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Cc:	Sokolowski, Rosana; Smith, Michelle
Subject:	2014 Goose nest monitoring Report
Date:	Thursday, July 31, 2014 3:12:21 PM
Attachments:	Goose Nesting summary 2014.pdf

Dear Rocky Reach Wildlife Forum Members,

Good afternoon, please find attached the 2014 Canada Goose Nest Monitoring Report as required under the Rocky Reach Wildlife Habitat Management Plan. I hope this report will be useful in guiding our monitoring efforts for the next 5-year Rocky Reach Wildlife Management Plan that will be drafted this fall.

Please contact me if you have any questions.

Sincerely,

Von

Von R. Pope

Wildlife Program Manager

Chelan County PUD

509.661.4625

Goose Nesting Monitoring along Rock Island and Rocky Reach Reservoirs, 2014

Von R. Pope and Kelly Cordell-Stine

Public Utility District No. 1 of Chelan County

P.O. Box 1231

Wenatchee, WA 98807-1231

July 2014

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Introduction

The Chelan County PUD monitors Great Basin Canada goose (*Branta canadensis* ssp. *moffittii*) nesting activity each spring along Rock Island and Rocky Reach Reservoirs on the Columbia River in compliance with Federal Energy Regulatory (FERC) requirements. Monitoring began on Rock Island Reservoir in 1975 as part of a proposed 6 foot pool rise that was approved in 1974 by the Federal Power Commission (FPC 1974) and implemented in 1979. 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 Rock Reach Reservoir. Canada goose nest monitoring along Rocky Reach continues as required under Article 403 of the new license (FERC 2009). 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 along both reservoirs. This annual report summarizes goose nesting along Rock Island and Rocky Reach reservoirs for the 2014 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 the Rock Island and Rocky Reach reservoirs from river miles 453.6 to 490.1. Chelan and Douglas counties border the west and east sides of the reservoirs, 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. Both reservoirs have islands within them which Canada geese use for nesting. Geese prefer to nest on small islands in the reservoirs, blending in with the rocks and low vegetation. The small islands are highly preferred over the mainland nesting, because they offer increased protection from predators and good visibility of the surrounding area. When threatened, the geese can 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 man-made elevated goose nesting structures (nest tubs) along Rock Island and Rocky Reach reservoirs. The nest tubs consist of either: pre-fabricated fiberglass tubs or tire tubs on elevated platforms. The pre-fabricated fiberglass tubs are mounted on metal poles with concrete footings and situated on small islands along the reservoirs. 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 are also done during the pre-season preparations.

Since the late 1970's man-made nest tubs have been installed along Rock Island Reservoir. By 2006, there were a maximum of 25 man-made nest tubs on Rock Island Reservoir. In 2008, 13 structures were removed due to lack of use from overgrown vegetation and deterioration of the structures. Currently, 13 nest tubs remain along Rock Island Reservoir.

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 are surrounded by vegetation and no longer available for nesting or are located on private property and are not monitored. Three of the tubs along Rocky Reach Reservoir were in disrepair and need to be re-constructed or moved to different sites due to land ownership changes. A total of 17 tubs were serviceable and available for Canada geese for the 2014 nesting season.

Geese prefer to nest in close proximity to water and 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) 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 along the reservoirs the following spring.

Continued development of properties along the Columbia River in the Wenatchee area has introduced hunting closures along the Douglas County side of Rock Island Reservoir between Highway bridges 2 and 28. As the area continues to grow, further restrictions on waterfowl hunting may be imposed, potentially reducing the effect of hunting on local goose populations. With considerable development along the Chelan County shoreline, waterfowl hunting opportunities are very limited along this stretch of Rock Island Reservoir.

Throughout the year, Canada geese are very common at parks and golf courses adjacent to Rocky Reach and Rock Island Reservoirs. 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 location locations within the Wenatchee Valley including Rock Island Golf Course, Wenatchee Confluence State Park, and Walla Walla Point Park. 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. Band returns though hunter harvest or direct observation (especially for neck collars) should provide some information on the movement patters for geese in the Wenatchee area.

