Canada Goose Nest Monitoring along Rocky Reach Reservoir, 2017

Public Utility District No. 1 of Chelan County

P.O. Box 1231

Wenatchee, WA 98807-1231

June 2017

Introduction

Chelan County PUD monitors Great Basin Canada goose (*Branta canadensis* ssp. *moffittii*) nesting activity each spring along the Rocky Reach Reservoir portion of the Columbia River in compliance with the 2016 – 2020 Rocky Reach Wildlife Habitat Plan (Chelan PUD 2015) approved by the Federal Energy Regulatory Commission (FERC). Canada goose nest monitoring along Rocky Reach Reservoir was initiated in 1983 to collect baseline data for a proposed pool rise that was denied by the FERC in 1994 (FERC 1994). From 1983 through 1994, artificial nest platforms were installed to enhance Canada goose nesting success along Rock Reach Reservoir.

Canada goose nest monitoring continued annually through 2009 under the original license to operate Rocky Reach Reservoir. Under the new operating license, awarded in 2009 (FERC 2009), the FERC required a new Wildlife Habitat Management Plan to be developed by the Rocky Reach Wildlife Forum (RRWF). In 2010, the FERC approved the 2010 Rocky Reach Wildlife Habitat Management Plan (FERC 2010) which prescribed continued Canada goose nest monitoring along Rocky Reach Reservoir through 2015. The FERC requires that the Rocky Reach Wildlife Habitat Management Plan be updated every 5 years. The FERC approved the 2016-2020 Rocky Reach Wildlife Habitat Management Plan (Plan) in 2015 (FERC 2015). For the current Plan (2016-2020), the need for Canada goose nest monitoring will be determined by the RRWF annually. For 2017, the RRWF agreed to maintain 20 artificial nest platforms and conduct Canada goose nest monitoring along Rocky Reach Reservoir as in previous years. Nests, both on natural substrates and in man-made structures, were monitored to determine the number of nests initiated and nesting success. Chelan PUD provides and maintains the man-made nesting structures for Canada geese. This annual report summarizes goose nesting along Rocky Reach Reservoir for the 2017 nesting season and provides a brief summary of surveys conducted to date.

Study Area

The project area is located along the Columbia River in North-central Washington State. The surveys take place along Rocky Reach Reservoir from river miles 474.6 to 490.1. Chelan and Douglas counties border the west and east sides of the reservoir, respectively. Steep cobble and dirt banks comprise much of the reservoir shoreline. Shrub steppe vegetation, fruit orchards, parks, residential, and industrial areas occupy areas up-slope from the riparian edge of the river. The reservoir has islands which Canada geese use for nesting. Geese prefer to nest on small islands where they blend in with the rocks and low vegetation. The small islands are highly preferred over mainland nesting opportunities because they offer increased protection from predators and good visibility of the surrounding area. When threatened, the geese can easily escape to the safety of the water, where few predators can attack them.

Vegetative cover of the islands is characterized by the shrub steppe habitat that covers most of central Washington. Shrub steppe vegetation is dominated by big sagebrush (*Artemisia tridentata*), rabbitbrush (*Chrysothamnus* spp.), and bluebunch wheatgrass (*Pseudoroegneria spicata*). However, at the water's edge of the islands a variety of riparian plant species occur that provide additional nesting cover.

Management History

Man-made Nests

In addition to monitoring Canada goose ground nests on natural substrates, Chelan PUD maintains and monitors 20 man-made elevated goose nesting structures (nest tubs) along Rocky Reach Reservoir. The nest tubs consist of metal barrels, fiberglass, or tire tubs on elevated platforms. The metal barrels

were split in half to create surface area for nesting geese and mounted on metal poles with concrete footings and situated on small islands or in the shallows along the Reservoir. Fiberglass tubs consist of a one-piece fiberglass tub mounted on a pole and set into rockwork. Tire tubs are constructed by using old vehicle tires and bolting them to a triangular-shaped platform elevated by metal legs. Some of the metal support legs are encased in PVC pipe to further deter mammalian predators from climbing into the structures. Additionally, other artificial nests like rock rings or driftwood "blinds" have been assembled from materials on-site, providing enhanced ground nest sites but are not counted as man-made elevated nest platforms. Prior to nesting season, field crews prepared the nest tubs with fresh straw as a nesting substrate. Necessary repairs or modifications to the structures were completed during pre-season preparations.

The Washington Department of Fish and Wildlife (WDFW) erected several goose nest structures along Rocky Reach Reservoir in the late 1970's and early 1980's, of which Chelan PUD currently monitors. By 2006, there was a maximum of 24 nest tubs on Rocky Reach Reservoir. Over time, some tubs have deteriorated or were removed due to lack of access from shoreline development. A total of 20 tubs were serviceable and available for Canada geese for the 2017 nesting season.

