COLORADO RIVER RECOVERY PROGRAM   RECOVERY PROGRAM
FY 2017 ANNUAL PROJECT REPORT   PROJECT NUMBER: C-28a

I.   Project Title: Stationary PIT detection system in the Green River Canal, Green River, UT

II.   USU Cooperative Agreement Number: R11AC40005
        Lead Agency: U.S. Bureau of Reclamation

III.   Principal Investigators:

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        Date: November 13, 2017

IV.   Abstract:

        The goal of this project is to evaluate entrainment of native fish (PIT-tagged non-listed
        and endangered individuals) in the Green River Canal (near Green River, Utah) using a
        passive interrogation array (PIA). The PIA includes two sub-arrays (one each below the
        first flume and the first siphon downstream of the canal head gates) consisting of two
        antennas each.   In 2017, 273 individual fish were detected in the Green River Canal
        during the irrigation season (March – November), which represents the second lowest
        number of individual fish entrained annually since antennas were installed in 2013. Of
        these, 219 were identified through Species Tagging, Research and Monitoring System
        (STReaMS; streamsystem.org) and were comprised of 165 razorback sucker, 37 bonytail,
        13 Colorado pikeminnow, and 4 flannelmouth sucker. Detection frequency tended to be
        highest following cessation of spring peak flows in early July.

V.   Study schedule: FY13-FY22 (approx.)

VI.   Relationship to RIPRAP:

        Green River Action Plan
        II.   Restore habitat
        II.B.2   Screen Tusher Wash diversion to prevent endangered fish entrainment, if warranted
        II.B.2.b   Design.
        II.B.2.c   Construct.

VII.   Accomplishment during FY 2017: Tasks and Deliverables, Discussion of Initial Findings
        and Shortcomings:

        Task 1: March-November, 2017 (irrigation season): Activate and operate system;
                download antennae data, perform diagnostics, repair system if necessary; system
                shut-down.

                The flume and siphon PIA sub-arrays were activated prior to the onset of the 2017
                irrigation season (late March). A disruption in communications with the flume
                antenna occurred in June 2017 when it was discovered that the cell antenna had
                been stolen. A new antenna was installed in August, and the data collected during
                the communication blackout was manually downloaded in September. Our fish
                detection engineer worked closely with the Colorado Natural History Program to
                upload data, monitor data files and answer data- or site-related questions
                pertaining to the Green River Canal PIA.

        Task 2: December: Annual report.

                A total of 273 individual tagged fish were detected by at least one PIA sub-array
                in the Green River Canal in 2017 (Figure 1a-f), the second lowest number since
                antennas went into operation in 2013. Of these, 54 were not identifiable using
                STReaMS and will need to be revisited after recent stocking and field collection
                data is added to the system. Razorback sucker comprised 75% (165 fish) of all
                identifiable fish detected in 2017, followed in order of frequency of detection by
                bonytail (17%; 37 fish), Colorado pikeminnow (6%; 13 fish), and flannelmouth
                sucker (2%; four fish).

                The highest rates of entrainment occurred in the base flow months of August (65
                unique fish entrained), September (42 fish) and October (61 fish), which
                collectively accounted for 62% of all fish entrained in the seven month
                monitoring period. Entrainment rates were lowest in June (17 fish entrained),
                perhaps in relation to peak flows (ca. 22,000 cfs), but similar flows were observed
                in May when 28 fish were entrained.   Razorback sucker entrainment occurred
                throughout the irrigation season but peaked in October (43 fish entrained).
                Bonytail were detected at low levels throughout the irrigation season but peaked
                slightly on isolated occasions in April and September. Colorado pikeminnow
                entrainment did not occur until mid-July.

VIII. Recommendations:

- Continue to analyze data to determine entrainment characteristics (species, timing).
- Continue to pursue a remedy for entrainment under Project C28. Currently, construction of a fish excluding weir near the top of the Green River Canal is slated to begin during the winter of 2018 – 2019. Weir design will include PIA installations at several locations including above and below the weir and in the return channel to the Green River. Thus, we will be able to assess efficacy of fish exclusion prior to and following construction of the weir.

IX. Project Status: Ongoing

X. FY 2016 Budget Status

A. Funds Provided: $ 6,025
B. Funds Expended as of September 30, 2016: $ 6,025
C. Difference: $0
D. Percent of the FY 2016 work completed, and projected costs to complete: 100%.
E. Recovery Program funds spent for publication charges: $0

XI. Status of Data Submission (where applicable): Entrainment data from March through November 8, 2017 has been submitted to STReaMS.