Methods

Surveys - 2014

In 2014, goose nest monitoring along Rock Island and Rocky Reach reservoirs began on 24 March and 4 April, respectively. Chelan PUD biologists conducted surveys along each reservoir three to four times during the 2014 nesting season, depending on the duration of nesting activity. Generally, each nest was visited an average of 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 2014, goose nest monitoring on Rock Island Reservoir was impacted by reservoir operations. On 27 February, Chelan County PUD was notified that Wanapum Dam, located below Rock Island Dam and owned and operated by Grant County PUD, had a crack in one of the spillway piers, requiring them to draw down the Wanapum Reservoir to reduce the volume of water and reduce the pressure on the up-river side of the dam. This would allow engineers to inspect the dam and assess the damage. The lower Wanapum Reservoir elevation created a lower tailwater elevation at Rock Island Dam leading to a generation issue at Rock Island Dam due to increased headwater. Chelan PUD activated its Incident Command Structure on 28 February to bring a focused response to the situation. On 2 March, an Emergency Action Plan (EAP) was initiated to formally establish communication channels with first responders. The EAP was lifted on 7 May.

The Wanapum Reservoir was drawn down more than 26 feet and remained so throughout the goose nesting season. In order to avoid potential catastrophic damage to Rock Island Dam generation turbines power generation was shut down on 3 March. To assess generation issues at Rock Island Dam, Rock Island Reservoir was drawn down about 7 feet initially. The conditions at Rock Island Dam were stabilized and power generation was restarted on 9 March. However, unpredictable flows and top spill created a potentially dangerous condition for boats in the forebay; as a result, no access was granted to conduct Canada goose nest monitoring in the Rock Island Dam forebay. The Rock Island forebay is that area located immediately above the dam and includes several islands. The islands in the Rock Island Dam forebay account for considerable proportion of goose nests along Rock Island Reservoir (Cordell-Stine and Pope 2013). Therefore, we attempted to monitor goose nesting on the islands from a high point on the Chelan County side of the reservoir using binoculars and spotting scopes.

Analysis

Since monitoring Canada goose nests in the Rock Island forebay were not conducted due to operations which were affected by the Wanapum Dam incident, we estimated the total number of nests initiated for Rock Island Reservoir by combining the known number of nests monitored during regular surveys in 2014 with the average number of nests found on the Rock Island Forebay Islands over the past 10 years (28.6 nests). We estimated the number of successful nests by multiplying the estimated total number of nests by the success rate observed on Rock Island Reservoir in 2014. The number of

goslings produced was estimated by multiplying the estimated number of successful nests by the average number of goslings fledged in 2014.

Chelan PUD has been monitoring Canada goose nesting on Rock Island Reservoir since 1975 and on Rocky Reach Reservoir since 1983. Historical nesting summaries are summarized for each reservoir by relevant time periods and 10 year intervals and long term averages. Averages include the number of nests initiated, clutch size, nest success (by number and percent) and number of goslings fledged. The long term comparisons of nest attempts by reservoir are provided from 1983 to present.

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. For Rocky Reach Reservoir, numbers of nesting attempts are summarized in total and by nest type (man-made or natural).

Results and Discussion

Rock Island

Along Rock Island Reservoir, Canada geese initiated a minimum of 48 nests. Only nests located upstream of the Rock Island Dam forebay were monitored to determine nest numbers and fate. No man-made nest structures are located within the Rock Island forebay. Two nests initiated by domestic geese were documented, but were excluded from data analysis. A total of 254 eggs were laid in the 48 nests used to determine nest fate and fledgling success. Twenty-nine nests (60%) were successful in producing goslings. The eggs had a hatch rate of 60%, with 153 eggs hatching. Five nests containing 29 eggs were attempted in 13 available goose tubs maintained by Chelan PUD. Four (80%) of those nests were successful in producing goslings (n = 20). By comparison, only 25 of 43 (58%) natural nests along the Reservoir fledged goslings. Of the 146 eggs laid in natural nests, 107 (73%) hatched. The average clutch size for all goose nests in 2014 (calculated from successful nests only) was 5.8 eggs/nest. The average number of goslings fledged per nest (calculated from successful nests only) was 5.4 goslings/nest. Total nesting success for Rock Island Reservoir in 2014 (60%, Table 1) was the lowest recorded in 38 years of monitoring (Table 1). This result is likely biased for 2 reasons, 1) an unusually high nest failure rate (see below) and missing data from the Rock Island forebay which accounts for a high proportion of nests annually (Cordell-Stine and Pope 2013).