Geese prefer to nest in close proximity to water where they can readily escape from potential dangers. Geese practice site fidelity, i.e., they nest in the same locations year after year. Many of these well-used natural ground nests are marked with flagging or numbers on nearby rocks (for identification purposes) from past years.

Canada Goose Population Management

During the winter of 1996 – 1997, the portion of the Columbia River between Rock Island Dam and Winesap (Oklahoma Gulch; approx. 17 miles upstream of Rocky Reach Dam) was opened to Canada goose hunting. Prior to that winter, goose hunting had been closed within 1/4 mile of that portion of the Columbia River. The liberalized goose hunting boundaries were, in part, a response to public requests to reduce goose numbers observed at parks and golf courses in the Wenatchee area (Fielder 1997). The increased fall and winter goose hunting along the Columbia River in the Wenatchee area likely harvests a large proportion of resident geese. This may result in less nesting geese locally the following spring.

Throughout the year, Canada geese are very common in parks and orchards adjacent to Rocky Reach Reservoir. To assess the movement patterns of Canada geese in the Wenatchee area, WDFW conducted a goose banding effort along Rock Island Reservoir, downriver from Rocky Reach Reservoir, from 2009 – 2013. Canada geese were banded by WDFW during the molt period, when most geese are flightless. During the 2009 banding effort, adult birds were also marked with a numbered PVC neck collar. Hatch-year birds were marked with leg bands only. During similar efforts beginning in 2010 to current efforts, only leg bands were used to mark both adults and juvenile birds. In 2015, WDFW began banding Canada geese on Rocky Reach Reservoir, near Rivermile 478. Band returns though hunter harvest or direct observation (especially for neck collars) will provide some information on movement patterns for geese in the Wenatchee area.

Methods

2017 Surveys

In 2017, goose nest monitoring along Rocky Reach Reservoir began on 31 March. Chelan PUD biologists conducted 5 surveys during the 2017 nesting season. Generally, each nest was visited 2 - 3 times per season: one visit during nest initiation, incubation, and following hatch. Throughout the nesting season, we determined the location and number of nests encountered, number of eggs laid, and the fate of each nest attempt (including causes of predation and other unsuccessful nesting attempts) during nest surveys. Nests were documented if they had at least one egg in them. Successful nests were those from which at least one egg hatched and at least one gosling left the nest. Numbers of nesting attempts are summarized in total and by nest substrate (man-made or natural). Clutch size was calculated from successful nests only.

Results and Discussion

Nest Success

We observed 58 Canada goose nests along Rocky Reach Reservoir which contained a total of 334 eggs. Seventy-eight percent (n = 259) of all the eggs laid hatched. The average clutch size for nests on all substrates was 5.4 eggs/nest and the average number of goslings produced was 5.0 goslings/nest (calculated from successful nests only). Eighteen nests containing 117 eggs were attempted in 20 available goose tubs provided by Chelan PUD. Seventeen of those nests (94%) were successful in producing goslings (n = 108). One nest initiated in a goose tub was unsuccessful. The Canada goose was observed incubating 7 eggs on 31 March. The gander that flew up as we inspected the nest appeared to be a Canada x domestic hybrid. The goose incubated the eggs throughout the season, and on the 5 June wrap-up survey, she was gone and all 7 eggs appeared to be infertile upon inspection. By comparison, we observed 40 nests on natural substrates along the reservoir containing 217 eggs, and 32 (70%) were successful. Of the 217 eggs laid in nests on natural substrates, (70%) hatched, producing 151 goslings. With the exception of clutch size, results from the 2017 goose monitoring were better than the long-term average (Table 1).

Fledging success was greater in man-made structures (92%) along Rocky Reach Reservoir compared to 70% fledging success at natural sites (Table 2). The occupancy rate of man-made structures was high 90% (18 of 20 available sites occupied). However, the number of goslings produced (n = 151) from natural nests was greater than the number produced (n = 108) from goose tubs simply due to the higher proportion of natural nests (69%) relative to the proportion of nests in goose tubs (31%).

Although occasional “hybrid” geese (Canada x domestic cross) were observed along Rocky Reach Reservoir, only one was observed in 2017 and was suspected to be the gander to a nesting goose that produced and incubated infertile eggs. The “hybrid” was seen in the vicinity of Entiat. No instances of nesting domestic geese were observed in 2017.

Unsuccessful Nests

Canada goose nests on Rocky Reach Reservoir had a failure rate of 15% with 9 of 58 nests failing in 2017. Of the nests that failed, 8 (89%) were located on natural substrates and 1 (11%) was located in a nest tub. Five of the 9 failed nests were documented as being destroyed by mammalian or avian predators. Three other nests were initiated and subsequently abandoned for unknown reasons. One additional nest was found to have an entire clutch of infertile eggs). Many of the successful nests (n = 49) suffered some loss of eggs to avian or mammalian predation yet were able to successfully hatch goslings following the partial loss of eggs. Infertile or unhatched eggs were also observed in some nests. One nest was found to have an abnormally small egg that did not hatch.

