Project Title

Study and Monitoring Plan to evaluate the potential effects of experimental endangered fish flow releases from Flaming Gorge Dam on downstream resources

Bureau of Reclamation Agreement Number:
R19PG00112 - NPS
R20PG00049 – USGS
*This is one monitoring plan, but it has agreements and obligations to two different entities. I have put both in here where appropriate.

Project/Grant Period:
NPS
Start Date: 06/01/2019
End Date: 09/30/2023
Reporting period end date: 09/30/2020

USGS
Start date: 04/29/2020
End date: 09/30/2024
Reporting period end date: 09/30/2020

Is this the final report? Yes _____ No _X_

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Abstract:
The Recovery Program is proposing new experimental flow releases from Flaming Gorge Dam for (1) revised 'elevated' summer base flows to promote survival and recruitment of age-0 endangered Colorado pikeminnow, and (2) early summer flow spikes to disadvantage spawning invasive smallmouth bass. The flow experiments coupled with possible further reductions in magnitude or duration of peak flows could exacerbate the long-term trend of flow stabilization on the Green River which could lead to reductions in quantity and quality of Colorado pikeminnow nursery habitat. NPS and USGS are monitoring the channel in the important nursery habitat area in the Jensen to Ouray reach. FY2020 was dedicated to selecting monitoring sites and collecting the first year of data at each of the sentinel sites (topographic surveys, vegetation sampling, transducer installation, collection of high resolution UAS and satellite imagery).

Study Schedule:
2020-2023/2024

Relationship to RIPRAP:
I.A.4.b.(1). Periodically monitor future channel narrowing and compare to historic rates using aerial or satellite imagery in the Green River (between Yampa and White rivers) [and other rivers]
I. Provide and Protect Instream Flows (Habitat Management)
I.D. Develop Study Plans to Evaluate Flow Recommendations
I.D.2.c. Develop Study Plan to evaluate revised base flows and flow spike.
I.D.2.f. Evaluate effect of base flow variability on backwater maintenance and quality.

Accomplishment of FY 2020 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

NPS

Task 1. Convene expert group to review draft monitoring plan and develop adaptive management framework (no funding requested)

- Complete

Task 2. Finalize monitoring plan (no funding requested)

- Completed in August. Trammel, M., D. Perkins, C. Holmquist-Johnson, and J. Rebenack. 2020. Study and Monitoring Plan to evaluate the potential effects of experimental endangered fish flow releases from Flaming Gorge Dam on downstream resources. 39pp.

Task 3. Pre-flow spike treatment monitoring trip.

- N/A because no flow spike conducted

Task 4. Group development and finalization of adaptive management plan

- Complete. This was intended to be a stand-alone adaptive management framework; however, after further discussion with the Program, we decided to incorporate our annual findings into the existing adaptive management cycle. The monitoring plan now states "The results of this study will be evaluated annually within the Program's existing adaptive management cycle with other partners and consider other study results and water management interests."

Task 5. Post flow spike and baseline base flows monitoring trip

- The initial sampling trip took place August 1-8, 2020 with flows ranging from 1,760 to 2,310 cfs. We established 6 sites between Jensen and Ouray, UT. Three were established on BLM land between river miles 164 and 158 and three more at Ouray National Wildlife Refuge at river miles 144 and 143. Each site had between 7 and 11 transects that extended to the inactive floodplain on each side of the river. Along these transects over 1,900 vegetation plots were placed. Figures 1 and 2 show transect layout and an overview of the Collier site. We are confident that these plots are located across a wide range of hydrological flows and have sufficient sample size to detect changes in cover and frequency for key species.

  Vegetation and survey data are in the process of going through QA/QC and entry into our database. This winter initial estimates of percent cover and percent frequency can be determined. This will provide a baseline to evaluate flows moving forward.

  We established a total of 10 transducers in the water and 2 in the air that includes having at least one water transducer above and below each site. This will provide information that will be able to tell us how many days each plot was under water and when. This will provide essential information to tie changes in percent cover and changes in elevation to hydrology.

  Due to efficiencies from an earlier trip that took place right before this one, we were able to add 2 more days than budgeted to this trip. This was helpful as establishment can take longer than repeat visits. However, we think that we will have to reduce a few transects at each site in future years in order to make the trip fit within one pay period. We plan to finalize the permanent transects over the winter.

