I. Project Title: *Interagency Standardized Monitoring Program* (ISMP) assessment of Colorado pikeminnow reproduction and larval abundance in the lower Yampa River, Colorado, and the lower Green and Colorado rivers, Utah.

II. Principal Investigator(s):

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III. Project Summary: Larval Colorado pikeminnow *Ptychocheilus lucius* (formerly, Colorado squawfish) were sampled with drift nets at three sites in 1999. Sites included the lower Yampa River, Echo Park, Colorado, the lower Green River, near Green River, Utah, and the Colorado River near Moab, Utah. Sampling was designed to provide a measure of annual reproductive success of Colorado pikeminnow. Diel variation in abundance of Colorado pikeminnow larvae in the drift was also assessed. This data will be used to assess effects of flow and temperature regimes on reproduction by Colorado pikeminnow and to correlate abundance of larvae to abundance of juveniles in autumn.

IV. Study Schedule: 1998-2003. It is anticipated that this study will continue under the auspices of the *Interagency Standardized Monitoring Program (ISMP)*. Only the Yampa River site is slated for funding in FY-2000.

V. Relationship to RIPRAP:

Reproduction and recruitment of early life stages are critical components of the life history of endangered Colorado pikeminnow. Understanding trends in reproductive success may help define status of Colorado pikeminnow in specific river reaches in the Colorado River Basin and should play a role in determining when recovery has been achieved.

Annual assessment of Colorado pikeminnow reproduction and larval abundance (this study) is necessary to assess factors affecting annual recruitment, and is directly linked with many Recovery Program activities such as discharge management and control of

non-native fishes.

Specific RIPRAP Relationships **Green River Mainstem**—*I.A.1.a.* (Provide and protect instream flows--habitat management; Green River above Duchesne River; initially identify year-round flows needed for recovery while providing experimental flows; summer/fall), *I.A.1.c.* (Provide and protect instream flows--habitat management; Green River above Duchesne River; initially identify year-round flows needed for recovery while providing experimental flows; summer/fall; review summer/fall flow recommendations), *I.A.3.a.* (Provide and protect instream flows--habitat management; Green River above Duchesne River; deliver identified flows; operate Flaming Gorge pursuant to the Biological Opinion to provide summer and fall flows), *I.A.3.c.* (Provide and protect instream flows--habitat management; Green River above Duchesne River; deliver identified flows; operate Flaming Gorge Dam to provide winter and spring flows and revised summer/fall flows, if necessary), *I.B.1.* (Provide and protect instream flows--habitat management; Green River below the Duchesne River; initially identify year-round flows needed for recovery while providing experimental flows), *I.B.2.a* (Provide and protect instream flows--habitat management; Green River below the Duchesne River; initially identify year-round flows needed for recovery while providing experimental flows; review scientific basis), *II.A.1.a.4.* (Restore habitat--habitat development and maintenance; Old Charlie Wash; monitor and evaluate success), *II.C.1.* (Restore habitat--habitat development and maintenance; enhance water temperatures to benefit endangered fishes; identify options to release warmer water from Flaming Gorge Reservoir to restore native fish habitat in the Green River), *V.A.1.* (Monitor populations and habitat and conduct research to support recovery actions--research, monitoring, and data management; verify additional Colorado pikeminnow spawning areas in lower Green).
Green River, Yampa/Little Snake Rivers—*I.B.1.* (Provide and protect instream flows--habitat management; Yampa River below Little Snake River; initially identify year-round flows needed for recovery), *I.B.2.a.* (Provide and protect instream flows--habitat management; Yampa River below Little Snake River; state acceptance of initial flow recommendations; review scientific basis).
Colorado River—*I.B., I.C., I.D.*

VI. Accomplishment of FY 99 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Tasks identified in FY-99 scope-of-work were:

1) Set-up sample sites and collect samples. Unlike in 1998 and before, in 1999 the Larval Fish Laboratory collected samples at all three sampling locations, Echo Park, Yampa River, CO, and lower Green River and lower Colorado River, Utah.