Along Rock Island Reservoir in 2014, fledging success rate in man-made structures was lower (69%) with 20 goslings fledging compared the fledging success at natural sites (73%) with 107 goslings fledging. However, the occupancy rate (38%) of man-made structures on Rock Island was low with only 5 of 13 nest tubs were used along Rock Island Reservoir. Since no man-made structures are located in the Rock Island forebay, the effect from the Wanapum Dam incident had no effect on the occupancy rate of man-made structures.

Rock Island Estimates - 2014

The Rock Island Dam forebay islands were excluded from monitoring due safety concerns created by unusual operating conditions resulting from the Wanapum Reservoir elevations. Monitoring from a high point above the forebay was not very successful. Only 10 nests were observed on the Rock Island Dam forebay islands from the viewpoint on the Chelan County side of the forebay. Many of the regular nest locations are not visible from the observation point due to vegetation and topographical

relief. Therefore, we estimated the total number of nests initiated in the Rock Island forebay for 2014 to account for the missing data.

From 1975 – 2013, 41.0% of all nests initiated on Rock Island were located on islands in the Rock Island Dam forebay, averaging 35.2 nests/year. Over the last 10 years (2004 – 2013), the proportion of nests in the Rock Island forebay compared to the entire reservoir has increased slightly to 41.4% but the average number of nests/year declined to 28.6 nests/year. Using the average number of nests in the Rock Island Forebay over the last 10 years (28.6 nests/year) combined with the 48 nests documented during routine monitoring in 2014, we estimate the total number of nests initiated for Rock Island Reservoir in 2014 to be a 76.6 nests initiated, which is close to the 38-year average of 82 nests (Table 1). The percentage of successful nests was unusually low due to high predation of nests in 2014 (Table 1), which may have been affected by reservoir operations. The average clutch size (5.8 eggs) for 2014 was equal to the 38-year average. Using the 2014 nest success rate (60%), and an average of 5.3 goslings fledged/nest, we estimate that the minimum number of goslings produced along Rock Island Reservoir in 2014 was 243. This is well below the 38-year average of 349 goslings.

Rocky Reach

Along Rocky Reach Reservoir, Canada geese attempted 56 nests. No instances of nesting domestic geese were observed along Rocky Reach Reservoir. A total of 43 nests (77%) were successful. A total of 297 eggs were laid in the 56 nests. The eggs had a hatch rate of 79%, with 234 goslings fledged. Sixteen nests containing 105 eggs were attempted in 17 available goose tubs provided by Chelan PUD. Fifteen of those nests (94%) were successful in producing goslings (n = 91). One nest in a goose tub was unsuccessful. The nest was abandoned for unknown reasons. By comparison, of 40 natural nests along the reservoir, 28 (70%) fledged goslings. Of the 192 eggs laid in natural nests, 143 (74%) fledged from the nests. The average clutch size was 5.4 eggs/nest. The average number of goslings fledged per nest (calculated from successful nests only) was 5.2 goslings/nest. With the exception of clutch size, results from the 2014 goose monitoring were better than the 31-year average (Table 2).

Fledging success was greater in man-made structures (87%) along Rocky Reach Reservoir with 91 goslings fledging, compared to 70% fledging success at natural sites. The occupancy rate of man-made structures was high 94% (16 of 17 available sites occupied). Rocky Reach Reservoir has fewer smaller islands and natural features preferred by Canada geese for nesting. One of the nests in a man-made structure along Rocky Reach Reservoir that failed was abandoned for unknown reasons.