Signed: /s/ Dave Speas   Nov 13 2017
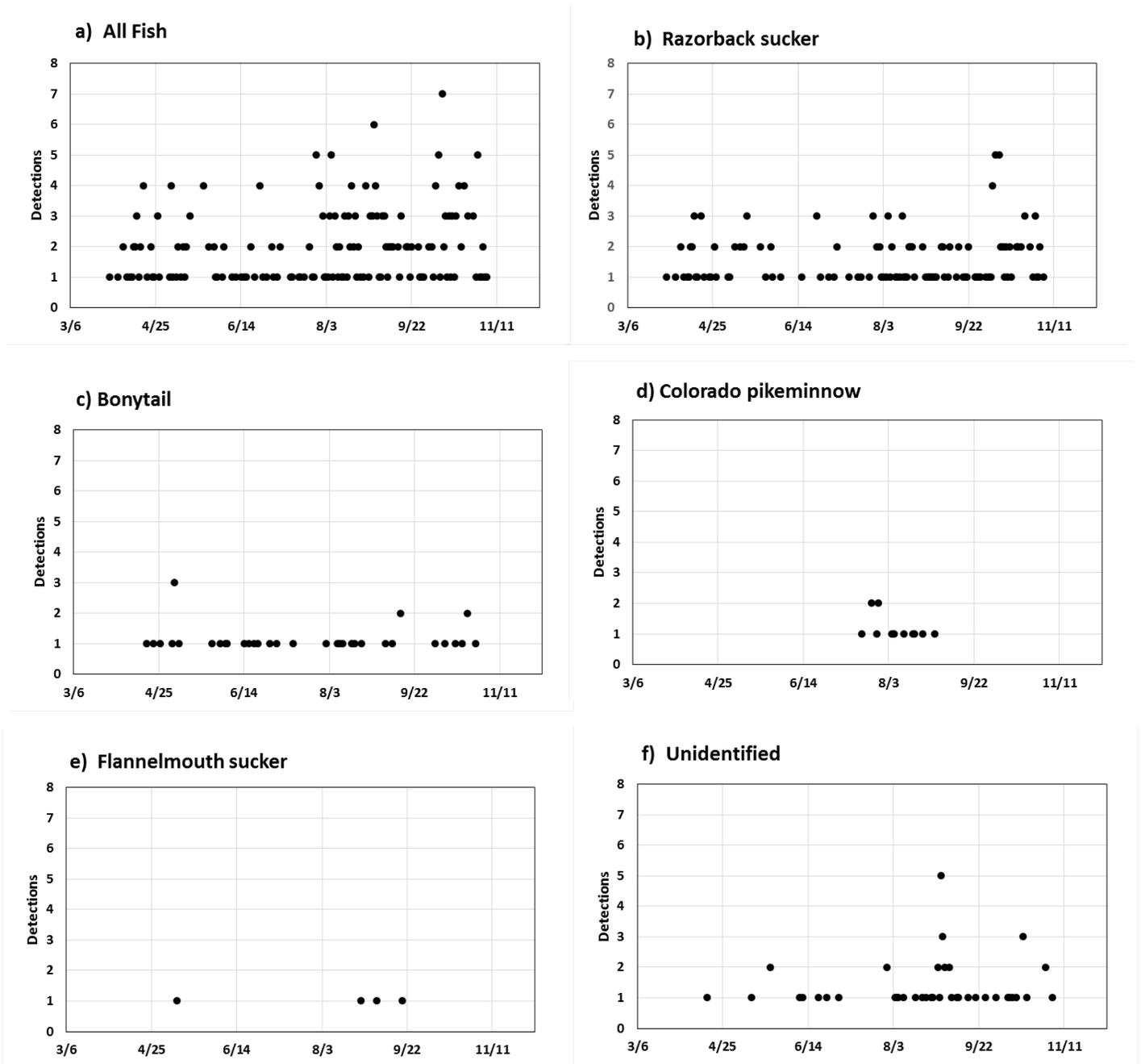Principal Investigator

Figure 1a - f. Detections of individual fish (first detection only) in the Green River Canal, irrigation season 2017. Data are preliminary, please do not cite.