

103. P. IV-27. Consider defining pollutant loads for listed runoff/discharges. If pollutant loads reveal concern for specific source, consider incorporating added measures to control release of pollutants into the Tres Rios system as part of the water quality improvement component of this study. Additionally, if possible, quantify efficiency of proposed constructed wetlands to reduce pollutants loads within the Tres Rios system.

**Response:** Water quality improvement is not a project purpose, but is a potential incidental project benefit. Quantification of any benefits would not affect plan formulation. Since EPA is requesting that local drainage be routed through the wetlands, where feasible, quantification of likely pollution reduction is a goal.

104. PP. IV-27/IV-44. There appears to be substantial data that is missing, which results in reliance on assumptions for this study. Specify if the intent is to narrow data gaps prior to continuation of study, and identify which data will be acquired as the study progresses.

**Response:** Some of the listed data gaps have been answered, and this new information is included in the technical appendices and the main report. Water quality improvement is not a primary project purpose, so any existing data gaps should not affect plan formulation. Remaining water supply data gaps have led to conservative assumptions being used for plan formulation. The remaining flood control data gaps will either be resolved in the next phase of study or are pending coordination with the Gila River Indian Community.

105. P. V-3 (Sub-Paragraph 4). Why be constrained by 50 years? Recommend open ended commitment.

**Response:** This is the standard project life recommended to be used for restoration projects.

106. P. V-4 (Floodflow). Elaborate on what kind of substances will be flushed out.

**Response:** Substances such as total dissolved solids, metals, accumulated organics and herbicides could be flushed during a high flow event.

107. P. V-6 (GRIC). What is the basis for effluent water being culturally unacceptable to the GRIC.

**Response:** The Gila River Indian Community has rejected offers of effluent as part of water rights settlements. Wastewater is culturally unacceptable to many Native American Tribes. For this reason, the Southside features would receive water from a dewatering well.

108. P. V-7 (Salt Cedar Eradication). What is the disposal plan for removal of the Salt Cedar.

**Response:** A disposal plan would be developed in the next phase of study. Usually, it is piled up and burned after a burn permit has been obtained from the county.

109. P. V-7 (Constructed Wetlands). Is the constructed wetlands to be used to not only naturally treat Waste Water Treatment Plant discharge, but to also naturally filter pollutants for other discharges as well (as referred to on Page IV-51, Water Quality)?

**Response:** These specific Constructed Wetlands will be receiving water from the Wastewater Treatment Plant and from local interior/storm drainage that it is feasible for them to intercept.

110. P. V-7 (Constructed Wetlands). What is the impact on wetland integrity during peak storm flows?

**Response:** The constructed wetlands would be designed to withstand peak flows with a minimum loss of system integrity.

111. P. V-7 (Alternatives). Establish a matrix listing all the alternatives with associated characteristics. Will enable quick comparison of alternatives.

**Response:** Comment noted. Due to the small number of alternatives that were fully evaluated and analyzed, a matrix has not been included.

112. P. V-9. (Disposal Areas): Does the existing sand and gravel mining locations refer to those borrow areas located within the Salt River channel? Additionally, what is the quantity of material to be excavated, and does the in-channel mining areas have the capacity to receive all of the material? If not, what other disposal sites would be available to receive surplus excavated sediments, and are these sites willing to accept sediment laden with VOCs and other pollutants?

**Response:** It appears that excavated material can be utilized within the study area by existing and future mineral excavators and sand and gravel mining operations. The rate and phasing of

the excavation will need to be coordinated to avoid overloading their capability to process the material.

113. P. V-19 (Water Losses). Describe assumption basis for water loss values per year.

**Response:** The water budget assumptions are described in Appendix C, Water Budget Analysis.

114. P. V-29 (Table 5.8). Are recreational point values assigned based on current usage or projected usage once the recommended alternative is constructed? Additionally, how are these point values included in assessing the alternatives?

**Response:** Recreational values are based upon projected usage. Additional information is available in the Economics Appendix.

**Technical reviewer: Glenn Mashburn (CESPL-ED-HH)**

115. Main Text; Figure 2.2: It would be nice to include stream flow arrows and a few more street (avenue) locations that were called out in the text (i.e., 113th Ave., 101st Ave., and 123rd Ave.).

**Response:** Comment noted. Additional features will be added as appropriate.

116. Main Text; last paragraph on page III-15: The 115th Avenue bridge has been completed.

**Response:** This section has been modified in response to other comments.

117. Main Text; Hydraulic Analysis Section (page IV-4): It would be appropriate to discuss the hydraulic flooding effects (or non-influence) of contemporaneous confluence flows on the Salt River relative to the Agua Fria and Gila rivers.

**Response:** Agua Fria River: Remaining flood flows in the Agua Fria River below New Waddell dam would generally result from locally severe thunderstorm type of events centered over downstream portions of the agua fria River basin or its tributaries. As a consequence, runoff from the Agua Fria River is not expected to add significantly to flood flows from the Salt and/or Gila rivers, which typically are produced by general winter or summer events. Gila River: On the average, the Gila + Santa Cruz hydrographs produced about 10% of the peak flows and volumes, below the confluence, for flows greater than 30,000 cfs, and about 5% for flows less than 30,000 cfs. These ratios were applied to the worst case 50-year hydrograph (1889 to 1939) to generate the local inflow amount at the Gila River confluence (between cross section 201.05 and 201.33).

118. Main Text; last paragraph on page IV-50: The referenced floodplain (w/o project) delineation plates supposedly contained in the Hydraulic Appendix are not there. Recommend

that the entire F-3 "Without Project Hydraulic and Sedimentation Analysis" (January 1999) documentation report (which includes subject overflow plates) be included in subject appendix.

**Response:** Concur - this will be included in the F5, Draft Report Appendices.

**City of Phoenix Review Comments  
June 21, 1999**

1. Page II-5, Figure 2.1. Show the Gila River Indian Community with boundaries. Show Avondale on map.

**Response:** The general boundary of the GRIC lands is shown as a dotted line on Figure 2.2. Avondale can be shown on the figures for the draft report.

2. Page II-6, Figure 2.2. Show the boundary of the Gila River Indian Community on the study area vicinity map.

**Response:** The general boundary of the GRIC lands is shown as a dotted line on Figure 2.2. Avondale can be shown on the figures for the draft report.

3. Page II-7, bullets after third paragraph. Should "Arizona State Land Department" be added to local government jurisdiction?

**Response:** No. The referenced section describes local government jurisdictions, not land ownership.

4. Page II-7, fourth paragraph. In the first sentence, change 101st Avenue to Bullard Avenue. The seventh sentence is not a complete sentence.

**Response:** Concur, this has been incorporated into the main report.

5. Page III-2, first partial paragraph, last sentence. Add "downstream" between "River and to..."

**Response:** Concur, this has been incorporated into the main report.

6. Page III-11, first paragraph. Change "Avid" to "Arid"

**Response:** Concur, this has been incorporated into the main report.

7. Page III-13, fourth paragraph. The plant discharges about 100 mgd (annual average) to the Salt River. About 45 mgd is sent by a pipeline to the Palo Verde Nuclear Power Plant.

**Response:** Concur, this has been incorporated into the main report.

8. Page IV-3, second paragraph, third sentence. Add agricultural irrigation return flows.

**Response:** Concur, this has been incorporated into the main report.

9. Page IV-4, second paragraph, third sentence. Refers to "topography, discharges, and n-values described in the previous paragraph." No such previous paragraph exists in the current F-4 document. May refer to a paragraph in the Hydraulic Analysis Appendix, or was taken from another report?

**Response:** Concur, this sentence has been deleted.

10. Page IV-5, second paragraph. Bureau of Reclamation was previously abbreviated as BOR.

**Response:** Concur, the US Bureau of Reclamation is referred to as USBR in all cases now.

11. Page IV-6, first paragraph, sixth sentence. There is a misspelling. Should be "Mesa and Tempe area."

**Response:** Concur, this has been incorporated into the main report.

12. Page IV-7 and IV-8. "Water outflows from the system include" Add evapotranspiration to bullet list.

**Response:** Evapotranspiration is included in "riparian consumptive use".

13. Page IV-8, second paragraph. Change the capacity of 91st Avenue WWTP to 161.75 mgd.

**Response:** Concur, this has been incorporated into the main report.

14. Page IV-10, ANPP, first paragraph. Add the following information into this paragraph: C Option 4 has now expired. ANPP has total annual contract options of 105,000 AF/yr. C ANPP can only use the reclaimed water for electrical generation. (i.e. they cannot take additional water and resell.)

**Response:** Concur, this information has been revised to reflect that they have "options for up to....".

15. Page IV-10, third paragraph. Regarding the evaporation as part of the cooling process, we have estimates of 80,000 gpm evaporating when all reactors and cooling towers are on-line.

**Response:** Concur, this has been incorporated into the main report.

16. Page IV-13, first paragraph. Delete the words "the 91st Avenue WWTP effluent channel" and replace with "a pipe and a ditch."

**Response:** Concur, this has been incorporated into the main report.

17. Page IV-21, Table 4.9. What is the source of the pollutants of concern?

**Response:** The pollutants of concern were defined by the Tres Rios Water Quality Technical Committee.

18. Page IV-21, last paragraph. What is the source applicability?

**Response:** The intent of this comment is unclear.

19. Page IV-22, first paragraph, second sentence. Add "urban stormwater runoff" to list of possible sources of metal contamination.