Although many apparent “hybrid” geese (Canada x domestic cross) were observed along Rocky Reach Reservoir, none were observed to be nesting in 2014. 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 31- year average of 54 nests (Table 3). An average of 16.8 man-made structures were used during the 5-year period with an average success rate of 65.2% compared to an average of 39.3 natural nests initiated with a 73.3% success rate (Table 3). For the past 5 years, percent nest success has been similar between natural and man-made nest sites.

Unsuccessful Nests

Rock Island Reservoir had a high Canada goose nest failure rate (40%) in 2014 with 19 of 48 nests failing. This nest failure rate was applied to the estimated total number of nests since lower reservoir elevation during the nesting period may have also influenced nest failure rates in the Rock Island forebay. Most of these failed nests were located on natural substrates. Only one nest in a man-made structure failed (abandoned for unknown reasons). The abandoned nest did not exhibit signs of predation, such as broken eggs or adult carcasses in the vicinity. The remaining 18 nests failed due to destruction by either mammalian or avian predators. The majority (72%) of these destroyed nests were located on Porter's Pond Island. Canada goose nests on Porter's Pond Island have had high predation rates in recent years (Cordell-Stine and Pope 2013). However, in 2014 this island was connected to the mainland during the drawdown period between 3 – 9 March due to the lower reservoir levels in response to Wanapum Reservoir elevations, increasing the risk of mammalian predation. Further, disturbance by people and dogs exploring the island may have caused geese to abandon the nests, allowing mammalian predators easier access to the nests and eggs.

Rocky Reach Reservoir had a much lower Canada goose nest failure rate (23.2%) with only 13 of 56 nests failing in 2014. Of these nests that failed, 12 were located on natural substrates and 1 was located in a nest tub. Eleven of the 13 nests were documented as being destroyed by mammalian or avian predators and 2 other nests were abandoned for unknown reasons. Nests along both reservoirs suffered some loss of eggs to avian or mammalian predation yet some were able to successfully hatch goslings following the partial loss of eggs. Infertile or unhatched eggs were observed in some nests as well.

During some years, early runoff can flood nests, particularly near the confluence of the Wenatchee and Columbia Rivers. No Canada goose nest failures or partial losses were attributed to flooding by high water in 2014. Peak flows did not occur until the first week of June. All goose nests along both reservoirs had fledged by the first week of June.

The percent of successful nests (77%) for 2014 along Rocky Reach Reservoir was above the average success rate of 70% from 1983 – 2013 (Table 2). However, clutch size (5.4 eggs) in 2014 was below the average of 6.1 eggs. Rocky Reach Reservoir had a higher than average number of fledged goslings with 234 goslings leaving the nests in 2014 (Table 2).

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. Common ravens have been observed nesting on cliffs along the reservoirs, and may account for some of the 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 frequently observed along Rock Island and Rocky Reach Reservoirs. From 2010 – 2013, 157 of 374 (42%) adult geese were re-captures from previous banding efforts (WDFW 2013, unpubl. data) in the Wenatchee area (Rock Island golf course and Walla Walla Park combined).

During 2014, 2 Canada goose nests initiated along Rock Island Reservoir were tended by leg-banded geese. At least one additional neck-collared goose appeared to be nesting on a large island in the Rock Island Dam forebay. Several other leg banded geese were observed loafing in the forebay. However, due to unusual operations at Rock Island Dam caused by the Wanapum Reservoir elevations,

Rock Island Dam forebay islands were only observed from a high point along the Chelan County shoreline with a spotting scope. This made it difficult to gain any specific information regarding nesting geese on the forebay islands. Additionally, in prior years of nest monitoring on Porter's Pond Island, many banded geese had been observed. However, during 2014, by the first survey the majority of nests on Porter's Pond had already been destroyed and the adults had abandoned the island.