Task 6. Annual report and assessment of impacts

- Complete with this report.

Task 7. Three-year summary report

- Not applicable.

Task 8. Collect and analyze drone imagery (USGS)

- See next section covering the USGS agreement.

USGS

Task 1. USGS FORT shall provide surveying assistance for field visits on the Green River from Jensen to Ouray, UT.

USGS assisted NPS in field surveying operations as requested.

- Established Survey control for each of the Jensen and Ouray study reaches, assisted with topographic surveying and transducer installation, and provided assistance in downloading and processing of survey data.

Task 2. USGS FORT shall collect high resolution (<10cm/pix) natural color aerial mapping using small Unmanned Aircraft Systems (sUAS) over each of the 3-5 sentinel field sites established by NPS along the Green River between Jensen and Ouray, UT.

The first year of drone imagery collection was completed in August 2020 and included all of the NPS sentinel sites located between Jensen and Ouray, UT.

- Jensen Horseshoe Bend study reach: collected natural color imagery over approximately seven river miles along Horseshoe Bend which includes all the NPS sentinel sites in this reach.
- Ouray National Wildlife Refuge study reach: collected natural color imagery over approximately seven river miles within the Ouray National Wildlife Refuge which includes all the NPS sentinel sites in this reach.

Task 3. USGS FORT shall analyze high resolution imagery to distinguish between bare sand, water, and vegetation, and depending on the resolution of the imagery possibly look at changes in size, area, and distribution of larval pikeminnow habitat.

- Initial processing of raw imagery was completed to confirm appropriate flight overlap in the field to generate the high resolution imagery. Final processing and analysis of the high resolution imagery will be completed in FY2021 and used in conjunction with future years data collection efforts as part of the larger monitoring plan.

Task 4. USGS FORT shall submit annual Data Acquisition Requests (DARS) through the CRSSP Imagery-Derived Requirements (CIDR) Tool for acquiring high resolution aerial imagery using 'worldview' satellites which offer <50cm/pix resolution. When successful, the imagery will be used for analyzing reach wide changes related to vegetation encroachment.

DARS were submitted for the Jensen to Ouray study reach and was successfully acquired during the first part of August, the same time frame the field work was being conducted. Analysis of the initial worldview imagery will be conducted in FY2021 and used in conjunction with future years requests as part of the larger monitoring plan.

Additional noteworthy observations:
Appreciate logistical and informational support from UDWR, FWS, and ONWR staff.

Recommendations:
With only one year of baseline information we have no recommendations for flows for 2021. Continue to implement monitoring plan and associated data collection.

Project Status:
All field activities were successfully completed except for the pre-spike flow trip which did not occur because there was no spike flow. The funds designated for this can be used in FY21 should a spike flow occur. All data is being entered and going through QA/QC processes.

FY 2020 Budget Status

NPS
Funds Provided: $101,695.03

Funds Expended: $64,498.57

Difference: The IAA in 2019 covered 2 years of baseline post-spike flow monitoring and one year of pre-spike flow monitoring. However, the money came too late in FY2019 to conduct a year of baseline monitoring, instead a reconnaissance trip took place. This reconnaissance trip was not budgeted. In addition, the spike flow monitoring did not occur in FY20 so no pre-spike flow trip occurred. NPS still has funds to do a pre-spike flow trip should one occur and most of the funds needed for a second year of post spike-flows baseline trip in 2021. We are about $2,069 (cost of 2019 reconnaissance trip) short of what we planned to spend in 2021.

Percent of the FY 2020 work completed, and projected costs to complete: 85%. Only part that was not completed was the pre-spike flow trip which did not occur because there was no planned spike flow.

Recovery Program funds spent for publication charges: $0

USGS
Funds Provided: $70,385.11

Funds Expended: $30,285.60

Difference: Field surveys and Drone imagery were collected in the 4th quarter of FY20 and therefore costs associated with processing and analysis of the data will occur in FY21.

Percent of the FY 2020 work completed, and projected costs to complete: 43% of first year budget spent and remainder will be spent on processing and analysis of imagery in FY21.