**Response:** Concur, this has been incorporated into the main report.

20. Page IV-22, second paragraph. Replace "sewage" with "septic tank" in the fourth sentence.

**Response:** Concur, this has been incorporated into the main report.

21. Page IV-22, second paragraph. Bicarbonate and chloride are secondary standards.

**Response:** Concur.

22. Page IV-22, third paragraph. What is source of recommended TDS standards for irrigation waters?

**Response:** Please refer to the discussion in the EIS on page 3.3-8 for more information.

23. Page IV-23, fourth paragraph, last sentence. Add "and exotic vegetation." at the end of sentence.

**Response:** Concur - the following sentence has been added:  
"Deposition is also increased due to the growth of exotic vegetation within the channel."

24. Page IV-25, second paragraph, fourth sentence. Add "suspended solids" as another pollutant generated by CAFO operations.

**Response:** Concur, this has been incorporated into the main report.

25. Page IV-27, last paragraph. "Nine special-status wildlife species could potentially occur in the study area; however, none have been recorded in or expect to occur in the study area (CH2M Hill et al., 1997)" What about the Yuma Clapper Rail Nesting Pairs found around 115th Avenue in previous years? What about the Willow Flycatcher? Do we want to cite this particular quote in the F-4?

**Response:** Concur, reference to the nesting pairs of Yuma clapper rails have been added to the report.

26. Page IV-32, Constructed Wetlands, Vegetation Bullets . Delete “terrestrial”, “alkali”, and “canary” from bulleted items. Change “grass” to “grasses”

**Response:** Concur, this has been incorporated into the main report.

27. Page IV-36, first paragraph. Does the “study area” in the third sentence refer to this feasibility study or the CH2M Hill study?

**Response:** The words “study area” has been replaced by “Buckeye/Arlington area”.

28. Page IV-39, second paragraph, second sentence. Consider changing “open water” to “densely vegetated, slow moving or stagnant areas with the study reach can be an ideal environment for mosquito production.”

**Response:** Concur, this has been incorporated into the main report.

29. Page IV-39, second paragraph, last sentence. Consider changing the current sentence to “Communities within and adjacent to the study area are currently considering implementing a Pest Abatement District to address some of these issues as well.”

**Response:** Concur, this has been incorporated into the main report.

30. Page IV-39, last paragraph, last sentence. Change “This data does” to “These data do”.

**Response:** Concur - this has been changed where appropriate.

31. Page IV-47, last paragraph. States that the largest average bed elevation change was 2.9 feet over the 50-year simulation near 83rd Ave. Are there areas in the channel today that show more than 5 feet of accretion?

**Response:** No. The maximum average bed elevation increase was 2.9 feet.

32. Page V-3, paragraph (4). SROG will only agree to a water supply commitment period up to the point at which an additional 404 permit would be required by COE for maintenance of the facilities.

**Response:** Details have been added to Chapter VII.

33. Page V-19 and V-20, Water Budget Bullet Items and Table 5.1.

a.) Infiltration Rate for wetland with soil liner: The infiltration rate used for the water budget appears to be too high. Measured and estimated data suggests that the long-term average

infiltration rate is approximately 22 ft/yr, which corresponds to a 0.06 ft/d loss rate. Also, groundwater exfiltrates from the river bed just east of 115th Avenue.

**Response:** Water Budget has been revised and corrected.

b.) Evapotranspiration rate for open-water marsh could be lower, approximately 10 ft/yr which corresponds to a 0.33 in/day rate.

**Response:** Concur. The water budget has been revised and corrected.

### **Cassidy And Associates Comments on Tres Rios F4 Documentation**

1. Overall comments. The formulation of the project does not appear to be based upon an integrated consideration of both economic and restoration benefits. Specifically, while cost figures are stated for various alternatives which apparently produce joint benefits (flood control, environmental restoration, recreation), the only benefits that have been reflected in the analysis are for flood control. The appendix states that benefits for environmental restoration and recreation will be provided at the F5 meeting. The result is that, at least for now, flood control is being given an inappropriate weight in the formulation process burden for the entire project. Furthermore, much of the information in the Economic Appendix consists of summary information without statements of the rationale for the assumptions about inputs or even a lack of information about assumptions.

**Response:** Ecosystem restoration benefits and costs are analyzed separate from the costs and benefits of flood control features. The economic appendix quantifies flood control benefits and costs. An incremental analysis was conducted separately using IWR-PLAN to assess the incremental benefits of restoration alternatives. In this manner, the various restoration scenarios and their respective benefits very much drove the plan formulation and selection process for the restoration features of the plan. The economic appendix will better justify the assumptions made and the results.

2. Section III, Page 15 notes that Holly Acres flood control level of protection is estimated at 115,000 cfs with three feet of freeboard. The current method of determining "level of protection" is through risk and uncertainty analysis. Freeboard is no longer used. Thus, one cannot tell how much protection is available to Holly Acres nor, consequently, what costs would be involved in providing 100-year protection.

**Response:** True - in the F4 we looked at a single size to represent a FEMA certified levee - for the AFB we have looked at different levee sizes based on risk and uncertainty to determine the NED plan.

3. The report notes (Section IV, Page 2) that the natural vegetation in the area is cottonwood/willow and mesquite. It is also quite clear that salt cedar is an undesirable species.

According to Appendix F, salt cedar has about half the environmental value of cottonwood/willow. The report further states (Section IV, Page 30) that salt cedar will dominate other species and grows more densely. Thus, existence of salt cedar may add to operation and maintenance costs and reduce flood control outputs. Several of the plans call for removal of most, but not all of the salt cedar. A sensitivity analysis should be done to examine the benefits of complete removal of the salt cedar to reduce O&M costs and to improve the flood control performance.

**Response:** Different levels of removal of salt cedar were, in fact, analyzed as part of the various restoration scenarios. Salt Cedar is very efficient at overtaking disturbed areas, so it is impractical to remove salt cedar from areas that would not be quickly and fully converted to other habitat types. Therefore, salt cedar will only be removed in areas where we felt confident we could convert it to a habitat type that would prevent regrowth of the salt cedar.

4. In Section V, page 4, the Corps states that they have no jurisdiction over vector control. While that is true, if the project creates a vector control problem, the project analysis must include provisions for addressing the issue, including any induced costs of vector control and appropriate mitigation actions. The same is true for law enforcement issues.

**Response:** The project design incorporates features that will minimize vector and law enforcement concerns. Once the project is implemented, any extant concerns would be the responsibility of the Non-Federal sponsor. Additional information pertaining to design features that minimize vector control issues has been added to the main report in Chapters IV and VI.

5. The extent of coordination with the Gila River Indian Community is not clear. This is a critical project issue and needs to be addressed early and thoroughly.

**Response:** Concur - coordination continues with the GRIC however obligations and commitments required of the Federal Government will be discussed as an issue item at the AFB conference.

6. Care should be taken to identify each of the assumptions underlying the analysis, a clear rationale should be provided, and the sensitivity of the outcome to those assumptions should be tested.

**Response:** Concur.

7. Section V, Page 20, indicates a high evapotranspiration during the start up period requiring a large capacity water supply system. The size of the system should be examined with other i.e., slower, start up conditions and timing.

**Response:** The water budget has been revised and corrected. Any additional sizing and operating issues will be addressed during value engineering during the detailed design phase.

8. The unit cost, \$62,000 per habitat unit seems high. Efforts should be made to reduce the unit cost in the interest of being more competitive with other projects seeking authorization and funding several years hence.

**Response:** The referenced unit cost is not annualized. This cost is within the range of reasonableness when compared with projects nationwide. Habitat units from one ecosystem cannot be compared to those from another ecosystem in another part of the country.

9. Finally, the calculation of agricultural benefits in the Economic Appendix is not clear. The numbers given in the various tables do not track.

**Response:** Concur - these issues will be clarified.

### **Review Comments by Flood Control District of Maricopa County**

#### ECONOMIC ASSESSMENT

P 3. Recommend labeling the frequency-discharge table: "Gila River (below Salt River Confluence)"

**Response:** Concur - this will be labeled or clarified for the draft report.

P.17. Levee to protect 91st Avenue treatment plant has been completed.

**Response:** This will be labeled or clarified for the draft report.

P. 21. Table 13. Explain why the residual damages for alternatives 3d and 4d are higher than the without project with levee alternative?

**Response:** The residual damages for alternative 3d and 4d reflect the remaining damages after the restoration features have been incorporated for these two alternatives (ie, no levee). The with levee alternative reflects the elimination of the majority of the damages due to the levee.

P. 22. Table 16. It is our understanding that the justification for the flood control components will be based on conventional benefit to cost methods and justification for environmental restoration components will be based on environmental and recreational account benefits. We therefore recommend that this table be expanded or modified to reflect the added incremental benefits provided by flood control components of alternatives 3d and 4d. From such a modified table it would appear evident that a Tres Rios flood control component under any alternative will be a project justified project component under the Federal authority cited on page 1 (Section 321 WRDA 92).

**Response:** Concur - the restoration and flood control benefits are presented separately for the AFB package. The separable flood control levee appears justified.

