

MEMORANDUM FOR THE RECORD

SUBJECT: Long Range Acoustic Device (LRAD) Demonstration at John Day Dam

1. Attendance (others were present)

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2. Background

Gull predation on juvenile salmonids at John Day Lock and Dam (JDA) has increased in recent years, prompting the Corps of Engineers to make significant improvements in conventional avian deterrents, including the construction of a new avian wire array and the planned implementation of a boat-based hazing program in 2010. As part of our ongoing efforts to reduce avian predation impacts on ESA-listed salmonids, the Corps is interested in new technologies that may augment existing avian deterrent efforts. Birds have other impacts at Corps dams. Double-Crested Cormorants often roost on dam and powerhouse structures, causing costly maintenance problems; raptors sometimes nest on powerhouse structures and on parked gantry cranes, causing similar problems.

The Long Range Acoustic Device (LRAD), developed by American Technology Corporation (ATC), is a long range hailing and warning, directed acoustic beam device that has been used in a variety of applications, from military force protection to wildlife management. LRAD is capable of emitting a wide range of warning tones, in a focused beam, over long distances. DeTect, Inc. and ATC claim the following capabilities:

- Clearly audible communication for up to ~3 km
- Attention-getting and highly irritating warning tone effective 500 to 800 m

- Warning tone is effective, for human deterrent capability, at ~200 m. ATC received a report from a commercial ship's captain that the LRAD defeated a pirate attack at 0.6 to 0.8 nautical miles (1.1 to 1.5 km). This is the longest range that ATC has seen reported for the LRAD's deterrent capability.

Representatives from ATC (Richard Williams) and DeTect (Jared Quillen) performed a demonstration of the LRAD 1000X at JDA on 23 September 2009.

3. Notes on Operation (see attached LRAD 1000X product sheet for additional information)

- LRAD 1000X set-up is relatively simple. It took 5 to 10 minutes to mount the emitter on a dedicated tripod and connect it to the control panel case and power source. Alternatively, the device can be mounted in the bed of a pickup truck or permanently mounted somewhere, depending on needs/applications.
- Operates on 120 VAC, battery, inverter, or generator. We ran an extension cord out to the device and operated it on 120 at the nav lock, and ran it on a gas-powered generator at the Oregon shore.
- The LRAD can be operated all day without overheating, according to ATC and DeTect
- Safe operation requires minimal training. ATC offers a "train the trainer" operations and safety course at a cost of \$1,800.
- Control panel case and emitter are weather proof and field tested in harsh marine, desert, and oil field environments. ATC and DeTect recommended keeping the control panel case in a pickup truck while operating, as the panel itself (when case is open) is not 100% weatherproof.
- Because the LRAD produces loud, focused, irritating sounds, the Corps must consider beam trajectory and intensity when considering impacts to nearby residents, highway traffic, and dam visitors.

4. Demonstration Notes

The primary objective of the demonstration was to show Corps and PGE personnel how the LRAD 1000X device works and to discuss safety and logistics. The LRAD was tested in two locations: (1) Navigation lock deck, overlooking the tailrace, and (2) Oregon shore, near avian array anchor pole and recreational parking lot. First, the LRAD 1000X was set up on the navigation lock deck, overlooking the JDA tailrace. The emitter was mounted on a dedicated tripod and cabled to a power source (120 VAC) and the control panel, which is housed in a weatherproof case. Williams and Quillen discussed the basic specs, capabilities, and safety features of the LRAD.

Next, they demonstrated some of the sounds available in the audio library provided by DeTect with each purchase, including a variety of alarm sounds, shotgun blasts, bird distress calls, etc. The emitter was rotated around, toward the group, so participants could hear (with ear protection) the intensity and clarity of each sound. Although the sounds were audible behind the device, the sounds became increasingly intensified as the emitter was pointed at the group.

Bird Response

From the nav lock deck, we observed a group of cormorants roosting on the downstream rock island connected to the navigation lock guidewall. These birds responded to alarm pulse sounds (from nav lock deck) by slowly leaving the rocks and moving to open water to loaf. The birds were somewhat responsive, but reactions were not overt. DeTect rep Jared Quillen mentioned that each bird species seems to be sensitive to different sounds, and he had never used the LRAD on cormorants.

The LRAD was moved to the Oregon shore location (and powered by a gas-powered generator) to haze gulls we observed foraging near the Juvenile Bypass System (JBS) outfall. Gulls responded positively to gull distress sounds and negatively to alarm and shotgun sounds. Six gulls were initially seen foraging near outfall, but when the distress calls were played (directed near the birds) about 20 additional gulls flew in from downstream. At this point, all the gulls appeared agitated, flying in circles near the sound beam (30 degree arc). When the audio was switched to deterrent sounds and the emitter was manually turned to face downriver, the gulls invariably moved downstream. When the deterrent noises were stopped and the distress calls resumed, the gulls flew back and circled as before. This cycle was repeated twice, with consistent response by the gulls.

From the Oregon shore, cormorants foraging near the JBS outfall appeared to be highly responsive to the sounds of shotgun blasts.

5. Cost

ATC and DeTect estimated a purchase price of about \$32,670 (plus shipping) for a manually operated, basic LRAD 1000X (as demonstrated). Alternative mounting options, such as a pickup truck bed mount would cost extra.

6. Summary and Recommendations

In limited testing, the LRAD 1000X appeared to have a deterrent effect on a small number of gulls hunting near the JBS outfall. Gulls were particularly responsive to distress calls, as they flew toward the sounds when played on the LRAD. This could facilitate hazing, by LRAD or by conventional pyrotechnics. The device could also potentially be used to deter roosting or nesting in powerhouse structures or for long range voice communications (emergencies and enforcement).

Progressive habituation of birds to all hazing methods is known to commonly occur in all applications, so caution is advised in predicting its effectiveness at Portland District hydropower projects. LRAD would likely lose some of its initial deterrent impact if used in the same areas frequently and for an extended period of time. LRAD is not the “silver bullet” solution for avian deterrence, but it could be incorporated into our complex arsenal of avian predator abatement and control measures.

Safe operation appeared to be relatively simple, but specific operation guidelines may be required to minimize impacts to dam personnel, visitors, anglers, and highway traffic. ATC offers operation and safety training for LRAD users, but Corps personnel would have to devise guidelines for its operation at Corps facilities.

To further evaluate the avian deterrence value of the LRAD 1000X, we recommend that ATC and DeTect perform another demonstration at John Day Dam. This test should be held between April and July, when gull activity and predation on juvenile salmonids peak at John Day. Participants should include NWP biologists, biologists from the region, USDA Wildlife Services specialists, NWP rangers, and safety personnel should be present to facilitate discussion of demonstration results, operations, and safety.