

Updated Study Report (USR) Meeting

R.L. Harris Dam Relicensing FERC No. 2628

April 27, 2021



Meeting Etiquette



- Be patient with technology issues
- Follow the facilitator's instructions
- Phones will be muted during presentations
- Turn off cameras to avoid bandwidth issues
- Meeting will be recorded to assist with preparing the meeting summary
- Follow along with PDF of presentations
- Facilitator will ask for participant questions at designated times during presentation; chat feature also available for questions
- Clearly state name and organization when asking questions

Safety and Roll Call



Boat Safety by the Numbers



70% of boating fatalities are from drownings – **85%** of those who drown were not wearing life vests.

Only 13% of boating fatalities occurred on vessels where the operator had received boating safety instruction

There were **225** weather related accidents in 2013

50% of all boating accidents are alcohol related

497 accidents were caused by excessive speed in 2013

365 boating accidents were caused by navigational rules violations in 2013

Operator inexperience **ranks #3** in factors contributing to accidents

Accidents happen!

Be prepared while on the water:

- PFDs
- Inspected fire extinguisher
- First aid kit
- Tool kit with flashlight
- Float plan
- Check the weather

Harris Relicensing Milestones



April 12, 2021 FERC Filing

❖ Updated Study Report

❖ Draft Reports

- Downstream Release Alternatives Phase 2
- Operating Curve Change Feasibility Analysis Phase 2
- Battery Energy Storage System (BESS)

❖ Final Reports

- Aquatic Resources
- Erosion and Sedimentation
- Downstream Aquatic Habitat
- Water Quality
- A Botanical Inventory of a 35-Acre Parcel at Flat Rock Park, Blake's Ferry, Alabama
- Stakeholder comments on **Draft Reports** - **May 11, 2021**
- USR Meeting Summary - **May 12, 2021**
- USR Meeting Summary comments - **June 11, 2021**
- Preliminary Licensing Proposal (PLP) - **by July 3, 2021**
 - 90-day comment period
- Final License Application (FLA) and 3 Final Reports – **by November 30, 2021**

USR Meeting Purpose



Pursuant to 18 C.F.R. § 5.15(f)

- ❖ Overall study progress, including data collected
- ❖ Any variance from the study plan or schedule
- ❖ Remaining activities or study modifications, if any

Summary of HAT Meetings – Post ISR



| Meeting | Description | Date |
|----------------------|---|------------|
| Initial Study Report | Alabama Power presented information on the progress of each study including applicable study results, variances requested, and any additional studies or requested study modifications. | 04/28/2020 |
| HAT 3 | Auburn University presented research to date and informed the HAT of remaining work on the Aquatic Resources Study. | 06/02/2020 |
| HAT 1 and 5 | <p>Alabama Power presented the methodology for:</p> <ul style="list-style-type: none"> analyzing the number of usable recreation structures on Lake Harris at the current winter operating curve and the alternatives analyzing how structures located downstream of Harris Dam might be affected by a change in the winter operating curve during a 100-year flood event | 06/04/2020 |
| HAT 4 | Alabama Power reviewed the goals and objectives of the Project Lands Evaluation Study and discussed the Shoreline Management Plan and the Wildlife Management Plan outline. | 10/19/2020 |
| HAT 5 | Alabama Power discussed the Phase 2 analyses for the recreation component of the Downstream Release Alternatives study including the definition for boatable flows, as well as potential recreation PME measures. | 10/19/2020 |
| HAT 3 | Alabama Power presented modeling results on the Downstream Aquatic Habitat Study and discussed Auburn University's progress to date on the Aquatic Resources Study. | 11/05/2020 |
| Selected HAT 6 | Alabama Power and OAR presented a virtual cultural resources overview of Skyline. Selected HAT 6 participants attended due to the privileged nature of material. | 03/04/2021 |
| HAT 3 | Alabama Power and Auburn University presented results of the Downstream Fish Population Study for the Aquatic Resources Study. | 03/31/2021 |
| HAT 1 | Alabama Power presented results of the Phase 2 Operating Curve Change Feasibility Analysis Study and the Phase 2 Downstream Release Alternatives Study. | 04/01/2021 |