## FEASIBILITY STUDY, F4 DOCUMENTATION, JUNE 1999

### General Comments

1. It appears from information contained in the Economic Assessment Report that a flood control levee may be justified using Federal Cost Sharing Criteria. This discussion should be explained and included in the draft report.

**Response:** Concur, the main report will be revised to be consistent with the revised Economics Appendix.

2. One of the primary stated goals of the Flood Control Committee was to develop a flood control solution that does not make flooding worse in any area as a result of a proposed plan. (Reference Flood Summary Report, November, 1997 Page 2). The alternatives evaluated in the feasibility study with levees do not meet this object because they cause a significant increase in the 100-year flood water surface elevation thus impacting the south side of the river. In our opinion this significant issue must be addressed in order to assure a successful project which meets the needs of all stakeholders.

**Response:** Corps policy is to not induce any damages. Any induced damages would be required to be mitigated or offset. While the proposed plan does increase the water surface elevations in some locations, the increases are not considered significant because they do not induce economic damages.

3. The following are a summary of the Flood Control District's preferences for Tres Rios project features and overall project goals.

Include Features Which Improve Flood Conveyance Corridor

Open Water Areas

Reduction of Salt Cedar

Excavation of "High Spots" reference Flood Control Committee Report,  
Volume II HEC-2 Model Data, Analysis with Corridor Excavation

Bank Stabilization

FCD would not support a plan which reduces bank stability

FCD encourages project features which enhance bank stability

Constructed Wetlands

Prefer wetlands protected by levee due to potential for incidental flood benefits

Maintenance

FCD supports features which minimize maintenance

404 Permit should allow for vegetative maintenance and channel excavation as needed for the design life of the project

FCD Overall Project Goals

Improve river flood conveyance  
Provide 100-year flood protection to existing improvements (FEMA Standards)  
Maintain and enhance natural habitats  
Develop an implementable and sustainable plan through public/private partnerships  
Develop a plan that does not make flooding worse in any area

**Response:** Noted. These preferences and goals will continue to influence the design of the selected plan as they have influenced plan formulation.

#### Comments Referenced by Page Number

P. II-1, third paragraph. In consideration of the apparent high benefit to cost ratio of the flood control levee (reference Table 16, Economic Assessment Report), we recommend that a revised approach be considered to the project purpose such that flood control is made an overall goal and component of the Tres Rios Federal Project with associated direct flood control benefits. We believe such an approach would enhance the overall justification of the Tres Rios Project by better meeting the needs of all stakeholders while adding an economically justified flood control component to be cost shared by local sponsors.

**Response:** The referenced flood control component has been integrated into the project analysis and is subject to typical Federal/non-Federal cost sharing guidelines.

P. II-7, 4th paragraph, 2nd line. Revise to read "... west to 151st Avenue."

**Response:** This has been changed to Bullard Avenue in response to a comment from the City of Phoenix.

P. II-7, last sentence. Is there reservation land on the north shore?

**Response:** Yes - a small section of GRIC land does extend across the river in one location.

P. III-5. Include a reference and discussion of the Corps of Engineers report titled Interim Report On Survey For Flood Control Gila and Salt Rivers, Gillespie Dam To McDowell Site, Arizona, December 4, 1957.

**Response:** This report could not be located.

P. III-6, second paragraph. Correct title is: "Flood Control District of Maricopa County". Please correct here and in all other references.

**Response:** Concur - this has been changed in all cases.

P. III-15, last paragraph, first sentence. The 116th Avenue Gila River Bridge was completed in 1998. Revise sentence accordingly.

**Response:** Concur - this sentence has been changed to reflect this information.

P. IV-6, 1st paragraph, line 7. "Mesallempe area"... Mesa /Tempe area?

**Response:** This has been changed to "Mesa and Tempe area".

P. IV-13, 1st paragraph, last sentence. Provide more information on discharges for remaining portion of the day. What is the average discharge in relationship to the "averaged 3-4 mgd for 3-4 hours per day" value indicated?

**Response:** As stated in the report, discharge from Tolleson WWTP can vary from 11 mgd to zero depending on ANPP demands.

P. IV-47, third and fifth paragraphs. Statements on sedimentation appear to be contradictory, Third paragraph, "Overall the trend is depositional...". Fifth paragraph, the study reach "...is close to equilibrium."

**Response:** Concur. Although the statement that the system is "close to equilibrium" is accurate, since very little change is expected in the study are over the project life, the minor depositional trend described is a more accurate representation of the model results. The statement describing the system as "close to equilibrium" has been deleted.

P. IV-47. Does the sedimentation model assess the entrapment of sediment by vegetation and the added stability to the riverbed provided by the sediment? If a series of low flows sufficient to convey sediment, but not to remove the vegetation occurred, what would happen?

**Response:** First question response - No, but this will be looked at in greater detail in the next phase of the study. Second question response - Assuming there is a source for the sediment, most likely, it would deposit sediment in these vegetated areas.

P. IV-47 Recommend including a statement that sediment deposition is very sensitive to river channel conveyance blockage caused by unrestricted growth of salt cedar.

**Response:** Concur. This has been added to page IV-47.

P. IV-49, Table 4-16, second column, second row. Add "Improve flood flow conveyance" as an opportunity to address flooding problems. Reference page IV-51 (below table 4.17), "The opportunity exists to create additional flood capacity..."

**Response:** Concur, this has been incorporated into the main report.

P. V-3, item (1), first sentence. Revise to read: "A flood control levee should be constructed on the north side of the river to protect property from the 100-year flood."

**Response:** Concur, this has been incorporated into the main report.

P. V-3, item (2), last sentence. Revise to read: "The FCDMC could operate and maintain the channel."

**Response:** Concur, this has been incorporated into the main report.

P. V-3, item (3). The word "stable" needs to be defined in this context.

**Response:** The word "stable" has been deleted.

P. V-3, item (6). Management of mesquite or terrace areas needs to be defined. It is not appropriate at this phase of the project to indicate that the Flood Control District "should" maintain these areas.

**Response:** This is documentation of the Steering Committee report and does not bear on responsibilities as will eventually be outlined in the Plan Implementation chapter. The following sentence has been added:

"These elements represent preferences and suggestions and would not bear on responsibilities as will eventually be outlined in the **Chapter VII, Plan Implementation.**"

P.V-3. An objective should be added stating that: "All necessary permits to operate and maintain all features included in the plan, should be issued by the responsible permitting agencies for the life of the project (50 years)." In particular the permitted ability of the local sponsor to control vegetative growth so as to not exceed full vegetative development parameters (as utilized in hydraulic models) will be critical in the long term success of the project in meeting flood control objectives.

**Response:** This has been added to the discussion of planning constraints ("Maintenance of Existing Flood Conveyance Capacity") on page V-4.

P. V-4. 4th paragraph, Add the following statement: "The reach of the Salt/Gila River within the Tres Rios Plan has significantly more vegetation than upstream Salt River reaches and has, in the past, become clogged with salt cedars and has significantly reduced the natural conveyance capacity of the river."

**Response:** Concur, this has been incorporated into the main report.

P. V-6. 4th paragraph, last sentence. Revise to read: "Alternatives must not negatively impact the landfill."

**Response:** Concur, this has been incorporated into the main report.

Figure 5.1 This drawing shows a levee west of 115th avenue as part of this option. This would be unacceptable in that the levees would impound water causing increased flooding.

**Response:** Not sure this question is being completely understood. The proposed levee system would be continuous from 91st Avenue to Dysart Road.

Figures 5.1 through 5.5 The levees alignments indicated on these drawings are difficult to distinguish. Please show levee alignments in a line type and color that makes them readily identifiable.

**Response:** Concur.

Page V-20, last paragraph. A clarification needs to be made as to the location of the north levee. Does it follow the north bank or does run west from the 91st Ave WWTP and intercept an extension of the Holly Acres levee around 113th Avenue? It should be noted that on Figure 5.4 Alternative 4, that there the levee is on the north bank upstream of Holly Acres. Does this comply with the hydraulic criteria of no net increase in water surface elevation nor increase in floodplain area to the south bank?

**Response:** The levee runs west from 91st Avenue, on the north side of the constructed overbank wetlands, and intercepts the existing Holly acres levee. Any negative impacts caused by a project would be mitigated. There is a slight increase in water surface elevation in some locations on the south bank, however, they are not considered to be inducing any damages.

P. V-23. What are the annual repair and replacement costs for the project?

**Response:** The annual repair and replacement costs are currently being developed and will be included in the main report under Operation and Maintenance.

P. V-25, Table 5.4. What are the average damages for this alternative?

**Response:** The main report has been modified to be consistent with the revised Economics Appendix.

P. V-26, Table 5.5 What are the average damages for this alternative?

**Response:** The main report has been modified to be consistent with the revised Economics Appendix.

P. V-27, Table 5.6. Table does not include expected damages to implemented alternative.

**Response:** The main report has been modified to be consistent with the revised Economics Appendix.

P.V-27,Table 5.6. An explanation should be made why Alternative 6 (No action with levee) provides more flood control benefits (protection) than either of the other two with levee alternatives.

**Response:** The ecosystem restoration features provide flood control benefits in the two restoration alternatives. These benefits are incidental and attributed to the restoration features. Since the benefits cannot be counted twice, the the levee in these alternatives only provides the remainder of the possible benefits. For Alternative 6 (the levee alone), the total benefits can be attributed entirely to the levee.

