30 September 2021

Memorandum for the Record - Evaluation of Caspian tern predation deterrence operation within John Day Reservoir

To - Anadromous Fish Evaluation Program Study Review Workgroup (AFEP SRWG) and Fish Passage Operation and Maintenance Coordination Team (FPOM)

From - David Trachtenbarg, Fish Biologist, Environmental Resources Branch, USACE Portland District

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ENDANGERED SPECIES ACT CONSULTATION REFERENCE:

- 2020 Columbia River System Biological Assessment (CRS BA), 2.3.2.6 "From April 10 – June 1 (or as feasible based on river flows), the John Day reservoir elevation will be held between 264.5 feet and 266.5 feet (an average of 265.5 feet) to deter [delay] Caspian terns from nesting in the Blalock Islands Complex…The operation may be adaptively managed due to changing run timing; however, the intent of the operation is to begin returning to reservoir elevations of 262.5–264.5 feet on June 1, but no later than June 15, which generally captures 95% of the annual juvenile steelhead migration. The results of this action would be monitored and communicated with USFWS and NOAA Fisheries."

- 2020 CRS NMFS Biological Opinion (CRS NMFS BiOp) § 1.3.2.3, "The Action Agencies propose to increase the normal forebay operating range at John Day Dam by 2 feet during April 10 through June 1 to deter [delay] Caspian terns from nesting at the Blalock Islands Complex. The purpose of this operation is to reduce predation pressure on spring migrating, ESA-listed juvenile salmon and steelhead."

- CRSO Environmental Impact Statement (CRSO EIS) Appendix R, Mitigation, Monitoring, and Adaptive Management Part 1, Monitoring and Adaptive Management Plan, Section 2.2.3 Predator Disruption Operations (John Day).

BACKGROUND AND 2021 EVALUATION PURPOSE:

The Caspian tern colony on the Blalock Islands Complex has grown from an average of 57 breeding pairs (2005-2013) to an average of 409 breeding pairs (2014-2020) (BRNW 2021). As a result, predation on ESA-listed stocks by terns nesting within this island complex has at least partially offset benefits achieved by reduced predation associated with management efforts at other nesting locations such as Goose and Crescent islands.

As set forth in the CRSO EIS, the CRS BA and the CRS NMFS BiOp, to deter Caspian terns from nesting on low-lying habitat during the steelhead and yearling Chinook salmon outmigration through the steelhead outmigration period in order to reduce predation on the respective ESA-listed juvenile salmonid stocks, FCRPS operations were intended to hold the John Day reservoir between 264.5-266.5 feet generally from April 10 - June 1, but no later than June 15 (or as feasible based on river flows).

This 2021 monitoring effort and summary is intended to evaluate the efficacy of this operation in 2021 regarding Caspian tern nesting success in the Blalock Islands Complex region. Additional 2021 avian monitoring of the Columbia River basin was funded by Bonneville Power Administration (BPA) and

conducted by Real Time Research and Oregon State University (collectively referred to as Bird Research Northwest, BRNW). Reporting by BRNW is separate from this document and is anticipated to be available at http://www.birdresearchnw.org/ once released by BPA and BRNW. Additional monitoring (e.g., smolt monitoring and passage timing through the hydrosystem), was conducted independently of this monitoring and will be reported through their respective reporting mechanisms (e.g., Fish Passage Center, DART).

RESULTS

John Day Dam Operations

For the 2021 season, the reservoir level was raised to the 264.5-266.5' range (as measured at the John Day Dam forebay) to submerge low-lying nesting habitat in the Blalock Island Complex as set forth in the 2020 CRSO EIS, the 2020 CRS BA and the 2020 CRS NMFS BiOp. The operation officially began on April 10 and ended on June 5 (*Figure 1*). The coordinated transition period from the high pool conditions to Minimum Irrigation Pool (MIP) (262.5-264.5 ft) was June 2-5. The reservoir reached MIP mid-day on June 5 and remained within the MIP range through August 31.

