



**PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM  
REQUEST FOR PROPOSALS**

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2  
3 **SUBJECT:** 2020-2023 Annual LiDAR and Aerial Photography  
4 **PROJECT NUMBER:** P20-005  
5 **REQUEST DATE:** March 30, 2020  
6 **CLOSING DATE:** April 24, 2020  
7 **POINT OF CONTACT:** Justin Brei  
8 Headwaters Corporation  
9 4111 4<sup>th</sup> Ave, Suite 6  
10 Kearney, NE 68845  
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13

14 **I. OVERVIEW**

15 The Platte River Recovery Implementation Program (**Program**) was initiated on January 1, 2007  
16 between Nebraska, Wyoming, and Colorado and the Department of the Interior to address  
17 endangered species issues in the central and lower Platte River basin. The species considered in  
18 the Program, referred to as “target species”, are the whooping crane, piping plover, interior least  
19 tern, and pallid sturgeon.  
20

21 A Governance Committee (**GC**) has been established that reviews, directs, and provides  
22 oversight for activities undertaken during the Program. The GC is comprised of one  
23 representative from each of the three states, three water user representatives, two representatives  
24 from environmental groups, and two members representing federal agencies. Headwaters  
25 Corporation serves as the Executive Director’s Office of the Program. Program staff are located  
26 in Nebraska and Colorado and are responsible for assisting in carrying out the various Program-  
27 related activities.  
28

29 Aerial photography has been collected annually by the Program since 2007. Annual LiDAR  
30 collection began in 2009. These data are integral to several of the Program’s research and  
31 monitoring efforts and are our principle tools for assessing physical changes in river habitat  
32 through time.  
33

34 The GC submits this Request for Proposals (**RFP**) to solicit proposals from contractors to  
35 acquire bathymetric LiDAR and aerial photography during the period of 2020 - 2023.  
36

37 **II. PROJECT DESCRIPTION**

38 This scope of work set forth in this RFP includes four summer Program area aerial photography  
39 flights with a partial bathymetric LiDAR coverage and four fall/winter bathymetric LiDAR and  
40 Aerial photography flights that cover the entire 90-mile reach. Further background information  
41 on how the Program uses the data acquired through this RFP is available in an excerpt from the  
42 Program’s Remote Geomorphology and Vegetation Monitoring Protocol located in Appendix A.  
43



44 This RFP describes a multi-year program of work encompassing acquisition of aerial  
45 imagery and LiDAR in 2020 through 2023 according to the following schedule:

- 46
- 47 - June 2020: Full Program area aerial photography and partial area bathymetric  
48 LiDAR
- 49 - November 2020: Bathymetric LiDAR and concurrent aerial photography
- 50 - June 2021: Full Program area aerial photography and partial area bathymetric  
51 LiDAR
- 52 - November 2021: Bathymetric LiDAR and concurrent aerial photography
- 53 - June 2022: Full Program area aerial photography and partial area bathymetric  
54 LiDAR
- 55 - November 2022: Bathymetric LiDAR and concurrent aerial photography
- 56 - June 2023: Full Program area aerial photography and partial area bathymetric  
57 LiDAR
- 58 - November 2023: Bathymetric LiDAR and concurrent aerial photography
- 59

### 60 III. SCOPE OF WORK

61 The Program is requesting proposals from potential bidders to provide bathymetric LiDAR and  
62 digital aerial imagery of the project area as described below. Minimum product specifications  
63 follow:

#### 64 1) Schedule

- 65
- 66
- 67 a) Sub-Project 1 - November concurrent bathymetric LiDAR and Aerial photography.
  - 68 i) LiDAR and imagery will be acquired each year between November 1 and December  
69 15 under leaf-off and low Platte River flow conditions beginning in November 2020.  
70 Bidder must be flexible and work with Program staff during that time to schedule  
71 flights such that river flows in the project area are as low as possible (ideally under  
72 1,000 cfs).
  - 73 ii) Imagery will be acquired on cloud-free days with the sun at a sufficient angle to  
74 reduce the effect of shadows from trees and structures and efforts should be made to  
75 reduce sun glare on water surfaces.
  - 76 iii) Imagery will be acquired in combination with LiDAR such that the imagery reflects  
77 the condition of the river during the LiDAR acquisition. River conditions can change  
78 daily, and imagery must be flown at least the same day, if not at the exact same time  
79 as the LiDAR.
  - 80 iv) The Central Platte River is subject to artificial hydrocycling from hydropower  
81 operations, and close coordination and care in timing is required to acquire products  
82 acceptable to the Program.
  - 83 v) The acquisition area must be free of snow and ice, and extraneous environmental  
84 conditions such as rain, fog or smoke should be avoided.
  - 85 vi) Final delivery of Sub-Project 1 aerial imagery deliverables will be within 60 days  
86 of final acquisition flight each year.