Recovery Program funds spent for publication charges: $0

Status of Data Submission
(Where applicable): none needed

Signed:
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11/10/2020

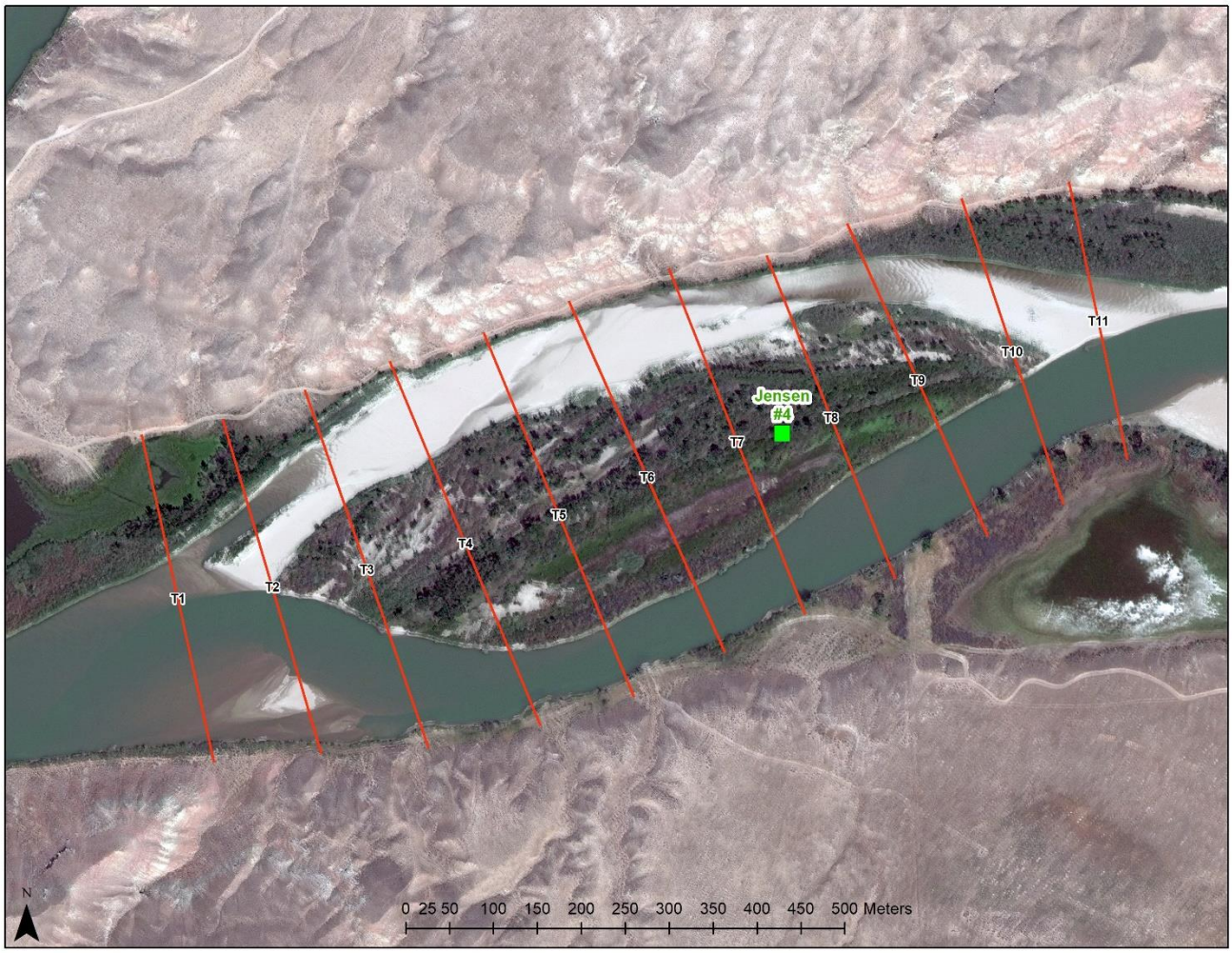

Figure 1. Example layout of transects at the Collier (aka Jensen #4) site.

Figure 2. Example overview photo of the Collier (aka Jensen #4 site) site.