During some years early runoff can flood nests, particularly near the river confluences. Although snowpack ranging above normal for lowland elevations during the winter of 2016 – 2017 combined with a cool wet spring resulted in higher-than-average flows for the Columbia River and its tributaries throughout April and May, no Canada goose nest failures or partial losses were attributed to flooding by high water in 2017 along Rocky Reach Reservoir. All goose nests had hatched by the first week of June.

The percent of successful nests (84%) for 2017 along Rocky Reach Reservoir was above the long-term average success rate of 70% from 1983 – 2016 (Table 1). However, overall clutch size (5.4 eggs) in 2017 was below the overall average of 6.1 eggs. Rocky Reach Reservoir had a higher than average number of goslings produced; with 259 goslings leaving the nests in 2017 (Table 1).

There has been an increase in mammalian predators such as mink and raccoon along Rocky Reach Reservoir since 2000, when a Washington State voter initiative was passed that greatly restricted furbearer trapping techniques. A total of 5 Canada goose nests along Rocky Reach Reservoir were destroyed by mammalian predators during 2017. Common ravens have been observed nesting on cliffs along the Reservoir, and in years past have predated eggs from nest tubs that are difficult for mammalian predators to access, although this activity was not observed during 2017.

Marked Geese

Marked geese (neck collars and/or leg bands) are commonly observed along Rock Island Reservoir. However, no banded Canada geese were observed nesting along Rocky Reach Reservoir during 2017. From 2010 – 2013, 157 of 374 (42%) adult geese captured during WDFW banding efforts along Rock Island Reservoir were re-captures from previous banding efforts in the Wenatchee area (Rock Island golf course and Walla Walla Park combined; WDFW 2013, unpubl. data). No capture effort occurred during 2017.

Capture efforts during 2016 along both Rock Island and Rocky Reach reservoirs were conducted on 17 June 2016. The Rocky Reach capture effort was located upstream of Turtle Rock, where geese tend to congregate in large numbers along a cherry orchard. The Rocky Reach capture effort resulted in 92 newly banded geese (46 goslings and 46 after-hatch-year birds). An additional 41 geese that were previously banded were recorded as recaptures during this effort. The Rock Island Reservoir capture effort was conducted at Chelan PUD's Walla Walla Point Park swim beach and resulted in 171 newly banded geese (71 goslings and 100 after-hatch-year birds) and 44 recaptured geese (M. Wilson, WDFW, pers. comm).

Interspecific Nest Competition

The frequency of Canada geese initiating nests in nests built by osprey has become an increasing problem. Chelan PUD installs artificial nest platforms to alleviate issues (power outages and unauthorized take of protected species) with osprey nesting on power lines. As the number of osprey nesting platforms increases, so does the frequency of geese taking over osprey nests. Canada goose occupancy of osprey nests were documented on beginning in 2005 (Table 3).

Canada geese begin nesting in mid-March prior to the arrival of osprey (early April in North-central Washington). When displaced from traditional nesting sites, ospreys have the tendency to build new nest structures nearby, frequently atop distribution and transmission line structures. Some structure configurations are not compatible with osprey nests and are at risk for power outages, pole fires, and are hazardous to the osprey. Current osprey nests are maintained so as to ensure the nests and structures are compatible.

After a number of goose-osprey conflicts during the nesting seasons of 2005 – 2008 (Table 3), Chelan PUD experimented with covering of osprey nest platforms with a "goose deterrent" to prevent geese from initiating nests in late winter of 2009. The goose deterrent consists of a large boat buoy covered with a heavy duty tarp and secured to the platform, creating a covered, convex surface that geese cannot nest on. Covers were installed during late winter and removed upon the return of osprey to territories on or around April 1. Of the 3 platforms that were covered in early 2009, none were occupied by Canada geese. Following removal of the nest covers, all 3 of nests were occupied by breeding osprey.

In subsequent years, additional covers were added as management concerns regarding additional sites arose. However, osprey nests on man-made or natural substrates not managed by Chelan PUD have been overtaken by geese. Monitoring of these potential problem sites helps Chelan PUD to identify areas of increased risk to transmission and distribution systems by displaced osprey. To the extent possible, Chelan PUD will manage osprey and Canada goose nests on its electrical system to reduce conflicts consistent with state and federal permits and Chelan PUD's Avian Protection Plan.

