

# Canada Goose Nest Monitoring along Rocky Reach Reservoir, 2015



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**June 2015**

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## Introduction

The Chelan County PUD monitors Great Basin Canada goose (*Branta canadensis ssp. moffittii*) nesting activity each spring along Rocky Reach Reservoir along the Columbia River in compliance with Federal Energy Regulatory (FERC) requirements. 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 Federal Energy Regulatory Commission in 1994 (FERC 1994). From 1983 through 1994, artificial nest platforms were installed to enhance Canada goose nesting success along Rocky Reach Reservoir. Per the Rocky Reach Wildlife Management Plan approved by the FERC in September of 2010, Chelan PUD continues to monitor Canada goose nesting along Rocky Reach Reservoir (Chelan PUD 2009). Nests, both on natural substrates and in man-made structures, are 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 2015 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 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. 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 due to development. A total of 20 tubs were serviceable and available for Canada geese for the 2015 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.

## **Hunting and Development**

During the winter of 1996 – 97, 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 at parks and golf courses adjacent to Rocky Reach Reservoir. To assess the movement patterns of Canada geese in the Wenatchee area, WDFW conducted goose banding efforts in the Wenatchee area from 2009 – 2013. The geese were banded by WDFW during the molt period, when most geese are flightless. Canada geese were banded at several locations within the Wenatchee Valley including Rock Island Golf Course, Wenatchee Confluence State Park, and Walla Walla Point Park. All of these sites are located along the Rock Island Reservoir, located downstream of Rocky Reach Dam. The banding efforts from 2009 – 2013 did not occur at sites along Rocky Reach Reservoir.

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 in 2010 – 2013, only leg bands were used to mark both adults and juvenile birds. The banding effort was not conducted during 2014 but was planned to occur in 2015 along Rocky Reach Reservoir. Band returns through hunter harvest or direct observation (especially for neck collars) will provide some information on movement patterns for geese in the Wenatchee area.

## **Methods**

### **2015 Surveys**

In 2015, goose nest monitoring along Rocky Reach Reservoir began on 26 March. Chelan PUD biologists conducted 4 surveys during the 2015 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.

In the initial Rocky Reach Wildlife Management Plan (Chelan PUD 2009) the Rocky Reach Wildlife Forum decided to evaluate the need to maintain artificial goose nest platforms along Rocky Reach Reservoir. Numbers of nesting attempts are summarized in total and by nest type (man-made or natural).

## **Results and Discussion**

### **Rocky Reach**

Canada geese attempted 72 nests along Rocky Reach Reservoir. No instances of nesting domestic geese were observed in 2015. A total of 56 nests (78%) were successful. A total of 370 eggs were laid in the 56 nests. The eggs had a hatch rate of 80%, with 296 goslings fledged. Eighteen nests containing 108 eggs were attempted in 20 available goose tubs provided by Chelan PUD (one tub was used twice in the same season by different geese). Fourteen of those nests (82%) were successful in producing goslings (n = 96). Two nests in goose tubs were unsuccessful. One nest was destroyed by an unknown predator, and another contained infertile eggs. By comparison, of 54 natural nests along the reservoir, 40 (74%) fledged goslings. Of the 262 eggs laid in natural nests, 200 (76%) fledged from the nests. The average clutch size was 5.3 eggs/nest. The average number of goslings fledged per nest (calculated from successful nests only) was 4.9 goslings/nest. With the exception of clutch size, results from the 2015 goose monitoring were better than the long-term average (Table 1).

Fledging success was greater in man-made structures (89%) along Rocky Reach Reservoir with 96 goslings fledging, compared to 76% fledging success at natural sites. The occupancy rate of man-made structures was high 85% (17 of 20 available sites occupied). Rocky Reach Reservoir has fewer smaller islands and natural features preferred by Canada geese for nesting.

Although many apparent “hybrid” geese (Canada x domestic cross) were observed along Rocky Reach Reservoir, none were observed to be nesting in 2015. These “hybrid” geese were seen most frequently in an area approximately 2 - 3 miles upstream from Turtle Rock Island.

### **5-Year Summary**

The average number of Canada goose nests initiated on Rocky Reach Reservoir for the first 5-year Rocky Reach Wildlife Habitat Plan (2010 – 2014) was 56.2 nests, slightly above the long-term average of 54 nests (Table 1). An average of 16.8 man-made structures were used during the 2010 – 2014 period with an average nest success of success rate of 77.8% compared to an average of 39.3 natural nests initiated with a 73.8% success rate (Table 1). For the past 6 years, percent nest success has been similar between natural and man-made nest sites (Table 2).

### **Unsuccessful Nests**

Rocky Reach Reservoir had a failure rate of 22% with 16 of 72 nests failing in 2015. Of the nests that failed, 14 were located on natural substrates and 2 were located in nest tubs. Fourteen of the 16 nests were documented as being destroyed by mammalian or avian predators, one was found to have infertile eggs, and one was abandoned for unknown reasons. Many nests 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.

During some years, early runoff can flood nests, particularly near the river confluences. No Canada goose nest failures or partial losses were attributed to flooding by high water in 2015. Low snowpack during the winter of 2014 – 2015 and an early, dry spring resulted in lower flows for the Columbia River and its tributaries. All goose nests had fledged by the second week of June.

The percent of successful nests (78%) for 2015 along Rocky Reach Reservoir was above the long-term average success rate of 69% from 1983 – 2014 (Table 1). However, clutch size (5.9 eggs) in 2015 was below the average of 6.1 eggs. Rocky Reach Reservoir had a higher than average number of fledged goslings with 296 goslings leaving the nests in 2015 (Table 1).