- 87           vii) **Final delivery of all other Sub-Project 1 deliverables will be within 120 days of**
- 88           **final acquisition flight each year.**
- 89
- 90       b) Sub-Project 2 - June Aerial photography.
- 91           i) Imagery will be acquired each year between May 15 and June 30 beginning in May
- 92           2020. Bidder must be flexible and work with Program staff during that time to
- 93           schedule flights such that river flows in the project area are as close to 1,200 cfs as
- 94           possible.
- 95           ii) The Central Platte River is subject to artificial hydrocycling from hydropower
- 96           operations, and close coordination and care in timing is required to acquire products
- 97           acceptable to the Program.
- 98           iii) Imagery will be acquired on cloud-free days with the sun at a sufficient angle to
- 99           reduce the effect of shadows from trees and structures and efforts should be made to
- 100          reduce sun glare on water surfaces.
- 101          iv) **Final delivery of Sub-Project 2 deliverables will be within 60 days of final**
- 102          **acquisition flight each year.**
- 103
- 104       c) Sub-Project 2A – June bathymetric LiDAR
- 105           i) LiDAR will be acquired each year between May 15 and June 30 in combination with
- 106           the Sub-Project 2 imagery acquisition.
- 107           ii) LiDAR will be acquired in combination with imagery such that the imagery reflects
- 108           the condition of the river during the LiDAR acquisition. River conditions can change
- 109           daily, and imagery must be flown at least the same day, if not at the exact same time
- 110           as the LiDAR over the Sub-Project 2A area.
- 111           iii) **Final delivery of Sub-Project 2A deliverables will be within 90 days of final**
- 112           **acquisition flight each year.**
- 113
- 114       d) Flight Cancellations
- 115           i) The Program, at its sole discretion, may choose to cancel any individual acquisition
- 116           or part of an acquisition (aerial imagery, LiDAR) over the course of the project. This
- 117           could occur if river conditions are such that the products received would not be of a
- 118           quality acceptable to the Program. If an acquisition is partially or fully cancelled, the
- 119           contract price would be adjusted and the cost of those acquisitions and products
- 120           removed.
- 121

122 **2) Project Area**

- 123
- 124       a) The area of interest for Sub-Project 1 consists of an area generally between the high
- 125       banks of the Platte River beginning near the junction of U.S. Highway 283 and Interstate
- 126       80 near Lexington, Nebraska, and extending eastward to near Chapman, Nebraska
- 127       (approximately 128 square miles). A polygon shapefile of the acquisition area is
- 128       included on the Program website ([www.platteriverprogram.org](http://www.platteriverprogram.org)) in the same location as
- 129       this solicitation.



- 130 b) The area of interest for Sub-Project 2 consists of an area 3.5 miles either side of the  
131 centerline of the Platte River beginning at the junction of U.S. Highway 283 and  
132 Interstate 80 near Lexington, Nebraska, and extending eastward to Chapman, Nebraska  
133 (approximately 750 square miles). A polygon shapefile of the acquisition area is  
134 included on the Program website ([www.platteriverprogram.org](http://www.platteriverprogram.org)) in the same location as  
135 this solicitation.
- 136 c) The area of interest for Sub-Project 2A consists of an area generally between the high  
137 banks of the Platte River beginning near the J-2 Hydropower Return southeast of  
138 Lexington, NE and extending eastward to the Highway 183 bridge near Elm Creek, NE  
139 (approximately 26 square miles). A polygon shapefile of the acquisition area is included  
140 on the Program website ([www.platteriverprogram.org](http://www.platteriverprogram.org)) in the same location as this  
141 solicitation.