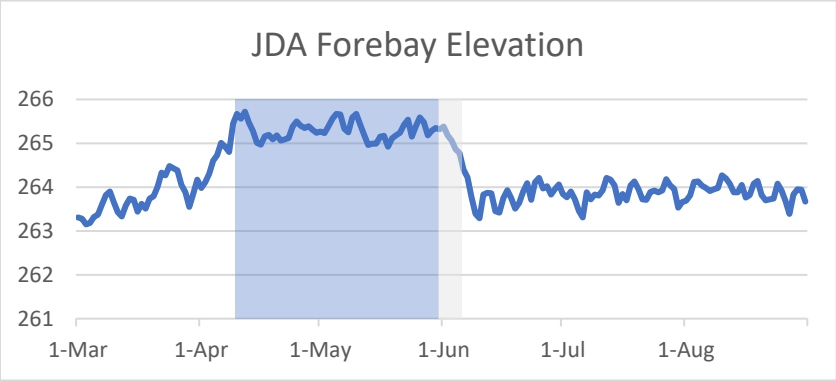

Figure 1. John Day Dam (JDA) operations. Extracted from DB Query on 23 September 2021 for station JDA.Elev-Forebay.Ave.~1Day.1Day.CBT-REV[ft]. The operation officially began on April 10 and ended on June 5 (light blue). The coordinated transition period from the high pool conditions to Minimum Irrigation Pool (MIP) (262.5-264.5 ft) was June 2-5 (light grey). The reservoir reached MIP mid-day on June 5 and remained within that range through August 31.

Survey Locations and Dates

The Civil Air Patrol - Air Force Auxiliary (CAP-AFAUX) flew over the John Day and McNary Reservoirs to capture imagery of nesting Caspian terns during six surveys (20 April, 04 May, 21 May, 03 June, 15 June, 13 July, and 10 August 2021). Imagery capture was at approximately 1,000 ft above ground level (pre-coordinated with USFWS Refuge for flights over Refuge property) and collected with a handheld digital camera from a CAP-AFAUX plane (Cessna 182 or Cessna 206). Corps biologists subsequently processed and reviewed the imagery to provide the following results.

Primary survey targets were the islands in the Blalock Island Complex (Figure 2, Figure 3). CAP-AFAUX observed other areas during flights and photographed potential nesting if Caspian terns was observed by flight crews. These secondary areas included: islands in the John Day Reservoir including Browns Island, Miller Rocks upstream of Miller Island, John Day Dam area including Preacher Island, and islands in the McNary Reservoir including islands in vicinity of outcroppings in McNary Dam forebay, Three Mile

Canyon, Blalock Island Complex, Crescent Island, Badger Island, Foundation Island, and the Findley Islands.

Figure 2. Blalock Island Complex showing names of smaller islands throughout the complex.

Figure 3. Geographic reach of surveys in the John Day and McNary Reservoirs during the 2021 Caspian tern nesting season extended from Browns Island (just downstream of Miller Rocks) to Foundation Island.

BLALOCK ISLANDS COMPLEX (PRIMARY) MONITORING RESULTS

The 2021 operation at John Day reservoir was successful in that no Caspian terns successfully nested within the Blalock Island complex during the spring 2021 operation.

Summary of Caspian tern nesting observations via aerial imagery collected by CAP-AFAUX during the spring of 2021 are provided in Figure 4. Imagery is available for all locations except for where dashes (-) indicate that Caspian terns were not observed in the field and CAP-AFAUX did not collect imagery of the respective location. Right rectified islands are a subset of the respective location and not intended to be 'double counted' in the summary table.