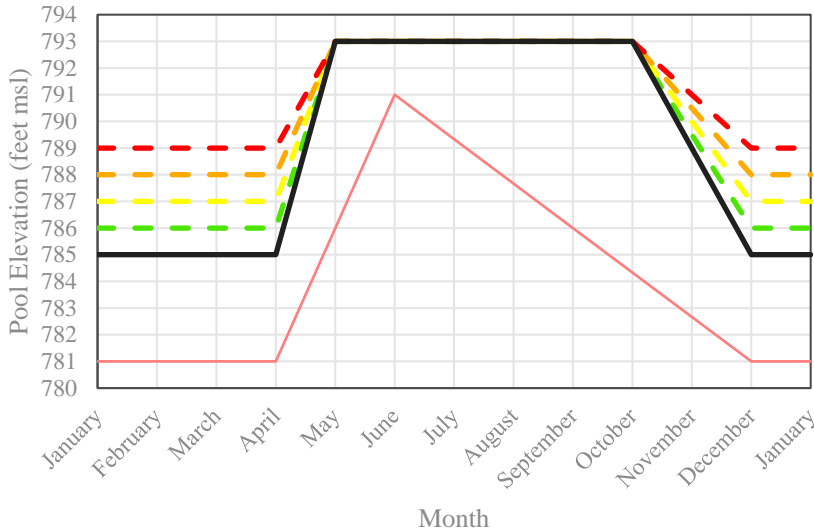
Agenda



Harris Relicensing Studies

- Operating Curve Change Feasibility Analysis
- Downstream Release Alternatives
- Battery Energy Storage System (BESS)
- Water Quality
- Erosion and Sedimentation
- Aquatic Resources
- Downstream Aquatic Habitat
- Threatened and Endangered (T&E) Species
- Project Land Evaluation
- Recreation Evaluation
- Cultural Resources

Harris Operating Curve and Operating Alternatives



— Drought Contingency Curve — Operating Curve

- Evaluated in increments of 1 foot from 786 feet msl to 789 feet msl

Phase 1

- Modeling to evaluate potential impacts of winter operating curve change on:
 - generation
 - flood control
 - navigation
 - drought operations
 - Green Plan flows
 - downstream release alternatives

Phase 2

- quantitative and qualitative evaluations of potential resource impacts

Operating Curve Change Feasibility Analysis Study



Study Progress:

- ❖ Used existing information, relicensing studies, and Phase 1 analysis
- ❖ Phase 2 Analysis analyzed operating curve effects on Project resource areas

- ❖ HAT 1 Meetings - June 4, 2020, and April 1, 2021

Operating Curve Change Feasibility Analysis Study



| Resource | +1 Foot | +2 Feet | +3 Feet | + 4 Feet |
|---|---|---------------------|----------------------|----------------------|
| Hydro Generation | \$(19,400) | \$(40,600) | \$(52,100) | \$(124,900) |
| Harris Reservoir Elevations | Over the period of record, increasing the winter pool elevation did not affect the amount of time the reservoir was at or above the full summer pool elevation of 793 feet msl. | | | |
| Downstream Effects of 100-Year Design Flood | 298 acres (4.9%) | 485 acres (7.9%) | 686 acres (11.2%) | 889 acres (14.6%) |
| Spillway Operation | 12 (0.1%) | 13 (0.1%) | 20 (0.1%) | 37 (0.2%) |
| Turbine Capacity Operation | 15 (0.0%) | 29 (0.1%) | 54 (0.1%) | 103 (0.3%) |
| Navigation | No Effect | | | |
| Drought Operations | No Effect | | | |
| Green Plan Flows | No Effect | | | |
| Downstream Release Alternatives | No Effect | | | |
| Structures Downstream of Harris Dam | 0 | 4 | 4 | 9 |
| Water Quality – Harris Reservoir | No Effect | | | |
| Water Quality – Harris Dam Discharge | No Effect | | | |
| Water Use – Harris Reservoir | Minor Beneficial Effect | | | |
| Water Use – Tallapoosa River | No Effect | | | |

