



WHERE EXPERIENCE MATTERS: Environmental Restoration in the Aleutian Islands

Conducting three environmental restoration projects in a single season on three separate islands in the Alaskan Aleutian archipelago contained many challenges, but a lengthy planning phase and innovative value engineering made it a success.

By Karina Quintans, M.SAME, and Scotty Mann, PG, M.SAME

When planning and executing environmental restoration projects at uninhabited sites in Alaska's Aleutian Islands, the list of challenges is as long as the barge trip to get there. With the high cost of mobilization to this remote archipelago, where fog, rain, and wind prevail over sunshine, and to locations where no records show a vessel landing since World War II (if ever), achieving project delivery in one field season is undoubtedly preferred. The work most often must be done within a slim window of only nine weeks. Experience matters.



To conduct three environmental restoration projects on three separate islands in the Alaskan Aleutian archipelago in a single season, experienced teams were needed at every level. PHOTOS COURTESY BRICE ENVIRONMENTAL

In 2019, Brice Environmental performed environmental restoration projects on three Aleutian Islands with a single barge in one judiciously choreographed field season. The focus was three defunct radio range towers once operated by the Civil Aeronautics Authority, the predecessor of the Federal Aviation Administration. Built to support defense priorities of World War II and the subsequent growth of commercial air travel across the region after, the facilities were eventually shut down—but the infrastructure remained. While some was repurposed and reused, the remainder could potentially contaminate the natural and historic environments of the now-uninhabited Caton, Umnak, and Hog Islands.

When funding became available, restoration of these once-native lands was possible.

PLANNING AHEAD

Project delivery on one remote island requires long-lead planning. Planning for three islands located as far apart as 221-nmi, in the same season, using one barge, significantly raises the bar.

Consider that the facilities on Umnak Island alone were built in partnership with a private contractor and the U.S. Navy with thousands of deployed troops. In contrast, the removal

A TOWER TRANSFORMED

When cultural resources were encountered within the Hog Island project footprint, heavy equipment could no longer be used to remove the base of the former radio range tower (according to the scope of work), which consisted of four concrete footers located at the top of a hill. Alternatives such as removing the footers by hand were both cost- and schedule-prohibitive.

A brainstorming session with the landowner and the client led to a creative solution. Given the historical significance of Hog Island, the decision was made to convert the radio range tower base into an historical marker with a scenic view of Dutch Harbor across the bay. Brice Environmental landscaped the area and designed an interpretative panel to highlight the historic role of the Federal Aviation Administration on Hog Island, as well as document the island's rich legacy. Hog Island is generally known to be one of the oldest archaeological sites in the Aleutian Islands at approximately 9,000 years old.



To preserve cultural resources at the site of a former tower, a creative solution was devised to convert it into an historical marker.



Keeping contingency supplies like SuperSacs stocked onsite allowed the project to continue without interruption.

THREE IF BY SEA

Barging is the only means of mobilizing heavy equipment to uninhabited islands in the Aleutians. Since this would be the most expensive line item in a remote/austere project budget, various options were evaluated through a rigorous cost analysis. While commercial barges do service a few select ports in the Aleutian Islands, being tied to their schedules would lengthen the project duration, complicate logistics, and drive up costs and weather-related safety risks. Alternatively, performing the work over multiple summers would likely have doubled mobilization costs and posed additional environmental and safety risks.

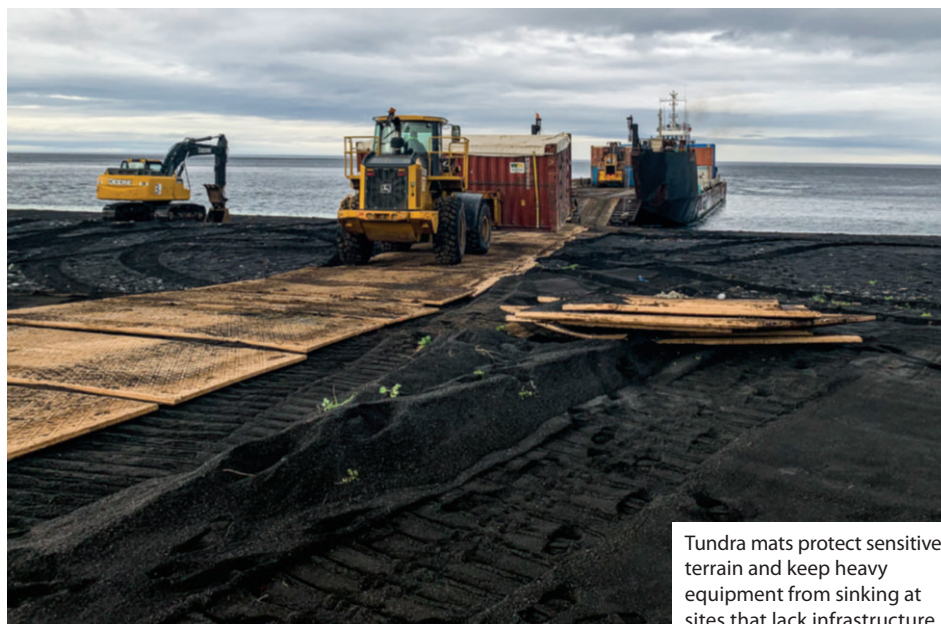
In the end, the use of a single barge to execute work on all three islands in one season was the best value option; this reduced project costs by nearly 50 percent compared to the alternatives.