Location	Flight Survey Date						
	4/20/2021	5/4/2021	5/21/2021	6/3/2021	6/15/2021	7/13/2021	8/10/2021
	Nests	Nests	Nests	Nests	Nests	Nests	Nests
Browns Island	0	0	0	0	-	0	0
Island West of Miller Island	0	0	0	0	0	0	0
Islets North of Miller Island	0	0	0	0	0	0	0
Miller Rocks	0	0	0	0	0	0	0
JDA Preacher Island	0	0	0	0	0	0	0
Three Mile Islands	0	0	0	0	-	-	-
Blalock Island Complex (Sum)	*13*	*0*	*0*	*0*	*0*	0	0
Straight Six	0	0	0	0	0	0	0
Long, Middle Islands	0	0	0	0	0	0	0
Souther Island	0	0	0	0	0	0	0
Unnamed Island	0	0	0	0	0	0	0
Rock Island	13	0	0	0	0	0	0
Big Blalock	0	0	0	0	0	0	0
Little Blalock	0	0	0	0	0	0	0
Anvil Island	0	0	0	0	0	0	0
Sand Island	0	0	0	0	0	0	0
Blalocks Slough	-	-	0	0	0	0	0
McNary Forebay	0	0	0	0	0	0	0
Crescent Island	0	1	2	1	1	0	0
Badger Island (Sum)	0	*85*	*194*	*200*	*128*	*9*	0
Interior Colony	0	85	125	145	102	0	0
Shoreline Colony	0	0	69	55	26	9	0
Remainder of Island	0	0	0	0	0	0	0
Walla Walla Delta	-	-	0	0	-	0	0
Findley Islands	0	0	9	0	0	-	0
Foundation Island	0	0	0	0	0	-	0

Figure 4. Summary of Caspian tern nesting observations via aerial imagery collected by Civil Air Patrol - Air Force Auxiliary (CAP-AFAUX) during the spring of 2021. Dashes (-) indicate that Caspian terns were not observed in the field and CAP-AFAUX did not collect imagery of the location. Right rectified islands are a subset of the respective location.

Blalock Island Complex

- During the 20 April 2021 survey, 13 nesting pairs (Figure 4) appeared to be initiating nesting on Rock Island within the island complex (Figure 5) with a JDA forebay elevation of 265.18'. This was the only observation of potential nesting attempts during the 2021 raised pool operation period. This area was subsequently inundated during the subsequent survey on 04 May 2021 when the reservoir was at an elevation of 265.56' at the JDA forebay (*Figure 1*, Figure 5).
- Some limited numbers of Caspian terns, Double-crested cormorants, and gulls were observed loafing in the Blalock Island complex (e.g., Figure 6) following the lowering of the reservoir water levels back to the historical forebay operating range in early June (Figure 1). However, no delayed nesting attempts were observed in the CAP-AFAUX photography following the return of the John Day Reservoir to MIP (262.5-264.5').

Blalock Island Nesting Habitat Area

- Caspian tern nesting habitat during the spring 2021 operation was mostly inundated by the raised forebay measure as anticipated in the 2020 CRSO EIS, 2020 CRS BA, and 2020 CRS NMFS BiOp.
- While some limited low-lying habitat was available at times (e.g., Figure 5), low-lying habitat was generally not available during the April 10 through June 1 period (e.g., Figure 7). For example, the focal low-lying islands of South, Middle, and Long Islands (Figure 2, Figure 8, Figure 9) where the majority of historical nesting has occurred (Figure 14, Figure 15) was underwater during the April 10 through June 1 period (Figure 8).

Figure 5. Rock Island in the Blalock Island Complex on 20 April 2021 (top), 04 May 2021 (middle), and 13 July 2021 (bottom). Photos taken by the Civil Air Patrol, Air Force Auxiliary (CAP-AFAUX).

Figure 6. Long and Middle Island in the Blalock Island complex (John Day Reservoir) on 13 July 2021. Photo taken by the Civil Air Patrol, Air Force Auxiliary (CAP-AFAUX).