Operating Curve Change Feasibility Analysis Study



| Resource | +1 Foot | +2 Feet | +3 Feet | + 4 Feet |
|---|--------------------------|---------|---------|----------|
| Erosion – Harris Reservoir | No Effect | | | |
| Sedimentation – Harris Reservoir | Adverse Effect | | | |
| Erosion – Tallapoosa River | Minor Adverse Effect | | | |
| Sedimentation – Tallapoosa River | No Effect | | | |
| Aquatic Resources – Harris Reservoir | Beneficial Effect | | | |
| Aquatic Resources – Tallapoosa River | No Effect | | | |
| Wildlife – Harris Reservoir | Beneficial Effect | | | |
| Wildlife – Tallapoosa River | No Effect | | | |
| T&E Species – Harris Reservoir and Tallapoosa River | No Effect | | | |
| Terrestrial Wetlands – Harris Reservoir | Beneficial Effect | | | |
| Terrestrial Wetlands – Tallapoosa River | No Effect | | | |
| Recreation – Harris Reservoir | 9.1% | 17.8% | 31.3% | 41.4% |
| Recreation – Tallapoosa River | Minor Adverse Effect | | | |
| Cultural Resources – Harris Reservoir | Minor Beneficial Effect | | | |
| Cultural Resources – Tallapoosa River | Potential Adverse Effect | | | |

Operating Curve Change Feasibility Analysis Study



Variations:

- ❖ Historic photos of Lake Harris could not be used to assess the effects of the winter pool alternatives due to the limited resolution to assess individual erosion areas.
- ❖ Provided qualitative information (rather than quantitative information noted in the Study Plan) regarding cultural resources on Lake Harris
 - analysis of cultural resources is ongoing.

Remaining Activities

- ❖ Stakeholder comments on the Draft Phase 2 Study Report
- ❖ Present the operating proposal and PME measures in PLP

Review of Downstream Release Alternatives Analyzed in Phase 2



| Name/Description | Abbreviation |
|---|--------------|
| Green Plan (baseline or existing condition) – pulsing flows as described in the Green Plan release criteria | GP |
| Pre-Green Plan (peaking only; no pulsing or continuous minimum flow) | PreGP or PGP |
| Modified Green Plan | ModGP |
| 150 cfs continuous minimum flow (CMF) | 150CMF |
| 300 cfs continuous minimum flow | 300CMF |
| 600 cfs continuous minimum flow | 600CMF |
| 800 cfs continuous minimum flow | 800CMF |
| A hybrid Green Plan that incorporates both a base minimum flow of 150 cfs and the pulsing described in the existing Green Plan release criteria | 150CMF+GP |
| A hybrid Green Plan that incorporates both a base minimum flow of 300 cfs and the pulsing described in the existing Green Plan release criteria | 300CMF+GP |
| A hybrid Green Plan that incorporates both a base minimum flow of 600 cfs and the pulsing described in the existing Green Plan release criteria | 600CMF+GP |
| A hybrid Green Plan that incorporates both a base minimum flow of 800 cfs and the pulsing described in the existing Green Plan release criteria | 800CMF+GP |

Operations Model Assumptions



- ❖ A rule for peaking operations is included in all simulations.
- ❖ The minimum elevation for Harris Reservoir is 770.5 feet msl.
- ❖ Pre-Green Plan: The release criteria from the Green Plan contained in the model were removed.
- ❖ Continuous Minimum Flows: A new continuous release rule replaces the current Green Plan release rule. The releases were reduced to 85 cfs when the flows at the Heflin gage drop below 50 cfs. This is the drought cutback in the current Green Plan.
- ❖ Continuous Minimum Flows + Green Plan: A new continuous release rule is added with the current Green Plan release rule. Both rules reduce their releases to 85 cfs when the flows at the Heflin gage drop below 50 cfs. This is the drought cutback in the current Green Plan.
- ❖ A theoretical minimum flow unit that uses same intake as existing Harris unit to produce power.

Downstream Release Alternatives Study



Study Progress

- ❖ Phase 2 Analysis:
 - Outflow hydrographs from HEC-ResSim were routed downstream using HEC-RAS to assess effects of the downstream release alternatives on Project resources