AT THE READY

Planning environmental restoration on uninhabited islands is like military expeditionary planning. The objective is to deploy a team capable of independently supporting and launching sustained operations with the same independence as fixed installations, while minimizing weight risks and setup time. Every risk, vulnerability, and potential compromise to resources while in the field had to be identified and mitigated.

In short, a successful plan would keep the project moving forward, despite any challenges that arose along the way. For this project, it came down to three critical success factors.

Proper Life Support. The three-person Hog Island field team was housed in a local hotel in Dutch



Tundra mats protect sensitive terrain and keep heavy equipment from sinking at sites that lack infrastructure.

and remediation of these defunct facilities in present day was completed by six deployed civilian contractor staff supported logistically by a barge, a man camp, all-terrain utility vehicles, and fat-tire bikes. The risk was high and required close coordination with an army of stakeholders, including the Federal Aviation Administration and U.S. Fish & Wildlife Service along with the Alaska Department of Environmental Conservation, the State Historic Preservation Office, and local landowners.

Harbor and traveled daily by water taxi to the project site. But for fieldwork at Caton and Umnak Islands, the field manager worked with a logistics company to design a hard-shell camp composed of 20-ft connexes that were better suited for the harsh Aleutian Island weather and required only two days of setup time by the existing field team, in contrast to the five days needed for a soft-shell camp set up by a subcontracted team. In

total, 13 connexes provided bunkhouses, bathrooms, water treatment, kitchen, dining room, office, and storage for the Caton/Umnak field team—adding a level of comfort and support that is key to maintaining morale under the most extreme working conditions.

Preparedness. To avoid lost productivity, a 14th connex was designated as a mechanics shed for Caton and Umnak fieldwork. Every tool, nut, and bolt (in both standard and metric, as well as parts and supplies) were stocked in the connex, enabling the field crew to repair anything from a flat tire to a blown out cooler belt or hydraulic hose onsite. This avoided what would have been costly delays had they relied on offsite support.

Skilled Practitioners. The 12-person field team (six staff for Caton and Umnak Islands; six staff for Hog Island) was selected based on proven experience successfully working in remote/austere/uninhabited locations. For the Caton and Umnak Island team, in particular, the field schedule required 12-hr days, seven days a week, with no days off for the entirety of the nine-week project schedule. Staff who can maintain a positive attitude through constant rain, fog, and mud; endure a drill rig failure; make do with an empty pot of coffee; and deal with the humdrum of removing 1,544-yd³ of soil without the use of dump trucks can ultimately be the difference between project success and failure.

LOGISTICAL SOLUTION

Few barges in Alaska can support a project of this complexity, save for the SamB, which is designed to operate for exactly this kind of task. The articulated tug and barge have the capability to land and dock in a traditional marina setting or, through the use of a ramp, land onshore on mud or sand—perfect for situations where the project sites lack infrastructure. Moreover, the SamB is large enough to transport the cargo required to support the project and is staffed by a crew with decades of experience operating in the most difficult environments in Alaska.

Even with the SamB in place, planning its mobilization sequence and schedule for three islands was a complex endeavor to achieve barge safety and project cost effectiveness. Successfully mobilizing to the Aleutians requires in-depth understanding of tide schedules, historical weather patterns, and soil types and water depths at each barge landing. Ultimately, there are few windows of opportunity to avail of the high waters needed to both land the barge and set sail. Missing these windows would result in significant project delays. Together, in-depth evaluation of these inputs for three islands with differing conditions contributed to the project's final Gantt Chart.

ANOTHER DAY IN THE FIELD

Once mobilized, much was still needed to facilitate the fieldwork. In Umnak, two roads totaling 1.5-mi were constructed to access the project site (one road began at the barge landing to avoid the sinking of heavy equipment into the beach's soft, wet soils). On Caton Island, tundra mats were placed down for ground protection while moving heavy equipment in and around sensitive pre-historic archeological sites. To conduct a remedial action of a landfill

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located at the bottom of a bluff on Caton Island, a 200-ft road was constructed using a dozer attached to an excavator with a winchline to clear and excavate down the bluff's 25 to 30 percent grade.

Changed conditions were also met in the form of significant increases in the remediation scope of work. Caton Island soil excavation quantities were 40 percent higher than scoped. On Umnak, soil quantities increased twenty-fold from 20-yd³ up to 400-yd³. Despite these significant volumes, fieldwork was able to progress unhindered by having contingency supplies stocked onsite (SuperSacs), avoiding the need for a delivery of supplies from Anchorage. Applying years of scientific knowledge and experience, the field team was able to properly evaluate contamination levels on these sites, which were not previously characterized, to cost-effectively achieve site cleanup in accordance with client expectations.

On Umnak as well, the field crew unexpectedly encountered a 2,000-gal underground storage tank filled with diesel fuel. Using a diaphragm pump and intermediate bulk containers stocked in the mechanics connex, and an additional container procured from Dutch Harbor by the support boat, the tank was purged of its contents and removed from the project site without impact to budget or schedule.

MISSION ACCOMPLISHED

For the inexperienced contractor, encountering difficult weather, equipment malfunctions, limited site access, and sizable scope increases might be treated as contract modifications due to changed conditions. But for the experienced team that comes prepared, it's just another day in the field in America's Last Frontier.

On this unique three-part environmental restoration in the Aleutians, a hand-picked 12-person field team once again achieved project delivery seamlessly and without incident, and returned to Anchorage, mission accomplished.

TME

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