### 142 3) **Sub-Project 1 Technical Specifications**

143 CIR aerial photography and bathymetric LiDAR over approximately 128 sq. mi.

#### 144 a) LiDAR Technical Specifications

- 145
- 146 i) Topo-bathymetric LiDAR (green LiDAR) is required.
- 147 ii) The LiDAR data will be collected at a mean resolution of 2.3 ft (0.7 m) GSD or  
148 better.
- 149 iii) The contractor shall ensure that the area of interest is fully and sufficiently covered  
150 with no data voids due to gaps between flightlines or system malfunction.
- 151 iv) Data voids in the bare-earth not caused by classification of geographic features shall  
152 not exceed three times the point spacing. Data voids of this size are sufficient  
153 reason to reject the dataset.
- 154 v) LiDAR data should be classified using the following ASPRS Standard LiDAR  
155 Point Classes:
- 156 • Class 1 – Unclassified
  - 157 • Class 2 – Ground
  - 158 • Class 7 – Low point and noise
  - 159 • Class 9 – Water
  - 160 • Class 12 – Overlap
- 161
- 162 (1) Class 1 will be used for feature points that are not in Classes 2, 7, 9, or 12.  
163 These typically represent returns from man-made structures, vegetation etc.
- 164 (2) Class 2 will be used for feature points that represent the bare-earth.
- 165 (3) Class 7 will be used for artifacts that do not represent the ground, manmade  
166 structures or vegetation. Typically these are extraneous points that are either  
167 below, or well above the surface not representing any true feature.
- 168 (4) Class 9 will be used to identify points found within water bodies, including  
169 streams and rivers.
- 170 (5) Class 12 will be used for LiDAR points in the overlap portion of flight lines that  
171 have been removed due to redundancy (if necessary).
- 172 (6) No points shall be deleted from the LAS files.



- 173 vi) Bare-earth classification shall adhere to the following specifications using both  
174 automated and manual filtering classification routines:
    - 175 • 90% of artifacts classified
    - 176 • 95% of outliers classified
    - 177 • 95% of vegetation classified
    - 178 • 98% of building classified
  - 179 vii) Special attention must be applied to the classification process due to the geographic  
180 nature of the project area which consists of extremely flat terrain mixed with  
181 important hydrographic characteristics. Channel geometry of streams and drainage  
182 features must be maintained as well as the ability to identify sand bar features  
183 within the Platte River. Dense vegetation data voids must also be minimized by the  
184 automatic removal process and “over smoothing” due to aggressive classification  
185 must be avoided.
  - 186 viii) Vertical accuracy for LiDAR will meet or exceed 0.3 ft (9.2 cm) RMSE (Accuracy<sub>z</sub>  
187 = 0.6 ft (0.18 m) at the 95% confidence level).
  - 188 ix) Horizontal accuracy for LiDAR will meet or exceed 1.97 ft (0.6 m) RMSE  
189 (Accuracy<sub>r</sub> = 3.41 ft (1.04 m) at the 95% confidence level).
  - 190 x) The vertical datum for LiDAR is NAVD88 (Geoid03), and the horizontal datum is  
191 Nebraska State Plane (1983). Elevation and projection in feet.
- 192
- 193 b) Aerial Photography Technical Specifications
    - 194 i) The imagery will be six-inch (0.5 ft) pixel resolution.
    - 195 ii) The imagery will be color-infrared.
    - 196 iii) The imagery will be ortho-rectified and seamless, and will be tone-balanced with  
197 adjacent images across the project area.
    - 198 iv) Imagery will be acquired on cloud-free days with the sun at a sufficient angle to  
199 reduce the effect of shadows from trees and structures and efforts should be made to  
200 reduce sun glare on water surfaces.
    - 201 v) The imagery will be projected in Nebraska State Plane Feet (1983 datum).
    - 202 vi) The imagery must be acquired concurrently with the LiDAR so as to reflect river  
203 conditions during acquisition. The imagery must be collected at least the same day, if  
204 not at the exact same time, as the LiDAR. Imagery acquired at flows significantly  
205 different than that of the LiDAR acquisition may require reflight.