## FEASIBILITY STUDY, TECHNICAL APPENDICES, JUNE 1999

### Appendix B: Hydraulics

1. The following impacts to the water surface elevation should be noted in the F4 Documentation Report. Item #29 refers to the effect of removing the landfill, the remaining are effects of the various alternatives. The models do not include an excavation within the corridor through the study reach, this results in a significant increase in the 100-year flood water surface elevation.

- Page 6 # 29 This impact should be noted in the feasibility study.
- Page 6 #34 water surface elevation increased up to 3.4 feet.
- Page 7 #38 water surface elevation increased up to 2.9 feet.
- Page 8 #45 water surface elevation increased up to 3.2 feet.
- Page 8 #49 water surface elevation increased up to 2.9 feet.
- Page 9 #53 water surface elevation increased up to 0.6 feet.
- Page 10 #56 water surface elevation increased up to 0.6 feet.
- Page 10 #60 water surface elevation increased up to 2.1 feet.
- Page 11 #63 water surface elevation increased up to 0.9 feet.
- Page 12 #69 water surface elevation increased up to 1.9 feet.
- Page 12 #73 water surface elevation increased up to 0.9 feet.
- Page 13 #78 water surface elevation increased up to 2.5 feet.
- Page 13 #81 water surface elevation increased up to 2.5 feet.
- Page 14 #90 should be noted in the design guidelines.
- Refer to Plate 1 and Plate 2 to compare existing water surface elevations against proposed.

**Response:** These changes in water surface elevation refer to the 100-year event and would only be meaningful if a corresponding location was also identified. This information could be incorporated into the draft feasibility report.

2. P. 14 # 85. This section indicates "In general, the decrease in water surface associated with Alternative 4 is greater than with Alternative 3." The District prefers open water features in Alternative 4 (and other features) which increase the conveyance capacity of the river and reduce the 100-year flood water surface elevation.

**Response:** Comment noted.

3. P. 15 #92 This section indicates: "The environmental features will essentially be holes in the ground. This translates into sediment traps and may fill even during small events." It is suggested that a continuous conveyance corridor may offer future sediment removal benefits.

**Response:** The sediment yield analysis indicates that the excavated open water features would fill with sediment approximately every 70 years. Operation and maintenance estimates have been included to indicate the average annual cost of maintaining these features. It is important to note that the open water features are currently proposed at a higher elevation than the continuous conveyance corridor. While the continuous conveyance corridor would help improve conveyance capacity, its economic benefits are unknown. This feature would be located in the low flow portion of the river, subject bed load movement, and also require operation and maintenance to maintain.

#### Appendix D: Design and Costs

1. Designs should include flood control component features such as conveyance corridor and excavation within the conveyance corridor to offset increased water surface elevation caused by flood control levee.

**Response:** These features are not currently included as part of the flood control features because they are not considered to be as cost effective as the levee solution.

2. P.5 North Bank Levee. What is levee crest width? Depth of toedown? Add a typical cross section for levee.

**Response:** The levee crest width and depth of toedown is presented in the design appendix. Concur that a typical cross section should be presented in the draft report.

#### **BUREAU OF RECLAMATION GENERAL REVIEW COMMENTS PRELIMINARY DRAFT ENVIRONMENTAL IMPACT STATEMENT TRES RIO FEASIBILITY STUDY**

1. The June 7, 1999, Preliminary Draft Environmental Impact Statement (EIS) provides a number of possible project alternatives including subalternatives. The preferred alternative should be clearly defined when one is selected. Some of the figures are inaccurately labeled, and additional information (text) associated with the individual features for each alternative should be provided to allow the reviewer to evaluate these features completely.

**Response:** The EIS has been revised and reorganized to highlight Alternative 3.5 as the preferred alternative/proposed action. The EIS has also been edited and revisions have been made to correct earlier deficiencies.

2. Additional discussion related to future projected diversions/deliveries of effluent/water from the 91<sup>st</sup> WWTP and other sources should be provided in the document to assess estimated water budget amounts. This would allow planning for other beneficial uses if it is determined surplus water is available.

**Response:** Additional information regarding this topic has been added to the EIS.

3. Reclamation believes additional information or discussion should be provided in the EIS, specifically Section 4. In addition, a number of mitigation measures could be added to the document to support the project. A number of impacts related to resources being assessed are followed by the statement "No Mitigation Required." The EIS requires substantial rewrite and editing.

**Response:** See responses to specific comments.

4. Reclamation suggests Table ES-1 and Table 2.4-1 list additional mitigation measures, and the Environmental Consequences (Section 4) provide more discussion associated with possible impacts to these resources. A number of measures that could be incorporated into the EIS tables and document are listed below.

**Response:** Tables ES-1 and 2.4-1 have been revised to reflect changes to the impact section.

### **Hydrology and Water Quality**

#### Impact: Potential Changes in Groundwater and Hydrology.

Periodic monitoring/sampling of surface/groundwater during project life. Implement measures to reduce adverse impacts (e.g., reoperation of releases, modify water levels, etc.).

Periodic monitoring of regulated runoff, agricultural, CAFO, tailwater, etc., to determine changes, or develop measures to safeguard water quality in the Tres Rios project area.

Periodic monitoring/sampling of soils in the Tres Rios area would also be a prudent measure to determine existing/new sources of contamination.

(COP does and will continue per EPA for permitting.)

**Response:** A monitoring and adaptive management plan will be implemented as part of the proposed action. Potential contamination issues have been addressed in the Public Health and Safety section.

## **Land Use and Recreation**

### Impact: Potential Changes in Land Uses or Recreational Activities.

Continue coordination with local government entities to ensure compliance with their recreation plans.

**Response:** The text has been revised.

## **Transportation**

### Impact: Temporary Increase in Traffic or Existing Roadways During Project Construction.

Coordinate with Traffic Department.

### Impact: Disruption of Traffic Circulation During Project Construction.

Notify the public (newspapers, road signs, etc.) of future delays on roads affected by heavy construction traffic (haul vehicles).

Two construction shifts would avoid peak traffic hours.

One construction shift - Staffer work hours to avoid peak hours (e.g., start early/finish early).

Reschedule or halt construction when raceway activities or other large events are planned in the immediate area.

**Response:** The text has been revised.

## **Air Quality**

### Impact: Generation of Construction Related Emissions.

No construction activities during air pollution alerts.

An air quality analysis would determine optimum number of hours construction equipment can operate during construction.

**Response:** A quantitative air quality analysis has been prepared.

## **Social and Economic**

### Impact: Potential Indirect Growth Inducing Impacts.

Implement new zoning laws around the Tres Rios area that protect the ecorestoration project from negative impacts.

**Response:** No changes have been made to the text. The Corps does not have the authority to make zoning changes.

### **Public Health and Safety**

#### Impact: Potential Mosquito Problems.

A discussion of vector control procedures to control mosquito infestation should be discussed in detail in the Section 4, along with mitigation measures to be implemented to control this problem (e.g., controlling water levels in a manner to control propagation, use of mosquito fish/gila top minnow, chemical spraying, thinning wetlands vegetation periodically, etc.). This is a major health issue, and the EIS indicates there are mosquito problems currently at the demonstration wetlands.

#### Impact: Potential Illegal Activities.

A discussion associated with policing/patrolling the area to prevent wildcat dumping, unauthorized firearms practice, swimming and fishing restrictions, etc., could be added to this section. This issue was brought to the attention of the Steering Committee by GRIC.

**Response:** With regard to vector control, the text has been revised. Revisions have been made to the text emphasizing the beneficial effects the proposed action would have on existing illegal activities in the project study area.

### **SPECIFIC REVIEW COMMENTS PRELIMINARY DRAFT ENVIRONMENTAL IMPACT STATEMENT TRES RIOS FEASIBILITY STUDY**

<u>Page</u>	<u>Section</u>	<u>Comment</u>
ES-2	ES	Delete "be" before either be created or restored...
ES-3	ES	Last paragraph - change "deuce" to reduce.
1-6	1-6	Last sentence does not make sense
Table 1.7-1		Wild and Scenic Rivers Act - Under Status Column - The "Santa Ana River is not listed in the Phase II" ... Should this not be the Salt, Gila, and/or Aqua Fria Rivers?
2-2	2.2.1	2 <sup>nd</sup> paragraph - delete "be" before either be created...
2-2	2.2.1	Last line; end sentence after "21 years."
2-4	2.2.1	Constructed Wetlands - I thought we deleted the "benching" option as it would negatively impact the habitat.
2-6	2.2.3	The habitat created along the north bank, west side of the project (between El Mirage Road and Aqua Fria River) should be <b>riparian stringers</b> and not open water/marsh (Alternative 3). This error also appears on the maps. ( <i>This is a</i>

*significant point as the riparian habitat has more wildlife value than the open water/marsh.)* Also mislabeled in Draft F4 Documentation.

**Response:** Text has been revised to address the aforementioned comments.

2-10 2.3.1 Figure 2.3-1 is missing.

2-10 2.3.2 Figure 2.3-2 is missing

**Response:** Figure references have been corrected.

2-12 2.4 When completing the text on summary of effects, the discussion should be specific with respect to changes.

**Response:** Text has been revised.

Table 2.4-1 Additions recommended for Executive Summary should be incorporated into this table as well.  
Change "Non-Nesting" to "Non-Breeding" under Biological Resources mitigation measures.