There has been an increase in mammalian predators such as mink and raccoon on both reservoirs since 2000, when a Washington State voter initiative was passed that greatly restricted furbearer trapping techniques. A total of 11 Canada goose nests along Rocky Reach Reservoir were destroyed by mammalian predators during 2015. Common ravens have been observed nesting on cliffs along the Reservoir, and may account for 2 additional destroyed nests and eggs, especially eggs predated from man-made structures that are difficult for mammalian predators to access.

### **Marked Geese**

Marked geese (neck collars and/or leg bands) are commonly observed along Rock Island Reservoir. No marked Canada geese were observed nesting along Rocky Reach Reservoir during 2015. 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 (WDFW 2013, unpubl. data) in the Wenatchee area (Rock Island golf course and Walla Walla Park combined).

One neck collared goose was observed frequently in the vicinity of the Horan Nature Area at Confluence State Park (approx. 5 miles downstream of Rocky Reach Dam; along Rock Island Reservoir). However, it was unknown if this collared goose was nesting along the Reservoir or simply travelling with family groups, as it was not directly observed incubating a clutch of eggs or tending to a nest. A banding effort by WDFW for Rocky Reach Reservoir Canada geese was scheduled for late June 2015.

### **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.

## **Long-Term Summary**

The addition of man-made goose 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 have stabilized since the late 1990’s (Figure 1).

## **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). Carl Brunette, Scott Hopkins, Todd Jackson, and Dennis Litchfield prepared nesting tubs for the season and Ryan Baze assisted with nest surveys along the Reservoir.

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**Table 1. Canada goose nesting along Rocky Reach Reservoir, historical data (1983 - 2014) and current year (2015).**

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 - 2014	58	5.5	80%	46	246
Program summary	1983 - 2014	54	6.1	69%	37	208
This season (actuals)	2015	72	5.9	78%	56	296

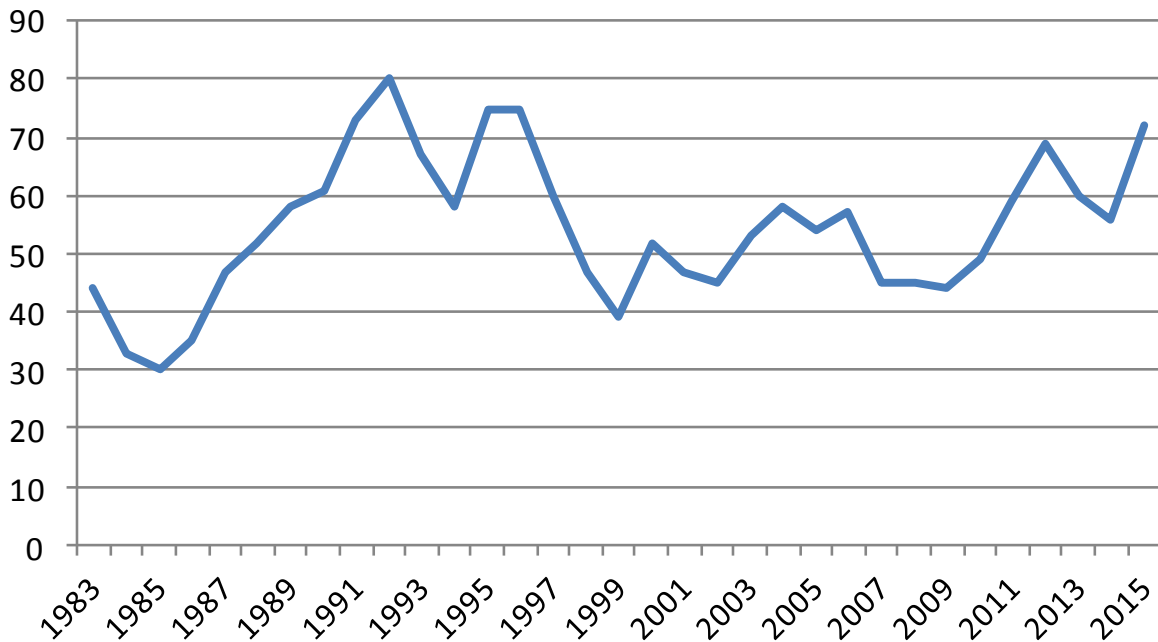
**Table 2. Canada goose nesting summary including number of nests and nest success (overall and by nest type) on Rocky Reach Reservoir, 2009 - 2015.**

YEAR	TOTAL	Natural	% Natural	Man-made	% Man-made	% Nest Success		
						Overall	Natural	Man-made
2010	49	32	65.3	17	34.7	67.3	68.8	64.7
2011	59	45	76.3	14	23.7	74.6	73.3	78.6
2012	69	49	71.0	20	29.0	73.9	73.5	75.0
2013	60	43	71.7	17	28.3	81.7	86.0	70.6
2014	56	40	71.4	16	28.6	76.8	67.5	100.0
2015	72	54	75.0	18	25.0	77.8	74.1	77.8
AVG	60.8	43.8	71.8	17.0	28.2	75.4	73.9	77.8



**Table 3. Osprey nests overtaken by Canada geese in Chelan PUD service area, 2005 – 2015. 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
<b>AVG</b>	<b>4.5</b>



**Figure 1. Number of Canada goose nests documented along Rocky Reach Reservoir by year, 1983 - 2015.**