Program Summary

The number of Canada goose nests initiated on Rocky Reach Reservoir in 2017 (n = 58) is above the long-term average of 55 nests (Table 1). A total of 18 nest tubs were used during 2017, which is slightly above the 2010 – 2017 average of 17. The success rate of nests initiated in nest tubs during 2017 was 94%, higher than the 2010 – 2016 average of 78%. For nests on natural substrates, 40 were initiated with a success rate of 80% during 2017 compared to the 2010 – 2016 average of 44 natural nests with a 74% success rate for the same time period (Table 2).

The addition of nest tubs along Rocky Reach Reservoir over time has helped to increase the numbers of nesting pairs of Canada geese. Numbers of Canada goose nests increased until 1997 (Figure 1), after which nesting attempts declined. The decline occurs shortly after hunting for Canada geese was re-opened during the winter of 1996 – 1997 after it had been closed some years earlier (Fielder 1997). Numbers of nesting Canada geese along Rocky Reach Reservoir stabilized during the 2000's (Figure 1) and have been generally increasing since 2010.

Acknowledgements

This project is conducted by the Public Utility District No. 1 of Chelan County to fulfill requirements for wildlife surveys under Article 404 of the Rocky Reach Hydroelectric Project as guided by the Rocky Reach Wildlife Habitat Management Plan (Chelan PUD 2009). Chelan PUD Natural Resources Department intern Rhiannon Volking assisted with nest surveys along the Reservoir.

Literature Cited

Chelan PUD. 2009. Rocky Reach Wildlife Habitat Management Plan. Final. Rocky Reach Hydroelectric Project No. 2145. 31 December 2009. Chelan PUD, Wenatchee, WA.

Chelan PUD, 2015. Wildlife Habitat Management Plan, 2016-2020. Final. Rocky Reach Hydroelectric Project No. 2145. 17 September 2015. Chelan PUD, Wenatchee, WA.

Federal Energy Regulatory Commission (FERC) 2010. Order Approving Wildlife Habitat Management Plan Pursuant to Article 403, 132 FERC ¶ 62,179. Rocky Reach Hydroelectric Project. FERC, Washington D. C.

Federal Energy Regulatory Commission (FERC) 2009. Order on Offer of Settlement Issuing New License, 126 FERC ¶ 61,138. Rocky Reach Hydroelectric Project. FERC, Washington D. C.

Federal Energy Regulatory Commission (FERC) 1994. Final Environmental Assessment, Application to Increase Reservoir Pool Level for the Rocky Reach Hydroelectric Project. Federal Energy Regulatory Commission, Washington D. C.

Fielder, P.C. 1997. Canada Goose Nesting 1997, Rock Island and Rocky Reach Reservoirs, Columbia River, Chelan and Douglas Counties, Washington. Chelan County PUD, Wenatchee, WA.

Washington Department of Fish and Wildlife (WDFW). 2013. Western Goose Round-up, 2013 unpublished data.

Wilson, Matthew, Statewide Waterfowl Specialist, Washington Department of Fish and Wildlife. Personal communication with Kelly Cordell, Chelan PUD Wildlife Biologist, re: Wenatchee Canada goose banding, 20 June 2016.

Table 1. Canada goose nesting success along Rocky Reach Reservoir, historical data (1983 - 2016) and current year (2017).

	Period	AVG # of initiated nests	Avg. clutch size	AVG % successful nests	AVG # successful nests	AVG # goslings fledged
Historical	1983 - 1992	51	6.4	55%	28	165
	1993 - 2002	57	6.1	74%	41	232
	2003 - 2012	53	5.9	77%	40	218
	2013 - 2016	63	5.7	79%	49	261
Program summary	1983 - 2016	55	6.1	70%	38	212
This season (actuals)	2017	58	5.4	84%	49	259

Table 2. Canada goose nesting summary including number of nests and nest success (overall and by nest substrate) along Rocky Reach Reservoir, 2010 - 2017.

						% Nest Success		
Year	Total	# Natural	% Natural	# Man-made	% Man-made	Overall	Natural	Man-made
2010	49	32	65	17	35	67	69	65
2011	59	45	76	14	24	75	73	79
2012	69	49	71	20	29	74	74	75
2013	60	43	72	17	28	82	86	71
2014	56	40	71	16	29	77	68	100
2015	72	54	75	18	25	78	74	78
2016	63	45	71	18	29	77	73	82
AVG	61	44	72	17	28	76	74	78
2017	58	40	69	18	31	84	80	94

Table 3. Osprey nests overtaken by Canada geese in Chelan PUD service area, 2005 – 2017. Goose deterrents were first deployed in 2009.

Year	# Osprey Nests occupied by Canada geese
2005	2
2006	5
2007	6
2008	9
2009	6
2010	4
2011	4
2012	2
2013	5
2014	4
2015	2
2016	2
2017	4
AVG	**4.2**

Figure 1. Number of Canada goose nests documented along Rocky Reach Reservoir by year, 1983 - 2017.