**Response:** Text has been revised.

3.2-6 3.2.2 **Gradient** - Is there a unit of measure to describe the gradient of 0.0021 (i.e., in relation to 1.0)?

3.3-4 3.3.2 Salt cedar can out-compete native riparian vegetation, but if the flood occurs during spring when cottonwood and willow are dispersing seeds, native vegetation can out-compete salt cedar.

3.3-5 3.3.2 Messallempe?? Mesa-Tempe??

3.3-14 3.3.3 Does this need to be so detailed? It seems like it could be shortened significantly. I'm not familiar with Corps document format.

**Response:** Text has been revised.

3.5-2 3.5.2 Even though CH2M Hill described agriculture as a "plant community". For the purposes of the EIS, I would recommend against it. I would say there were 7 plant communities plus ag and residential areas.

3.5-2 In general the biological section could use some editorial review. The entire section reads as if the sentences were pulled together from various documents without any thought given to continuity. Also, it does not adequately impart the important aspects of riparian habitat in a clear and concise manner.

3.5.2 3.5.2 **Cottonwood-willow** - Include a description of habitat patchiness, as well as patch size. What did the area look like and how has it changed over time. Can you characterize the age class of riparian habitat. The information presented indicates that the majority of CW habitat is young (inferring low habitat value). However,

trees may be 10 years old and still provide high quality habitat. Tree size varies per site and water availability.

I would replace the first sentence with: "Cottonwood-willow is representative of high quality riparian habitat in Arizona."

- 3.5-3 3.5.2 **Wildlife** - This section does not convince me of the value of riparian habitat for wildlife. For example, in first sentence, replace "usually" with a more positive declaration and cite references. There are many articles which describe the diversity of wildlife species in riparian habitat.  
Focus on wildlife species actually common in the Tres Rios area; eastern phoebe, scrub jays, and Swainson's thrushes are uncommon or rare. I suggest getting a copy of the bird list put together by Audubon and Reclamation which lists birds in the area and their abundance. Also note that yellow warblers and song sparrow do not require large tracts of riparian habitat for nesting and cover. When I think of large tract, I would think of yellow-billed cuckoos.
- 3.5-6 3.5.2 **Wildlife** - last paragraph on this page is essentially a repetition of the previous paragraph.
- 3.5-7 3.5.2 **Honey Mesquite** - Include same type of information requested for CW (typical size of habitat patch, is habitat in project area disjunct etc.). List of birds that primarily use mesquite should be revised. Bendire's thrasher, bushtit, great-tailed grackle are not good examples. What about Lucy's warbler, Bell's Vireo, Abert's Towhee, Elf Owl, Gila Woodpecker. Change name of black-tailed jackrabbit. Some of the lizard species appear to be more common in open areas, such as zebra-tailed and banded gecko.
- 3.5-9 3.5.2 **Constructed Wetlands- Wildlife** - Not all of those 70 species of birds were utilizing the wetland, they were there for the riparian habitat. This statement is misleading. As the CH2M Hill report includes all habitat types not just the wetland. Delete sentence: "Many other migratory waterfowl, shorebird and wading birds are expected to use the constructed wetlands." or replace with examples. I would suggest utilizing the Audubon bird list here also.
- 3.5-9 3.5.2 All fish species were artificially placed in the wetland. This should be made clear in the document.
- 3.5-9 3.5.2 **Desert/Desert Wash** - add an "s" after consist (first line).
- 3.5-10 3.5.2 **Desert/Desert Wash - Wildlife** - Mesquite is considered a unique and valuable habitat type in the Sonoran Desert. Although many of the wildlife species can be found in both habitat types, I am uncomfortable not delineating the differences.
- 3.5-10 3.5.2 **Open Water/Marsh** - White pelicans and buffleheads are not common in the Tres Rios area. Only a couple of waterfowl species (mallard and cinnamon teal) nest here. The desert SW is not a prime duck nesting area.
- 3.5-12 3.5.2 **HEP** - A "modified" HEP was conducted. This should be stated to distinguish it from standard HEP.
- 3.5-13 3.5.2 **American peregrine falcon** - note that the falcon has been proposed for delisting.
- 3.5-14 3.5.2 **Southwestern willow flycatcher** - Statement the WIFL's **occasionally** nest in salt cedar is incorrect. Check with AGFD for actual statistic, but well over 50% of the territories are salt cedar.

- 3.5-15 3.5.2 **Lesser long-nosed bat** - Note that there are no roosting or maternity sites in the project area.
- 3.5-15 3.5.2 **cfpo** - change dessert to desert
- 3.5-15 3.5.2 **Bald Eagle** - Bald eagles primarily forage on fish along reservoirs and rivers. Fields do not provide suitable foraging habitat and marshes/constructed wetlands are not considered primary forage areas. Please revise document accordingly.

**Response:** This section has been edited and revised per comments.

- 3.6-1 3.6 **Cultural Resources** - Coordination should be conducted with the Gila River Indian Community, Salt River Pima-Maricopa Indian Community, Ak-Chin Indian Community, and Hopi Tribe.
- 3.6-1 3.6 2<sup>nd</sup> paragraph - change edibility to eligibility

**Response:** The cultural resources section has been updated and will be completed for the public draft report.

- 4.2-2 4.2.2 **Geology and Geomorphology** - How much material (cubic yards) is to be excavated/relocated to construct project features both within and outside the channel. Are other disposal areas being considered if the sand/gravel pits planned for disposal cannot handle all the material.  
A description of the MCFCD Operation and Maintenance (O&M) procedures planned for each Alternative should be included in this section. This should include a discussion of periodic maintenance (i.e., every 5/10 years) and post-flood emergency maintenance. In addition, a discussion of 402, 404 permit requirements under both scenarios should be included in the document.  
How/where will they dispose this material during O&M operations. Although some of this information is provided in Appendix D - F4 Technical Appendices (vegetation maintenance) additional information should be provided in the EIS. SROG mentioned at the F4 meeting that their water would be tied to operation and maintenance (O&M) activities. That 404 permit limits be extended and mitigation requirements eliminated. SROG, Corps, and EPA need to work together to resolve this issue. The permit issue should be resolved and addressed in the EIS.
- 4.2-2 4.2.2 Should also include mitigation measures for O&M activities to prevent erosion to constructed wetlands from wave action (e.g., placement of riprap on windward side) and burrowing animals (routine inspections/berm repair) to ensure the stability of these features.
- 4.2-2 4.2.2 Should include similar routine O&M inspection as indicated above for levee(s) and post-flood inspections to ensure integrity of levee is maintained. Is there a rehabilitation plan for the levee.

**Response:** Rough estimates of excavated material were prepared for the air quality analysis and provided in this section. Available O&M information has been provided in the text.

4.2-3 4.2.3 Alternative 4 consists of both open water marsh and riparian corridors.

**Response:** Text has been revised.

4.3-1 4.3 **Hydrology and Water Quality** - Although the total amount of water to be utilized by alternatives is provided, a breakdown in the approximate water amounts being diverted (e.g., BIC, ANPP, etc.) or lost (percolation, evapotranspiration) would be useful. Some of this information is provided in the June 1999 - Draft F4 Documentation (Existing Conditions) including Figure 4, Page IV-15.

Recommended tables that shows the total projected amounts of reclaimed water effluent released from the WWTP's along with diversions to the ANPP and BIC diversions e.g., Tables 4.7 and 4.8, and Figure 4.2 from the F4 Report to be included in the EIS.

The 91<sup>st</sup> Avenue WWTP has contractual commitments through year 2027 to provide reclaimed water to the Palo Verde Nuclear Power Plant and Buckeye Irrigation District. Future growth in the vicinity of the WWTP may require additional upgrades or future expansion of the facility to handle increased sewage requirements allowing for increased discharges in the future.

This information would indicate if future effluent surpluses would be available for other purposes of projects such as SROG's and Reclamation's proposed groundwater recharge project located in the Agua Fria River area.

Somewhere in the document (Section 2) a discussion should be included that describes the treatment processes and use of wetlands to educate the public as to the benefits of using treated effluent.

**Response:** Information about water releases and diversions has been provided in the revised EIS.

4.3-2 4.3-2 Spell check this page.

**Response:** Text has been revised.

4.3-9 4.3-.5 Delete "the increase" in 1<sup>st</sup> sentence before these potentials...

**Response:** Text has been revised.

4.4-3 4.4.2 **Impact: Increased Development of Floodplain Properties** - Pre-project zoning changes in the immediate vicinity of Tres Rios by local government jurisdictions could be established to maximize project objectives/goals.

**Response:** Change not made. Zoning changes are beyond the authority of the Corps and would not be considered feasible mitigation.

4.5-2 4.5.2 How will salt cedar be disposed of during construction of features.

**Response:** The EIS assumes that salt cedar will be ground of off-site.

4.5-3 4.5.2 **T&E species** - I don't believe that Alt 3 will provide a "substantial" increase in WIFL habitat. The Cottonwood/willow habitat provided along the edge of the open water areas will not be very wide.  
Please explain how the potential disturbance to WIFL habitat will occur. Is it really actual loss of habitat or disturbance to birds.

4.5-5 4.5.3 **T&E species** - See comment above on disturbance to WIFL habitat.