- ❖ HAT 1 Meeting - April 1

Downstream Release Alternatives Study



| Resource | PreGP | ModGP | 150CMF | 300CMF | 600CMF | 800CMF | 150CMF+GP | 300CMF+GP | 600CMF+GP | 800CMF+GP |
|--------------------------------------|-------|-------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|
| Harris Reservoir Elevations | = | = | = | = | - | - | = | - | - | - |
| Hydro Generation | + | - | - | - | - | - | - | - | - | - |
| Flood Control | = | = | = | = | = | = | = | = | = | = |
| Navigation | = | = | = | = | = | = | = | = | = | = |
| Drought Operations | = | = | = | = | = | = | = | = | = | = |
| Martin Conditional Fall Ext. | + | = | + | + | - | - | - | - | - | - |
| Water Quality - Reservoir | = | = | = | = | - | - | = | - | - | - |
| Water Quality - Tallapoosa | = | = | = | = | = | = | = | = | = | = |
| Water Use - Reservoir | = | = | = | = | = | - | = | = | - | - |
| Water Use - Tallapoosa | = | = | = | = | = | = | = | = | = | = |
| Erosion - Reservoir | = | = | = | = | = | = | = | = | = | = |
| Erosion - Tallapoosa | - | + | + | + | + | + | + | + | + | + |
| Aquatic Resources - Reservoir | = | = | = | = | - | - | = | - | - | - |
| Aquatic Resources - Fish Entrainment | = | = | = | = | = | = | = | = | = | = |

Downstream Release Alternatives Study



| Resource | PreGP | ModGP | 150CMF | 300CMF | 600CMF | 800CMF | 150CMF+GP | 300CMF+GP | 600CMF+GP | 800CMF+GP |
|---|-------|-------|--------|--------|--------|--------|-----------|-----------|-----------|-----------|
| Downstream Aquatic Habitat – Tallapoosa | - | + | + | + | + | + | + | + | + | + |
| Downstream Temperature Fluctuation – Tallapoosa | - | + | + | + | + | + | + | + | + | + |
| Wildlife – Reservoir | = | = | = | = | - | - | = | - | - | - |
| Wildlife – Tallapoosa | - | + | + | + | + | + | + | + | + | + |
| T&E Species – Reservoir | = | = | = | = | = | = | = | = | = | = |
| T&E Species – Tallapoosa | = | = | = | = | = | = | = | = | = | = |
| Recreation – Reservoir | = | = | = | = | - | - | = | - | - | - |
| Recreation – Tallapoosa | - | + | + | + | + | + | + | + | + | + |
| Cultural Resources – Reservoir | = | = | = | = | - | - | = | - | - | - |
| Cultural Resources – Tallapoosa | + | = | - | - | - | - | - | - | - | - |

Downstream Release Alternatives Study



Variance

- ❖ No variances from the study plan or schedule

Remaining Activities

- ❖ Stakeholder comments on the Draft Phase 2 Study Report
- ❖ Present the operating proposal and PME measures in PLP

Battery Energy Storage System (BESS) Study



Study Progress

- ❖ Evaluated 2 BESS release alternatives:
 - 50% reduction in peak releases associated with installing one 60 MW battery unit (Option A)
 - A proportionately smaller reduction in peak releases associated with installing a smaller MW battery unit (Option B)
- ❖ Developed costs for installing a BESS
- ❖ Structural changes including changes in turbine generator units and costs for implementing each battery storage type
- ❖ Effects on recreation and aquatic resources at Harris Project
- ❖ Upcoming HAT 1 Meeting on May 3

Battery Energy Storage System (BESS) Study



Study Results

❖ BESS Costs Over 40-Year License Term

| | Option A | Option B |
|--|------------------------|------------------------|
| Total Installed Cost (2025\$) | \$96.6M (\$1,610 / kW) | \$39.0M (\$1,950 / kW) |
| Fixed O&M (including augmentation) (2025-2044) | \$1.77M * 20 years | \$0.597 * 20 years |
| Total Replacement Cost (2025\$) | \$56.4M (\$941 / kW) | \$19.7M (\$984 / kW) |
| Fixed O&M (including augmentation) (2045-2064) | \$1.94M * 20 years | \$0.647M * 20 years |
| Turbine Replacement Cost | Undetermined | \$20M |
| Interconnection O&M (based on current OATT rate and subject to periodic adjustments) | \$173,000 * 40 years | \$173,000 * 40 years |

❖ Existing turbines are not designed to operate at flows lower than best gate

Battery Energy Storage System (BESS) Study



Study Results

❖ Recreation – Lake Harris

- No effect to recreation if BESS would result in releasing same daily volume of water as current operations
- Adverse impact on recreation if BESS affected ability to maintain operating curve

❖ Recreation – Tallapoosa River downstream of Harris Dam

- Option A – under certain assumptions, may benefit recreationists launching in tailrace and for the first few miles below Harris Dam
- Option B – recreation based activities would still occur as they do under current operations, although peak release would be smaller