One additional neck collared goose was observed frequently in the vicinity of the Horan Nature Area at Confluence State Park. 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. An additional neck-collared goose was observed nesting in an old osprey nest at the Cashmere Gun Club along the Wenatchee River. The collar number was not obtained, but it is the third year a neck-collared goose has nested in that same location. No marked Canada geese were observed nesting along Rocky Reach Reservoir in 2014.

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 geese occupancy of osprey nests were documented on 2 occasions in 2005, 5 times in 2006, 6 times in 2007, 9 times in 2008, 6 times in 2009, 4 times in both 2010 and 2011, 2 times in 2012, and 5 times during 2013. During 2014, Canada geese initiated nests in 4 existing osprey nest, despite Chelan PUD efforts to exclude geese from artificial osprey nests (see below).

Canada geese begin nesting in mid-March prior to the arrival of osprey, around 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.

In early 2009, Chelan County PUD experimented with covering of osprey nest platforms with a "goose deterrent" to prevent geese from initiating nests. 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. Of the 3 platforms that were covered in early 2009, none were occupied by Canada geese. Covers were removed prior to return of osprey to territories on or around April 1. Following removal of the nest covers, all 3 of nests were occupied by breeding osprey.

During early 2010 and 2011, 4 nests were covered to deter Canada geese from nesting in managed osprey nests. Following removal of the covers, osprey returned to each of these sites. In 2012, 5 nest covers were deployed. The covers prevented goose initiation in 4 osprey nests, but one goose was able to initiate a nest at the Goodwin Bridge site following removal of the cover, displacing the osprey from the nest platform. During 2013, 5 nest covers were deployed, and all were successful in preventing geese from initiating in PUD-managed platforms. However, 2 additional PUD-managed osprey platforms that lacked goose deterrents were occupied by geese in 2013 and 3 other osprey nests on man-made or natural substrates not managed by Chelan PUD were overtaken by geese. In 2014, 5 covers were deployed and successful at deterring geese from initiating in osprey nest platforms. However, 2 existing nests managed by Chelan PUD that were not covered were overtaken by geese, and

2 additional nests not managed by Chelan PUD were also overtaken by geese. To the extent possible, Chelan PUD will manager osprey and Canada goose nest on its electrical system to reduce conflicts consistent with state and federal permits and Chelan PUD's Avian Protection Plan.

Long-Term Summary

Canada goose nest monitoring began on Rock Island Reservoir in 1975 to establish baseline data prior to a 6 foot pool rise associated with a powerhouse upgrade at Rock Island Dam that occurred in 1979. Similarly, Canada goose nest monitoring began on Rocky Reach Reservoir in 1983 to establish baseline data for a proposed pool rise that never occurred. Since 1983, similar efforts to monitor Canada goose nest initiation and success have been conducted on both Rock Island and Rocky Reach Reservoirs.

While the average number of nest attempts have varied greatly since 1983 (Tables 1 and 2), Rock Island Reservoir consistently has the highest proportion of nests attempts (Figure 1). The addition of man-made platforms on both reservoirs over time has helped to increase the numbers of nesting pairs of Canada geese on each Reservoir. Numbers of Canada goose nests increased along both reservoirs until 1997 (Figure 1), after which nesting attempts declined on both reservoirs. 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 both Rocky Reach Reservoir and Rock Island 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 in part to fulfill dam license requirements for Rock Island and Rocky Reach hydroelectric projects. Eric Degman and Linda Prado prepared nesting tubs for the season and assisted with nest surveys along the reservoirs.

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Table 1. Canada goose nesting along Rock Island Reservoir, historical data (1975 - 2014) and current year (2014).