Figure 7. Unnamed Island (also called Basketball Island) in the Blalock Island complex on 04 May 2021 (top) and 13 July 2021 (bottom). Photos taken by the Civil Air Patrol, Air Force Auxiliary (CAP-AFAUX).

Figure 8. Blalock Island Complex on 03 June 2021 (top) and 13 July 2021 (bottom). For orientation, in the top photo, Straight Six Island is in the foreground (lower left), Big Blalock and Little Blalock Islands are in the upper left, Anvil and Sand Islands are on the right and the low-lying South, Middle, and Long Islands between Anvil and Sand Islands are underwater (red circle area). Photo taken by the Civil Air Patrol, Air Force Auxiliary (CAP-AFAUX).

Figure 9. South, Middle, Long, and Anvil Islands within the Blalock Island Complex on 13 July 2021. Photo taken by the Civil Air Patrol, Air Force Auxiliary (CAP-AFAUX).

SECONDARY TARGETS MONITORING RESULTS

Crescent Island

- A single nesting pair was observed at Crescent Island during the 2021 spring nesting season. This nest was present during 04 May to 15 June CAP-AFAUX surveys and in the middle of the historic tern nesting area and surrounded by co-nesting gulls (Figure 10).
- A potential second nesting pair may have been present on 21 May 2021 adjacent to the first nest. However, a total of two terns appeared to be present in close proximity to each other and not observed again in subsequent surveys.

Figure 10. Crescent Island - 2021 - A single Caspian tern nesting pair was observed in the historic colony area during the spring nesting season. Photo taken by the Civil Air Patrol, Air Force Auxiliary (CAP-AFAUX).

Findley Islands

- It appeared that approximately 9 pairs of Caspian terns may have been attempting to initiate nesting on a low-lying gravel bar within the Findley Islands during the 21 May survey (Figure 11). This was the only nesting attempt observed during aerial surveys and was not conclusive as to whether terns were solely loafing, attempting to initiate nesting and/or actively nesting.

Figure 11. Findley Islands (top photo) in McNary Reservoir on 21 May 2021 with Caspian terns on the upstream gravel bar (bottom photo). Photos taken by the Civil Air Patrol, Air Force Auxiliary (CAP-AFAUX).

Badger Island

- The only substantive nesting colony within the John Day and McNary Reservoirs during the 2021 spring nesting season occurred at Badger Island (Figure 4, Figure 12). Caspian terns nested at two locations on the island, at a site along the shoreline and at a site on the interior of the island (Figure 13).

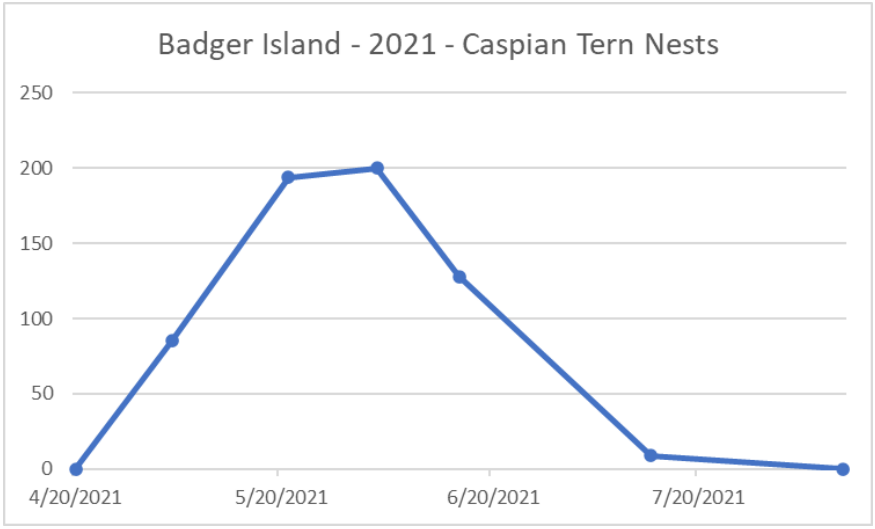

Figure 12. Caspian tern nesting pairs at Badger Island during the 2021 nesting season.