4.5-5 4.5.3 **Mitigation** - change non-nesting to non-breeding.

4.5-6 4.5.4 **T&E species** - See comment above on disturbance to WIFL habitat.

4.5-7 4.5.5 I believe the HEP team determined that although marsh habitat would change in location over time, the total acreage would remain the same. Consequently, habitat for the Yuma clapper rail should not decline.

**Response:** Text has been revised to address these comments.

4.7-2 4.7 **Transportation** - A number of mitigation measures could be implemented to minimize traffic impacts during construction and should be listed in this section under each potential traffic impact identified (Page 2, general review comments).

**Response:** Text has been revised.

4.8-1 4.8 See general comments

**Response:** Comment noted.

4.12-1 4.12 **Public Health and Safety** - Mosquitoes are a major concern. The document makes a blanket statement that vector control will be incorporated into all restoration features, but does not provide possible procedures/programs to be implemented to control this problem. The vector control plan (s) to be established should be incorporated in the DEIS.  
A plan to address health risks from unexpected releases of raw sewage in the event damage to the WWTP occurs during flooding should also be provided.  
A discussion of how the area will be policed or patrolled should also be included.

**Response:** The EIS has been revised to address vector control issues. Raw sewage releases have not been addressed because this potential impact is not relevant to the proposed action.

## **SPECIFIC REVIEW COMMENTS DRAFT F4 DOCUMENTATION FEASIBILITY STUDY**

### **Page Section/ Paragraph Comment**

II-1 A The Corps mentions that constructed wetlands is effective at polishing wastewater treatment plant effluent. A brief description of this process should be included in the DEIS to educate the public that wetlands improve effluent quality that can be used/disposed in a safe manner.

**Response:** A discussion has been added to the EIS in Section 2.

III-2 C-2 Two reports are missing from your list: Tres Rios River Management Plan Habitat Technical Committee Report and Recommendations was prepared by the Habitat Technical Committee. This report describes the historical and existing habitat, identifies constraints and limiting factors with respect to habitat restoration and provides recommendations for acceptable habitat features. The second report is titled: Invertebrates of the Tres Rios Constructed Wetlands. This report prepared by Dennis M. Kubly for the Bureau of Reclamation analyzed the taxonomic richness and relative abundance of the invertebrate population in the Demonstration Wetlands.

**Response:** Concur. These reports have been added to the list of prior reports (now in Chapter X).

IV-2 A- last par. "Most modern mesquite bosques are large..." This sentence leads the reader to believe there are still numerous mesquite bosques left, when in fact there are very few true bosques left in Arizona.

**Response:** Concur. This sentence now reads "Most of the few remaining modern mesquite bosques are small compared to pre-development bosques which extended for miles."

IV-6 1<sup>st</sup> para. "Messallempe" (Mesa-Tempe?)

**Response:** Concur. This has been changed.

IV-9 Table 4.4 par. The DEIS should briefly describe how the detention component of the constructed wetlands will help balance fluctuations to ensure an adequate water supply is available for the project.

**Response:** A discussion regarding the detention component and ability of the constructed wetlands to balance fluctuations in flow is addressed on page 2-3 of the EIS.

IV-15 Figure 4.1 A description of the water supply input/output into the Tres Rios system along with this figure should be included in the EIS.

**Response:** Additional information on the water supply input/output has been added to page 3.3-6 of the EIS.

IV-27 Data Gaps Identifying and periodically monitoring major sources of surface/water quality contamination in the immediate vicinity (e.g., agricultural runoff, CAFO's) if economically viable may prevent or minimize these problems in the future.

**Response:** Concur.

IV-27 Biological Res. Even though CH2M Hill described agriculture as a "plant community". For the purposes of the EIS, I would recommend against it. I would say there were 7 plant communities plus ag and residential areas.

**Response:** Concur. The main report has been modified to be consistent with the modified EIS.

IV-28 Cottonwood-willow In general the biological section could use some editorial review. It does not adequately impart the important aspects of riparian habitat in clear and concise manner.

**Response:** This section will be revised as appropriate.

**Vegetation** - Include a description of habitat patchiness, as well as patch size. What did the area look like and how has it changed over time. Can you characterize the age class of riparian habitat. The information presented indicates that the majority of CW habitat is young (inferring low habitat value). However, trees may be 10 years old and still provide high quality habitat. Tree size varies per site and water availability.

**Response:** The main report has been modified to be consistent with the revised EIS.

IV-29 Wildlife This section does not convince me of the value of riparian habitat for wildlife. For example, in the first sentence, replace "usually" with a more positive declaration and cite references. There are many articles which describe the diversity of wildlife species in riparian habitat.

**Response:** The main report has been modified to be consistent with the revised EIS.

Focus on wildlife species actually common in the Tres Rios area; eastern phoebe, scrub jays, and Swanson's thrushes are uncommon or rare. I suggest getting a copy of the bird list put together by Audubon and Reclamation which lists birds in the area and their abundance. Also note that yellow warblers and song sparrow do not require large tracts of riparian habitat for nesting and cover. When I think of large tract, I would think of yellow-billed cuckoos.

**Response:** The main report has been modified to be consistent with the revised EIS.

IV-31 Honey Mesquite Include same type of information requested for CW (typical size of habitat patch, is habitat in project area disjunct etc.). List of birds that primarily use mesquite should be revised. Bendire's thrasher, bushtit, great-tailed grackle are not good examples. What about Lucy's warbler, Bell's Vireo, Abert's Towhee, Elf Owl, Gila Woodpecker. Change name of black-tailed jackrabbit. Some of the lizard species appear to be more common in open areas, such as zebra-tailed and banded gecko.

**Response:** The main report has been modified to be consistent with the revised EIS.

IV-33 Constructed Wetlands **Wildlife** - Not all of those 70 species of birds were utilizing the wetland, they were there for the riparian habitat. This statement is misleading. As the CH2M Hill report includes all habitat types not just the wetland. Delete sentence: "Many other migratory waterfowl, shorebird and wading birds are expected to use the constructed wetlands." or replace with examples. I would suggest utilizing the Audubon bird list here also.

**Response:** The main report has been modified to be consistent with the revised EIS.

All fish species were introduced into the wetland. This should be made clear in the document.

**Response:** Concur. This sentence now reads as follows:  
"Fish species that have been artificially placed in the constructed wetlands include mosquitofish, small-mouth bass, tilapia, spotted sunfish, and catfish."

IV-33 Desert/desert wash **Wildlife** - Mesquite is considered a unique and valuable habitat type in the Sonoran Desert. Although many of the wildlife species can be found in both habitat types, I am uncomfortable not delineating the differences.

**Response:** The main report has been modified to be consistent with the revised EIS.

IV-34 Open water/ marsh White pelicans and buffleheads are not common in the Tres Rios area. Only a couple of waterfowl species (mallard and cinnamon teal) nest here. The desert SW is not a prime duck nesting area.

**Response:** The main report has been modified to be consistent with the revised EIS.

IV-35 Federally listed species **American peregrine falcon** - note that the falcon has been proposed for delisting.

**Response:** The main report has been modified to be consistent with the revised EIS.

IV-36 Federally listed species **Southwestern willow flycatcher** - Statement the WIFL's **occasionally** nest in salt cedar is incorrect. Check with AGFD for actual statistic, but well over 50% of the territories are salt cedar.

**Response:** The main report has been modified to be consistent with the revised EIS.

IV-36 Federally listed species **Lesser long-nosed bat** - Note that there are no roosting or maternity sites in the project area.

**Response:** The main report has been modified to be consistent with the revised EIS.

IV-37 Federally listed species **Bald Eagle** - Bald eagles primarily forage on fish along reservoirs and rivers. Fields do not provide suitable foraging habitat and marshes/constructed wetlands are not considered primary forage areas. Please revise document accordingly.

**Response:** Concur. The report has been modified accordingly.

IV-37 State listed species **cfpo** - The pygmy-owl is federally listed as endangered. Change desert to desert.

**Response:** Concur. This section has been modified as appropriate.

IV-38 Other sensitive species **Desert tortoise** - I do not believe that any of the upland areas **within the project** provide suitable desert tortoise habitat.

**Response:** Concur. The desert tortoise is mentioned because the study area is within the desert tortoise's geographic range.

IV-38 Public Health **Public Health** - The F4 report states there are public health concerns (e.g., contaminated fish, mosquitoes, wildcat dumping), but does not state what is planned to remedy these problems. Measures to reduce these impacts should be listed in the EIS.

**Response:** The project design incorporates features that will minimize vector and law enforcement concerns. Once the project is implemented, any extant concerns would be the responsibility of the Non-Federal sponsor. Additional information

pertaining to design features that minimize vector control issues has been added to the main report in Chapters IV and VI.

IV-48 Exp Future W/O **Wildlife Habitat** - The HEP team determined that the amount of marsh habitat would remain relatively unchanged due to the increasing groundwater table in the western reaches of the project area (115<sup>th</sup> Ave downstream). Consequently, wildlife dependent on marsh habitat would still survive although water quality decline due to increased salinity.