206 **4) Sub-Project 2 and 2a Technical Specifications**

207 Four-band aerial photography over approximately 750 sq. mi. LiDAR over approximately 26  
208 sq. mi.

- 209 a) Aerial Photography Technical Specifications
  - 210 i) The imagery will be six-inch (0.5 ft) pixel resolution.
  - 211 ii) The imagery will be 4-band (R, G, B, NIR).
  - 212 iii) The imagery will be ortho-rectified and seamless, and will be tone-balanced with  
213 adjacent images across the project area.



- 214 iv) Imagery will be acquired on cloud-free days with the sun at a sufficient angle to
- 215 reduce the effect of shadows from trees and structures and efforts should be made to
- 216 reduce sun glare on water surfaces.
- 217 v) The imagery will be projected in Nebraska State Plane Feet (1983 datum).
- 218 vi) Deliverables will include both RGB and CIR products described in Section III.6.

219

220 b) LiDAR Technical Specifications

- 221 i) Same as Sub-Project 1 LiDAR Specifications in Section III.3.a above.

222

223

224 5) **Project Deliverables**

225 All project deliverables should be processed and delivered according to the schedule in

226 Section III.1.

227

228 a) LiDAR (terrestrial and bathymetric)

- 229 i) LiDAR point data meeting or exceeding 2.3 ft (0.7 m) GSD resolution in a classified
- 230 LAS file format and adhering to the technical specifications in III.3 above. LAS file
- 231 projected to Nebraska State Plane Feet (1983 datum) and vertical reference NAVD88
- 232 feet (Geoid 03). Classified LAS file will include all LiDAR points, including first
- 233 and last returns.
- 234 ii) Daily reports during acquisition that display all flight lines, as well as completed
- 235 areas. Once acquisition is complete, a project summary report that shows time and
- 236 date of all flightline acquisitions. Time of day, not just the day, is important to match
- 237 river flow condition to acquisition.
- 238 iii) Tiling scheme shapefile for identifying LAS and DEM file locations. Tile size and
- 239 file size is flexible and will be discussed upon award of project.

240

241 b) Digital Elevation Model

- 242 i) Hydro-enforced and bathymetric bare-earth digital elevation model raster tiles (3-foot
- 243 cell size), projected in Nebraska State Plane coordinate system – elevation and
- 244 projection in feet.
  - 245 (1) See pages 11-13, 15, and Appendix 2 of the USGS LiDAR Guidelines and Base
  - 246 Specifications v13 for details on hydro-flattening: <http://pubs.usgs.gov/tm/11b4/>.
  - 247 In the proposal, provide details of the software/methodology to be used for this
  - 248 alternative.
  - 249 (2) Breaklines used in the generation of the hydro-enforced DEM are also a required
  - 250 deliverable.
- 251 ii) Highest-hit (first return) digital elevation model raster (3-foot cell size). Used to
- 252 approximate vegetation height.
- 253 iii) Full project area mosaic of digital elevation model tiles (3-foot cell size).
- 254 iv) NOTE: For Bathymetric LiDAR acquisition, two versions of the DEM will be
- 255 required. One hydro-enforced DEM for the given flow conditions during the flight,
- 256 and one DEM that incorporates bathymetry below the water surfaces.