2.) Analyze samples and prepare annual summary report; Larval Fish Laboratory will was also responsible for this task.

FY-99 Accomplishments

Task 1.--Objectives of this task were met. Sample sites were chosen and samples were collected at each of the three sites identified above and in the scope-of-work.

Task 2.---Objectives of this task were met.

Lower Yampa River. Samples were collected in the Yampa River about 0.8 km upstream from the Green River, the same site that samples were collected from 1990 to 1996 (Bestgen et al. 1998) and in 1998 . A total of 207 samples were collected between 30 June and 19 August 1999. These included samples collected at dawn, noon, dusk, and midnight on eight days to detect diel variation in drift abundance. All samples have been identified and verified. A total of 685 Colorado pikeminnow larvae were collected between 10 July and 18 August. Most Colorado pikeminnow larvae were collected from 16 July to 8 August and large drift pulses were detected on 16 July, 20 July, and 26-28 July. Reproductive success of Colorado pikeminnow was considered high in 1999 and nearly identical to 1998 when 716 pikeminnow larvae were collected.

Lower Green River. From 1992 to 1996, the lower Green River sampling site was located above Swayses Rapid on the Green River near RK 217.4. In 1998 the site was moved several miles downstream to below the Tusher Diversion Dam at RK 206.9, but in 1999 the sampling site was re-located to the location upstream of Swayses.

Drift-net sampling began on 28 June and ended on 20 August. A total of 169 Green River drift net samples were collected. A total of 39 Colorado pikeminnow larvae were captured at this sampling site between 10 July and 5 August; most were captured from 10-12 July and from 24 July-2 August. Verification of identity of specimens needs to be completed. Few larvae of any taxon were collected in 1999 samples at this site. Discharge and debris loads in the Green River were high until late in the sampling period, because of sustained high flows from Flaming Gorge Dam and rainstorms. As a result, daily sampling periods were often reduced from the standard two hours.

Colorado River: During 1992 to 1996, the Moab field office of the Utah Division of Wildlife Resources administered two sampling sites on the Colorado River, one near Westwater, and one near Moab at RK 105.3. Only sampling at the Moab site was funded for 1998 and 1999. Sampling began on 3 July and ended on 27 August. In addition to the standard dawn sample collection, diel sampling was conducted on five occasions when three nets were also set in the main channel at noon, dusk, and midnight. A total of 213 drift net samples were collected. A total of 34 pikeminnow

larvae were collected from 11 July to 13 August; no peaks in abundance were detected and few larvae of any taxon were collected. Identity of

specimens needs to be verified yet. Similar to the lower Green River, flows and debris loads in the Colorado River were high throughout the summer.

VII. Recommendations: Continue to sample early life stages of Colorado pikeminnow annually at these and perhaps other sites. This information is critical to establishment of long-term data that can guide informed management decisions regarding population viability and recovery.

For RIPRAP: Conduct ongoing monitoring of reproductive success of Colorado pikeminnow in the Green and Colorado River systems.

VIII. Project Status: On track and ongoing. Results should be included in the annual ISMP report summary.

IX. FY-99 Budget

A. Funds Provided: $76,800 (LFL share this year was 100%)
B. Funds Expended:$72,400
C. Difference: $4,400
D. Percent FY-99 work completed is 94%. Remaining funds will be needed for completion of sample and data analysis, cataloging, and database compilation by the LFL.
E. Recovery Program funds spent for publication charges: None.

X. Status of Data Submission (Where applicable): Data will be submitted when sample and data analysis is completed.

XI. Signed: Kevin R. Bestgen 30 November 1999
Principal Investigator Date

APPENDIX: Final report (Bestgen et al. 1998) that summarized results of drift net samples collected from three Green River basin sites from 1990 to 1996 was submitted and approved in spring 1998.

Bestgen, K. R., R. T. Muth, and M. A. Trammell. 1998. Downstream transport of Colorado squawfish larvae in the Green River drainage: temporal and spatial variation in abundance and relationships with juvenile recruitment. Colorado River Recovery Implementation Program Project Number 32, Larval Fish Laboratory Contribution 97. 63 pp.