Period		AVG # of initiated nests	Avg. clutch size	AVG % successful nests	AVG # successful nests	AVG # goslings fledged
Prior to reservoir rise	1975 - 1977	44	5.6	72%	32	172
Historical; post-reservoir rise	1978 - 1987	58	5.8	82%	47	255
	1988 - 1997	133	5.8	81%	105	550
	1998 - 2007	73	5.8	81%	59	324
	2008 - 2014	68	5.8	75%	53	277
Program Summary	1975 - 2014	82	5.8	80%	65	349
This season (actuals)	2014	48	5.8	60%	29	153
This season (Estimates based on previous forebay nesting data)	2014	76.6[1]	5.8	60%	45.9[1]	243.3[1]

[1] Estimated numbers based on previous number of nests initiated on forebay islands not surveyed in 2014

Table 2. Canada goose nesting along Rocky Reach Reservoir, historical data (1983 - 2014) and current year (2014).

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 - 2013	54	6.1	70%	37	207
This season (actuals)	2014	56	5.4	77%	43	234

Table 3. Canada goose nesting summary including number of nests and nest success (overall and by nest type) on Rocky Reach Reservoir, 2009 - 2014.

						% Nest Success		
YEAR	TOTAL	Natural	% Natural	Man-made	% Man-made	Overall	Natural	Man-made
2009	44	27	61.4	17	38.6	61	63	41
2010	49	32	65.3	17	34.7	67	67	65
2011	59	45	76.3	14	23.7	75	83	62
2012	69	49	71.0	20	29.0	74	76	75
2013	60	43	71.7	17	28.3	82	81	61
2014	56	40	71.4	16	28.6	77	70	87
AVG	56.2	39.3	69.5	16.8	30.5	72.7	73.3	65.2

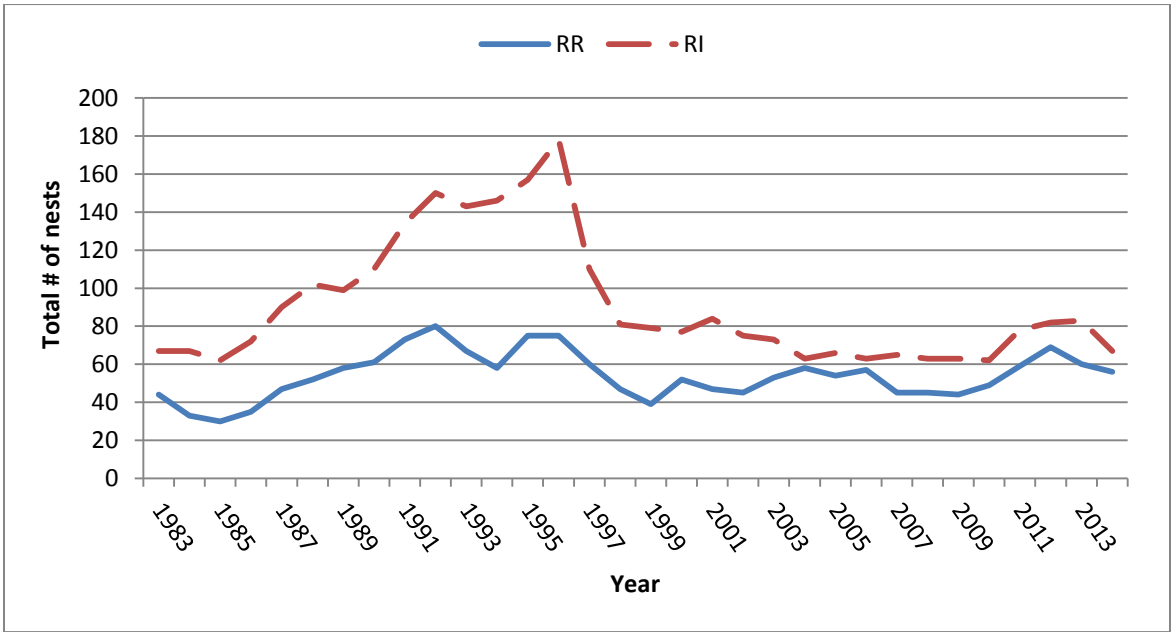

Figure 1. Number of Canada goose nests documented on Rocky Reach (RR) and Rock Island (RI) Reservoirs by year, 1983 - 2014.