257



- 258 c) Imagery
- 259 i) Color-infrared (Sub-Project 1) and 4-band (Sub-Project 2) digital orthophotography
- 260 with a six-inch (0.5 ft) pixel resolution (or better), covering the entire project area
- 261 seamlessly and without data gaps.
- 262 ii) The imagery should be geo-referenced and provided in tiled GeoTIFF (.tif) format.
- 263 iii) Compressed imagery mosaic (.sid). Typically entire reach compiled into one mosaic,
- 264 but may be split due to file size. Sub-Project 2 will require both a RGB mosaic and a
- 265 CIR mosaic. Sub-Project 1 will be a CIR mosaic only.
- 266
- 267
- 268 d) LiDAR and Imagery
- 269 i) Shapefiles of LiDAR and aerial photography flight lines or photo centers that identify
- 270 the date and time of the flight line or photo center.
- 271 ii) FGDC-compliant metadata to include, but not limited to: flight dates and times, flight
- 272 altitude, camera system information, LiDAR system information, aircraft information,
- 273 imagery resolution, LiDAR point density, horizontal accuracy, post-processing
- 274 software and steps, and horizontal and vertical control references.
- 275 iii) All LiDAR data, photography, and supplemental products will be delivered on USB
- 276 external hard drives or flash drives and will become the property of the Program. All
- 277 media and data collected under the contract shall be the sole property of and can be
- 278 freely distributed by the Program. No restrictions shall be placed on the data by the
- 279 contractor.
- 280 e) Ground Survey
- 281 i) Proposals should discuss the ground control and survey approach for ensuring
- 282 accuracy of elevation and imagery deliverables.
- 283 ii) The Program owns several thousand acres of land across the entire acquisition area
- 284 and can provide access to multiple river survey areas for bathymetric LiDAR ground
- 285 survey verification.
- 286 iii) Year-to-year compatibility of the deliverables is extremely important and post-
- 287 processing and ground survey should ensure that datasets are comparable year to year
- 288 (i.e. immobile objects such as paved roads should not report differing elevations
- 289 across years).

290 **6) Permits and Clearances**

- 291
- 292 a) It is the contractor's responsibility to file all required flight plans and obtain all necessary
- 293 approvals to fly over and acquire aerial imagery and LiDAR in the Project area.
- 294

295 **IV. CONTRACT TERMS**

296 The selected contractor will be retained by:

297  
298 Nebraska Community Foundation  
299 PO Box 83107  
300 Lincoln, NE 68501



301  
302 Terms and conditions will be negotiated as mutually agreeable. It is understood that the  
303 Governance Committee reserves the right to accept any proposal that, in its judgment, is the best  
304 proposal, and to waive any irregularities in any proposal.

305  
306 *Proposal costs incurred in response to this RFP will be the responsibility of the bidder. Neither*  
307 *the Nebraska Community Foundation nor the Governance Committee will be liable for any costs*  
308 *incurred by the bidder in the completion and submission of the proposal.*

309  
310 **V. SUBMISSION REQUIREMENTS**

311 All interested parties having experience providing the services listed in this RFP are requested to  
312 submit a proposal.

313  
314 **Instructions for Submitting Proposals**

315 *One electronic copy of your proposal must be submitted in PDF format to Justin Brei at*  
316 *[breij@headwaterscorp.com](mailto:breij@headwaterscorp.com) no later than 5:00 p.m. Central Time on Friday, April 24, 2020.*  
317 Maximum allowable PDF size is 8MB. A proposal is late if received any time after 5:00 p.m.  
318 Central Time and will not be eligible for consideration.

319  
320 **Questions regarding the information contained in this RFP must be SUBMITTED IN**  
321 **WRITING by 5:00 p.m. Friday, April 17, 2020. No questions on content can be submitted**  
322 **after this time. Questions and answers will be shared with all interested parties. These can**  
323 **be emailed to Justin Brei at [breij@headwaterscorp.com](mailto:breij@headwaterscorp.com) or mailed to the address at the top**  
324 **of this RFP. Questions can be submitted any time before the above time and answers may**  
325 **be posted intermittently to the Program website during the proposal period. Final**  
326 **questions and answers will be made available on the Program website in the location of this**  
327 **RFP by EOB Monday, April 20, 2020.**

328  
329 **Proposal Content**

330 Proposals must include:

331  
332 **1) Technical information including:**

- 333 a. Aircraft/LiDAR/camera system details
- 334 b. Ground control/verification methodology/plan
- 335 c. Post-processing software and summary of methodology
- 336 d. Design accuracy information

337  
338 **2) Relevant LiDAR and aerial photography experience** from the last two years, especially  
339 projects related to natural resources and river geomorphology. Example projects should  
340 demonstrate experience collecting and processing bathymetric LiDAR in river systems.  
341 Please provide a minimum of two project references including the name, location, and brief  
342 summary of the projects; name, address, and phone number of the contracting officer for the  
343 client; and when the project was completed.