❖ Aquatic Resources – Tallapoosa River downstream of Harris Dam

- Option A – could potentially benefit aquatic resources first 7 miles downstream
- Option B – would not have same benefits as Option A as peak is still required; similar to Pre-Green Plan operations

Battery Energy Storage System (BESS) Study



Variance

- ❖ The BESS was evaluated separately from the other downstream release alternatives and results of the analysis are presented in a separate report.
 - Due to constraints of existing model rules
 - Not considered a reasonable alternative

Remaining Activities

- ❖ Stakeholders comment on the Draft BESS Report

Water Quality Study

Study Progress



| Location | Source | Description | Period |
|--|---------------------|---|--|
| Lake Harris | ADEM | Vertical profiles and discrete chemistry samples at six locations | April - October 2018; June, July, September, & October 2020 |
| | Alabama Power | Vertical profiles in the forebay | March - October 2017 - 2020 |
| | Alabama Water Watch | Surface samples at six locations | monthly to semi-monthly, 2011 - 2019 |
| | ADEM | Monthly measurements and discrete samples at Tailrace, Malone, Wadley, and Horseshoe Bend | 2018 - 2020 (no measurements collected at Tailrace in 2019) |
| Tallapoosa River, Harris Dam to Horseshoe Bend | ADEM | Continuous (15-minute interval) monitoring at Malone | May 2018 - November 2019; April - November 2020 |
| | Alabama Power | Continuous (15-minute interval) monitoring during generation (approximately 800 ft downstream of dam) | June - October 2017 - 2020 |
| | Alabama Power | Continuous (15-minute interval) monitoring (approximately 0.5 miles downstream of dam) | March - October 2019; May - October 2020 |
| | Alabama Water Watch | Surface samples at Horseshoe Bend | 1993, 2007, & 2014 - 2017 |

Water Quality Study



Variance

- ❖ No variances from the study plan or schedule

Remaining Activities

- ❖ Alabama Power will prepare the 401 Water Quality Certification application and submit to ADEM after the FLA is filed with FERC.

Erosion and Sedimentation Study



Study Progress:

- ❖ No additional erosion data was collected downstream
- ❖ Conducted additional reconnaissance at identified sedimentation sites on Lake Harris during full (summer) pool conditions to determine if any nuisance aquatic vegetation was present.

Variance

- ❖ Alabama Power provided the results of the Nuisance Aquatic Vegetation Survey Report in Appendix F of the Final Erosion and Sedimentation Study Report rather than providing to HAT 3 in the form of a technical memorandum.

Remaining Activities

- ❖ No additional studies proposed and no remaining activities.

Aquatic Resources Study



Study Progress:

- ❖ Desktop Assessment characterizes aquatic resources and temperature in the Study Area

- ❖ Auburn University:
 - Conducted a literature review of temperature requirements of target species
 - Temperature analysis
 - Fish community sampling - continued sampling through January 2021
 - Tagged and tracked fish with acoustic/radio (CART tags) during the summer of 2020
 - Conducted static respirometry tests and measured active metabolic rates
 - Respirometry and bioenergetics modeling: effects of Harris operations (flow and temperature) on energy expenditures of target species

- ❖ HAT 3 Meetings - June 2, 2020, November 5, 2020, and March 31, 2021

Auburn University Study



Temperature Results:

- ❖ No differences found between pre- and post-Green Plan Temperatures
- ❖ 99.71% of hourly temperature fluctuations were within 2 °C
- ❖ Extreme hourly fluctuations (≥ 10 °C) were rare and could possibly be attributed to exposure of a logger to air or direct sunlight for a prolonged period followed by re-submersion
- ❖ Lowest daily range in temperatures at Heflin
- ❖ Temperature tended to increase with increasing distance from the dam but, in winter, temperature was typically warmer near the dam

Auburn University Study



Fish Community Results

- ❖ Diversity was lower than Travnichek and Maceina (1994), but overall trends in diversity upstream and downstream were similar
- ❖ Relative contribution of centrarchids lower than 1996 rotenone sample; combined contribution of cyprinids and castostomids similar to 1951 rotenone sample
- ❖ Channel Catfish and Alabama Bass had greater body condition in the tailrace. Several factors could cause this potentially including cooler temperatures (temp not reaching thermal maximum for growth) and/or diet
- ❖ Fewer older, larger fish captured in tailrace attributed to less available shelter from flows and/or sampling gear (barge instead of boat electrofisher)
- ❖ Lipstick Darter were abundant in tailrace, likely due to ideal habitat