**Response:** Concur. This section has been modified as follows:  
“The presence of wildlife habitat within the study area is closely tied to the availability of water. The future without-project condition assumes that the ground water level will rise in the future. Also, in the absence of a project discharge from 91st Avenue Treatment Plant would diminish every year, until it completely ceases by approximately the year 2023. Given these assumptions, it is further assumed that the total acreage of marsh would remain approximately the same, as marsh presently fed by treatment plant discharges would be replaced by increased marsh land fed by groundwater. Cottonwood/Willow habitat would decline in acreage and/or value due to water constraints and salt cedar invasion. Salt cedar would increase in acreage after approximately the year 2023 due to the lack of discharge of 91st Avenue Plant and the increase in overall salinity of the ground water. Based on the above assumptions, the value of much of the existing habitat is expected to decline in the future without-project condition.”

IV-50 Specific Prob & Opp **Area flooding** - Bullet #2 “large flows can destroy critical habitat through inundation and scouring effects.” What does “critical habitat” refer to in this sentence. If it references habitat for the Yuma clapper rail, it is an inappropriate use of the term. Within the context of Section 7 “critical habitat” has a specific definition. No critical habitat was identified for the Yuma clapper rail when it was listed. If this bullet is simply referring to habitat that provide potential clapper rail habitat, then the bullet should be reworded to indicate this. If critical habitat refers to something else it should be redefined.

**Response:** Concur. The word “critical” has been replaced with “valuable”.

IV-54 A plan to police/patrol the area or signage to warn the public of unlawful/unauthorized activities should be included in the EIS.

**Response:** A discussion has been included in the Public Health and Safety section of the EIS.

V-2 Spec Planning obj #2 - delete the word “riparian” from line 3. Wetland marsh and open water are not riparian habitat types.

**Response:** Concur. The word “riparian” has been deleted.

V-9 Flood Control Comp **Constructed Wetlands** - Construction of wetlands that requires benching would destroy existing riparian habitat and should be removed from consideration under this project.

**Response:** The proposed plan does not include any benching or the construction of a new terrace. The proposed constructed wetlands would be constructed in the existing overbank area.

V-11 Alternative 4 I thought Alternative 4 was to be primarily riparian corridors **not** open water wetlands. A linear wetland does not provide the same habitat value as a riparian corridor. This is an important point.

**Response:** Alt 4 involves primarily riparian corridors in the two major salt cedar areas - it did include some open water areas in salt cedar adjacent to existing open water (between 115 and 91). The open water areas do have a lower habitat value than the riparian corridors, and this is reflected in the analysis.

V-19 F - Eval 2<sup>nd</sup> Array **Water Budget** - The cottonwood/willow riparian corridors will have a standing/flowing water component during portions of project operation. This should be factored into the water budget.

**Response:** The water budget has been revised.

Identify how (or cite literature source) for the infiltration/ evaporation/ evapotranspiration rates.

**Response:** Appendix C, Water Budget, contains details as to the derivation of the infiltration/ evaporation/ evapotranspiration rates.

V-21 Environmental Res **last paragraph** - I thought that we (HEP team) assigned habitat values for target years 0, 20, and 50. Doesn't this paragraph conflict with paragraph in the middle of the next page?

**Response:** Concur. The reference on page V-21 has been corrected.

V-22 Bullets #4 - I thought we determined that the marsh acreage upstream of 115<sup>th</sup> Avenue would simply dry up and would be replaced by marsh created by increased groundwater levels. I don't remember any marsh being converted to AG.

**Response:** Concur. This reference has been deleted.

V-24 habitat benefits Top of page; continuation par. The HSI value for mesquite is 0.8. Mesquite should be removed from association with the poorer quality salt cedar and cobble habitats.

**Response:** Concur. This error has been corrected.

Figure 5.8 The depiction of this alternative shows very little riparian corridor habitat. Although, I recall we agreed to add Adron's open water marsh's at the west end of the project area, it was my understanding that all 6 linear riparian strips were still included. The 4 abbreviated riparian corridors are an unacceptable depiction of this alternative. Also, the riparian corridors should be parallel to the flow of the river, not perpendicular to it.

**Response:** The riparian corridors have been re-oriented to be parallel to the river flow. Alternative 3.5 attempts to balance open water and riparian corridors as was agreed at the steering committee meeting.

V-36 page is out of place.

**Response:** Page V-36 currently follows page V-35.

V-34 The text should be revised accordingly to describe the riparian corridors.

**Response:** A description is included on page V-7.

**Review Comments by Holly Acres Community  
(Electronic Copy of Letter not Available)**

**Response:** The Corps and sponsor are available to meet with representatives of the community to answer questions and explain the process and procedures associated with federal plan implementation.

## **ADDENDUM 1**

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Several copies of the Draft AFB Documentation, dated August 1999, for the Tres Rios, Arizona, Feasibility Study were transmitted with missing pages. The following pages are to be inserted in Chapter 5, "Plan Formulation," of the Draft AFB Documentation.

## C. Alternative Components

The TRRMP consensus concept plan contains the following key elements and objectives that have helped guide plan formulation during this feasibility study. These elements represent preferences and suggestions and would not bear on responsibilities as will eventually be outlined in the **Chapter VII, Plan Implementation**.

- (1) The construction of a flood control levee on the north side of the river to protect property from the 100 year flood. The Flood Control District of Maricopa County (FCDMC), the Corps of Engineers, and/or SROG should undertake actions to design and construct such a project.
- (2) In conjunction with the flood control levee, the FCDMC, the Corps of Engineers, and/or SROG should include a corridor in the river bottom, excavated and kept clear of vegetation to funnel high velocity flood flows. The FCDMC could operate and maintain the corridor.
- (3) In order to foster the establishment of riparian vegetation in the TRRMP area, the FCDMC, the Corps of Engineers, and/or SROG as part of the flood control component of the plan, should define an active channel and a flood prone area to transport the 100 year flood.
- (4) The existing and future wildlife habitat in the TRRMP area should be maintained and enhanced where possible. A commitment by SROG to provide an adequate water supply for at least 50 years for this purpose would be required.
- (5) Wetlands should be constructed by SROG and the Corps of Engineers to buffer daily fluctuations from the regional wastewater plant and to treat such inputs into the river as storm runoff, agricultural runoff, and other currently uncontrolled inputs.
- (6) The FCDMC should manage terrace areas within the project area for mesquite reestablishment under the guidance of the Arizona Game and Fish Department.
- (7) The Arizona Department of Game and Fish could undertake a process with landowners and appropriate stakeholders to establish an integrated river management plan structure for wildlife habitat within the study area.

## Ecorestoration Components

The following measures were selectively included as part of the alternatives:

- **Cottonwood-willow riparian corridors** - these would be restored/created within the channel and would primarily be located in areas dense with salt cedar and water quality problems due to stagnation. The habitat would use the following water sources: (1) existing flow that would be conveyed towards riparian areas by regrading portions of the channel, (2) water discharged from constructed wetlands along the banks and flowing downslope, and (3) dewatering well water that would be discharged within the channel into restored/created riparian corridors. In addition, reshaping of the ground surface could take place to create groundwater conditions conducive to growth. It is anticipated that the succession of cottonwood-willow habitat would have an initial, low vegetation stage consisting of 0-7 years of growth following planting, a medium height stage taking 7-14 years, and a mature stage taking over 21 years to reasonably mature.
- **Open water/marsh** - These areas would be created through excavation and/or by providing minor impoundments to restrict flow within the river thereby creating large ponds. As with the riparian corridors, this habitat would primarily be located in areas where salt cedar would be removed. Peripheral and emergent marsh and cottonwood-willow habitat would be planted and would naturally continue to grow along the fringe of the open water.
- **Salt cedar eradication** - Removal of salt cedar to enhance conveyance and provide habitat values by replacing this invasive species with riparian corridors and/or open water/marsh. Cutting and plowing of the roots would take place along with removal by bull dozers or other physical removal methods. Salt cedar eradication by itself was not considered unless the area could be modified to prevent salt cedar from regrowing in the same location.
- **Constructed wetlands** - Construction of wetlands to achieve habitat value and to improve water quality of the waste water treatment plant discharge would require construction of a pump station and pipeline from the treatment plant to the wetlands site. Thereafter, water would be conveyed through two types of wetlands, in series.
  - (1) Regulating wetlands would remove diurnal variations while simultaneously providing habitat. Removal of diurnal variations improves the health of the river by providing a more continuous flow of water keeps the river from drying up and helps improve the habitat value within the river and regular wetlands.
  - (2) Regular, constructed wetlands provide a more controllable environment for habitat by maintaining a uniform water surface elevation. This wetland also provides more uniform and

continuous discharge into the river.

Discharge from the wetland system may also provide water for the open water/marsh and riparian corridor habitat components of an alternative. In this case, the wetlands include (1) a pipeline outlet for conveying water further downstream, and/or (2) gated outlets for discharge immediately downslope from the overbank.

- **Distribution system for existing dewatering well water** - A system of wells currently exists at the treatment plant that offers a valuable water resource with which to create additional habitat. The existing well infrastructure is already in place, so that this component would only require construction of a collection pump and pipeline conveyance system. Groundwater would be conveyed through the system directly into the river along the north bank or via a conveyance system to the southside of the river between approximately 91<sup>st</sup> and 83<sup>rd</sup> Avenues. The well water would augment river water for alternatives that incorporate riparian corridors and/or open water/marsh at appropriate locations. The water also provides "effluent free" water to areas within GRIC-owned land, which is desirable within the community.