Figure 13. Badger Island in McNary Reservoir (top photos) - Caspian terns nested on the interior of the island (lower left photo) and along the shoreline (lower right photo) near the northern end of the island (upper photos). Photos taken by the Civil Air Patrol, Air Force Auxiliary (CAP-AFAUX).

HISTORICAL REFERENCE FIGURES

	Year															
Colony	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Goose Is. (Potholes Res)	325	273	282	293	487	416	422	463	340	159	2	0	0	0	0	6
Crescent Is. (Columbia River)	476	448	355	388	349	375	419	422	393	474	0	0	0	0	0	0
Blalock Is. (Columbia River)	6	110	43	104	79	136	20	6	26	45	677	483	449	313	379	150
Badger Is. (Columbia River)	0	0	0	0	0	0	33	60	0	0	0	0	41	8	0	0
Twinning Is. (Banks Lake)	13	23	31	27	61	34	19	22	13	67	64	6	0	0	0	0
Harper Is. (Sprague Lake)	7	7	0	11	4	4	4	30	1	8	10	3	92	79	18	0
North Rocks and Shoal Is. (Lenore Lake)	0	0	0	0	0	0	0	0	0	0	0	0	123	91	48	53
Total	**827**	**861**	**711**	**823**	**980**	**965**	**917**	**1003**	**773**	**755**	**769**	**675**	**705**	**491**	**445**	**209**

Figure 14. Sizes of Caspian tern breeding colonies (number of breeding pairs) at both managed and unmanaged colonies in the Columbia Plateau region prior to (2005-2013) and during (2014-2020) management (Table 3, BRNW 2021).

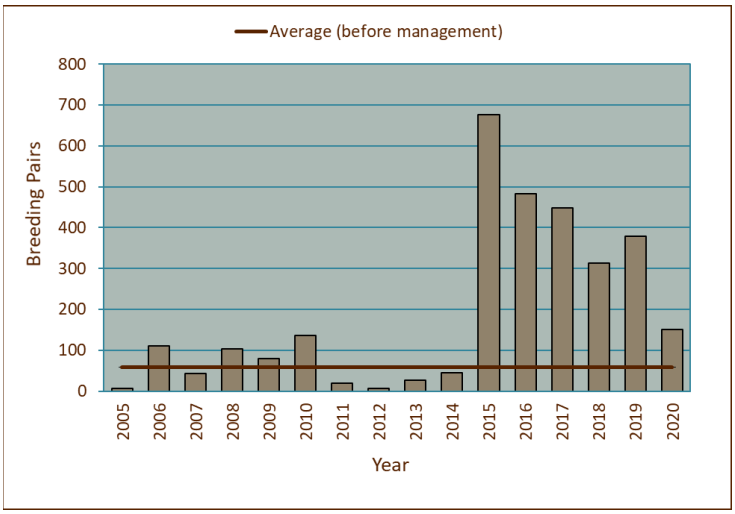

Figure 15. Size of the Caspian tern breeding colony (number of breeding pairs) at the Blalock Islands in the mid-Columbia River during 2005-2020. Also, provided is the average number of breeding pairs of Caspian terns on the Blalock Islands prior to tern management in the Columbia Plateau region (2005-2013). (Figure 4, BRNW 2021).

LITERATURE CITED

BRNW, 2021. *Avian Predation in the Columbia River Basin: 2020 Final Annual Report.* Submitted to Bonneville Power Administration (Contract No. 60846, Project No. 1997-024-00) and Grant County Public Utility District and the Priest Rapids Coordinating Committee (Agreement No. HFA 601-30H). Submitted by Real Time Research, Inc., and Oregon State University on 28 June 2021.

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