344





- 345 3) **Statement of annual availability** within the acquisition window of November 1 to  
 346 December 15 for Sub-Project 1 and May 15 to June 30 for Sub-Project 2.  
 347
- 348 4) **Estimated timeline** for activities including mobilization, acquisition and processing. Also,  
 349 specify the estimated flight time necessary to complete each acquisition over entire project  
 350 area (for planning purposes related to river operations in order to achieve lowest possible  
 351 flow).  
 352
- 353 5) **Detailed firm fixed price proposal.** At minimum, project budget should itemize Sub-Project  
 354 1 and Sub-Project 2 on an annual basis and include estimate of any applicable taxes. **Budget**  
 355 **will be considered, but contract will not be awarded solely on a lowest cost basis.**  
 356 Governance Committee approval is needed before the contractor is authorized to begin  
 357 implementation. A sample budget table is included for reference. A similar table should be  
 358 included in the proposal.  
 359  
 360

	June 2020 SP2	June 2020 SP2a	November 2020 SP1	June 2021 SP2	June 2021 SP2a	November 2021 SP1
Total Cost by Acquisition						

	June 2022 SP2	June 2022 SP2a	November 2022 SP1	June 2023 SP2	June 2023 SP2a	November 2023 SP1
Total Cost by Acquisition						

Total Project Cost

- 376 6) **Conflict of interest statement** addressing whether or not any potential conflict of interest  
 377 exists between this project and other past or on-going projects, including any projects  
 378 currently being conducted for the Program.  
 379
- 380 7) **Suspension and Debarment.** Contractor must not be suspended or debarred from receiving  
 381 federal funds. Proposal must include statement of eligibility to receive federal funds and must  
 382 provide contractor Dun & Bradstreet (D-U-N-S) number or other means of identification in  
 383 the U.S System for Award Management site ([www.sam.gov](http://www.sam.gov)).  
 384
- 385 8) **Description of insurance** shall be provided with the proposal. Proof of insurance will be  
 386 required before a contract is issued. Minimum insurance requirements will include  
 387 \$1,000,000 general liability per occurrence.



388 **VI. CONTRACTOR SELECTION**

389 The GC will appoint a selection committee to review responses to this RFP. Proposals will be  
 390 reviewed and the award made to the lowest cost proposal that conforms to the specifications of  
 391 this solicitation and is considered to provide the most value to the Program.

392  
 393 **VII. PROGRAM PERSPECTIVE**

394 The GC of the Program has the sole discretion and reserves the right to reject any and all  
 395 proposals received in response to this RFP and to cancel this solicitation if it is deemed in the  
 396 best interest of the Program to do so. Issuance of this RFP in no way constitutes a commitment  
 397 by the Program to award a contract, or to pay contractor’s costs incurred either in the preparation  
 398 of a response to his RFP or during negotiations, if any, of a contract for services. The Program  
 399 also reserves the right to make amendments to this RFP by giving written notice to contractors,  
 400 and to request clarification, supplements, and additions to the information provided by a  
 401 contractor.

402  
 403 By submitting a proposal in response to his solicitation, contractors understand and agree that  
 404 any selection of a contractor or any decision to reject any or all responses or to establish no  
 405 contracts shall be at the sole discretion of the Program. To the extent authorized by law, the  
 406 contractor shall indemnify, save, and hold harmless the Nebraska Community Foundation, the  
 407 states of Colorado, Wyoming, and Nebraska, the Department of the Interior, members of the GC,  
 408 and the ED Office, their employees, employers, and agents, against any and all claims, damages,  
 409 liability, and court awards including costs, expenses, and attorney fees incurred as a result of any  
 410 act or omission by the contractor or its employees, agents, subcontractors, or assignees pursuant  
 411 to the terms of this project. Additionally, by submitting a proposal, contractors agree that they  
 412 waive any claim for the recovery of any costs or expenses incurred in preparing and submitting a  
 413 proposal.

414  
 415 **VIII. AVAILABLE INFORMATION**

416 A shapefile of the acquisition area for Sub-Projects 1, 2, and 2A are available on the Program  
 417 website ([www.platteriverprogram.org](http://www.platteriverprogram.org)) at the same location as this RFP solicitation. A map of the  
 418 acquisition area is found on the last page of this solicitation.

419  
 420