#### Flood Control Components

In addition to the direct flood protection offered by a levee on the river-side of the residential communities and adjacent farmland and buildings, the following ecosystem restoration components also provide a degree of flood protection.

- **Salt cedar eradication** - removal of salt cedar alone increases the carrying capacity of the river by providing more conveyance volume and removing potential debris and impediments to flow. Replacement of salt cedar with cottonwood-willow and/or open water/marsh also improves flood conveyance by reducing the friction factor ("n-value") compared to the denser salt cedar habitat.
- **Open water/marsh habitat** - excavation and lowering the river bottom to approach groundwater and create areas of permanent open water increases cross-sectional area of the river and provides lower frictional resistance ("n-value") to channel flows.
- **Constructed wetlands** - any excavation required to construct the overbank wetlands that results in benching facilities into the bank would increase the cross-sectional area of the river.

## D. Alternative Plans - First Array

The following preliminary alternative plans consist of reasonable configurations of the various restoration components discussed in the previous section. The alternatives take advantage of the opportunities to solve the identified problems and address the planning constraints.

### Alternative 1

This alternative is characterized by:

- low infrastructure costs,
- no land constraints,
- existing water sources rerouted to help create habitat,
- no development of the dewatering groundwater well water source, and
- no constructed wetlands.

As shown by **Figure 5.1**, this alternative mainly consists of the creation of open water/marsh areas and the rerouting of some of water within the river. The alternative consists of 5 open water/marsh areas in the north side of the channel west of El-Mirage Road, and three open water/marsh areas in the south side of the channel east of 115th Avenue. Open water/marsh areas are either located adjacent to existing, open water within the channel and/or in locations where salt cedar would be eradicated. Water within the marsh areas would come from conveyance of surface water within the main river channel and from proximity to groundwater.

- A flood control levee protecting Holly Acres as well as other surrounding residential/commercial/industrial buildings and farmland is formulated as part of every alternative. The economic justification of Federal cost-sharing in such a flood control structure will be analyzed along with the other features of the alternatives.
- Disposal areas would occur within the study area to offset the cost of disposal and hauling long distances.
- All restoration features would be designed and maintained with vector control incorporated.

### Alternative 2

This alternative:

- avoids GRIC land south of the channel centerline, upstream of 115<sup>th</sup> Avenue,
- includes GRIC disputed land north of the channel centerline,

- creates a regulating wetland for treatment plant discharge,
- maximizes the creation of linear, constructed wetlands along north overbank,
- does not include riparian corridors flowing downslope from wetlands, and
- converts salt cedar into open water/marsh areas where possible.

As shown in **Figure 5.2**, this alternative mainly consists of constructed wetlands on the channel overbank, and both open water/marsh areas and riparian corridors within the channel. The alternative includes a pump station to convey wastewater treatment plant discharge to a regulating wetland between 91st and 99th Avenue, from where water would be conveyed into a linear overbank wetland between 99th and 115th Avenue. Discharge from the wetland would flow into a pipeline conveying water into six open water/marsh areas along the northern banks of the river between El Mirage Road and the Agua Fria. Alternative 2 also contains 5 open water/marsh areas located adjacent to existing, open water within the channel, east of 115<sup>th</sup>. Water within these marsh areas would come from conveyance of surface water within the main river channel and from proximity to groundwater. Finally, water within the main channel would supply two cottonwood-willow corridors between 115th and Dysart Avenue through minor regrading of the channel.

- A flood control levee protecting Holly Acres as well as other surrounding residential/commercial/industrial buildings and farmland is formulated as part of every alternative. The economic justification of Federal cost-sharing in such a flood control structure will be analyzed along with the other features of the alternatives.
- Disposal areas would occur within the study area to offset the cost of disposal and hauling long distances.
- All restoration features would be designed and maintained with vector control incorporated.

### Alternative 3

This alternative is characterized by:

- no land constraints,
- a regulating wetland for treatment plant discharge,
- minimum overbank wetland area and minimum pipeline costs,
- riparian corridors from overbank wetland discharge
- southside distribution of dewatering well water into open water/marsh areas with some riparian corridors, and
- eradication of portions of salt cedar and conversion to open water/marsh in select locations.

As shown in **Figure 5.3**, this alternative mainly consists of constructed wetlands, open water/marsh areas, the rerouting of some of the water from the dewatering well near the wastewater treatment

plant into the main channel for primarily open water/marsh areas, and the creation of some cottonwood-willow riparian corridors. The alternative includes a pump station to convey wastewater treatment plant discharge to a regulating wetland between 91st and 99th Avenue, from where water would be conveyed into two separate overbank wetlands that have discharge outlets into the main channel. The alternative also consists of 5 open water/marsh areas in the north side of the channel between El Mirage Road and the Agua Fria. Open water/marsh areas are located adjacent to existing, open water within the channel. Water within the marsh areas would come from conveyance of surface water within the main river channel and from proximity to groundwater. Finally, dewatering well water would be conveyed into the main channel and would flow southward through restored cottonwood-willow, initially, and then to six open water/marsh areas.

- A flood control levee protecting Holly Acres as well as other surrounding residential/commercial/industrial buildings and farmland is formulated as part of every alternative. The economic justification of Federal cost-sharing in such a flood control structure will be analyzed along with the other features of the alternatives.
- Disposal areas would occur within the study area to offset the cost of disposal and hauling long distances.
- All restoration features would be designed and maintained with vector control incorporated.

#### Alternative 4

This alternative is characterized by:

- no land constraints,
- a regulating wetland for treatment plant discharge,
- the creation of linear, constructed wetlands along north overbank,
- riparian corridors from overbank wetland discharge
- southside distribution of dewatering well water into cottonwood-willow riparian corridors, and
- eradication of portions of salt cedar and conversion to open water/marsh downstream on the north side of the channel and cottonwood-willow habitat upstream on the south side of the channel.

As shown in **Figure 5.4**, this alternative mainly consists of constructed wetlands, the rerouting of water from the dewatering well near the wastewater treatment plant southward into the main channel, and the creation of cottonwood-willow riparian corridors and open water/marsh areas. The alternative is similar to Alternative 2 downstream of 115<sup>th</sup> Avenue. The alternative includes a pump station to convey wastewater treatment plant discharge to a regulating wetland between 91st and 99th Avenue, from where water would be conveyed into one linear overbank wetland between 99th and 115th Avenues. Discharge from the wetland would flow into a pipeline conveying water into

six open water/marsh areas along the northern banks of the river between El Mirage Road and the Agua Fria. Water discharged from the wetland would also combine with water from the channel to supply three cottonwood-willow corridors between 107th and Dysart Avenue through minor regrading of the channel. Alternative 4 also contains 5 open water/marsh areas located adjacent to existing, open water within the channel, east of 115<sup>th</sup> Avenue. Water within these marsh areas would come from conveyance of surface water within the main river channel and from proximity to groundwater. Finally, dewatering well water would be conveyed into the main channel south of 83<sup>rd</sup> Avenue. This water would help create cottonwood-willow riparian corridors within eradicated salt cedar habitat along the southern bank of the river.

- A flood control levee protecting Holly Acres as well as other surrounding residential/commercial/industrial buildings and farmland is formulated as part of every alternative. The economic justification of Federal cost-sharing in such a flood control structure will be analyzed along with the other features of the alternatives.
- Disposal areas would occur within the study area to offset the cost of disposal and hauling long distances.
- All restoration features would be designed and maintained with vector control incorporated.

#### Alternative 5

This alternative:

- avoids GRIC land south of the channel centerline, upstream of 115<sup>th</sup> Avenue,
- avoids GRIC/City of Phoenix disputed land north of the channel centerline, upstream of 115<sup>th</sup> Avenue,
- creates a regulating wetland for treatment plant discharge,
- creates minimum overbank wetland areas including pipeline discharge to downstream habitat,
- converts salt cedar into open water/marsh areas where possible,
- does not include riparian corridors flowing downslope from wetlands, and
- does not include a southside distribution system using dewatering well water.

As shown in **Figure 5.5**, this alternative only consists of overbank wetlands upstream of 115<sup>th</sup> Avenue. The alternative is similar to Alternative 2 downstream of 115<sup>th</sup> Avenue, where it includes open water/marsh areas and the creation of some cottonwood-willow riparian corridors. The alternative includes a pump station to convey wastewater treatment plant discharge to a regulating wetland between 91st and 99th Avenue, from where water would be conveyed into two separate overbank wetlands. Discharge from the overbank wetlands could be rerouted and redistributed to more effectively create open water/marsh areas and cottonwood-willow corridors. Excavation and

regrading would also be performed to provide appropriate base conditions and cross-sections for the restoration alternatives.

- A flood control levee protecting Holly Acres as well as other surrounding residential/commercial/industrial buildings and farmland is formulated as part of every alternative. The economic justification of Federal cost-sharing in such a flood control structure will be analyzed along with the other features of the alternatives.
- Disposal areas would occur within the study area to offset the cost of disposal and hauling long distances.
- All restoration features would be designed and maintained with vector control incorporated.

#### Alternative 6 - No Action Plan

The No Action Plan is analyzed to provide a basis from which to assess the advantages and disadvantages of the other study alternatives. Under this alternative, the Corps of Engineers would take no action to provide ecosystem restoration within the study area, nor to develop plans with potential incidental benefits associated with flood damage reduction, recreation, and water quality and supply.