Auburn University Study



Bioenergetics and Growth Simulations:

- ❖ Growth simulations could only be run for Redbreast Sunfish (using respiration rate parameters from published Bluegill data)
- ❖ Other species had insufficient sample sizes or models that did not accurately estimate respiration rates

Bioenergetics Results:

- ❖ Releases could slightly increase growth rate of age-1 Redbreast Sunfish
- ❖ Release could slightly decrease growth rate of age-3 and age-5 Redbreast Sunfish due to the increased energy expenditure of swimming during releases; Model assumes that fish do not seek shelter during releases
- ❖ Model used activity rates around Horseshoe Bend and assumes releases decrease temperature 5°C, but temperature fluctuations of that magnitude likely occur further upstream (tailrace to Malone)

Aquatic Resources Study



Variance

- ❖ Auburn University did not use the 30+2 sampling method as it was determined in the field to not be feasible/effective for sampling the sites
- ❖ Instead, shallow areas were sampled using boat and barge electrofishing equipment, which were found to be effective in sampling shallow areas within the study sites.
- ❖ The boat method used was a modification of the recently developed non-wadeable index of biological integrity (IBI). Sampling intensity was modified to accommodate available habitat, sampling frequency, and therefore IBI scores were not calculated.

Remaining Activities

- ❖ No additional studies proposed and no remaining activities.

Downstream Aquatic Habitat Study



Study Progress

- ❖ Collected level logger data at 20 locations in the Tallapoosa River below Harris Dam through June 2020
- ❖ HAT 3 Meetings - June 2, 2020, November 5, 2020, and March 31, 2021

Variance

- ❖ No variances from the study plan or schedule

Remaining Activities

- ❖ No additional studies proposed and no remaining activities.

Threatened and Endangered Species Study



Study Progress

- ❖ Alabama Power completed field surveys at Lake Harris and Skyline to determine if T&E species are located within the Project Boundary.
- ❖ Filed the final report on January 29, 2021
 - Included the Desktop Analysis and results of all field investigations
- ❖ HAT 3 Meetings - June 2, 2020, November 5, 2020, and March 31, 2021

Variance

- ❖ No variances from the study plan or schedule

Remaining Activities

- ❖ No additional studies proposed and no remaining activities.

Project Land Evaluation



Study Progress

- ❖ Samford University conducted a botanical survey on an additional 35 acres of land adjacent to the previously surveyed area at Flat Rock Park.
 - This additional botanical inventory report was filed on April 12, 2021
- ❖ HAT 4 Meeting - October 19, 2020

Variance:

- ❖ No variances from the study plan or schedule

Remaining activities:

- ❖ Alabama Power will file a Wildlife Management Plan and Shoreline Management Plan with the FLA.

Recreation Evaluation



Study Progress

- ❖ Filed the Final Recreation Evaluation on November 24, 2020.
- ❖ HAT 5 Meetings - June 4, 2020 and October 19, 2020.

Variance

- ❖ No additional variances from the study plan or schedule

Remaining Activities

- ❖ No additional studies proposed and no remaining activities.

Cultural Resources Study



Study Progress

- ❖ February 2021 - Concluded cultural resources assessments for the sites identified during the Lake Harris preliminary archeological and completed cultural resource assessments for Skyline
- ❖ March 4, 2021 - Held a virtual site visit of Skyline for applicable tribes and the Alabama Historical Commission
- ❖ April 2021 – Complete TCP identification process with the Muscogee (Creek) Nation

Cultural Resources Study



Variance

- ❖ Alabama Power will complete the TCP identification process with the Muscogee (Creek) Nation in April 2021 (rather than February 2021 as noted in the Study Plan)

Remaining Activities

- ❖ Complete eligibility assessments for known cultural resources
- ❖ Issue determination of effect on historic properties
- ❖ Develop a Draft Historic Properties Management Plan (HPMP) for the Harris Project to be filed concurrently with the PLP
- ❖ Upcoming Selected HAT 6 Meeting- May 5, 2021. Selected due to sensitive nature of meeting material.