



Coastal Waterbird Survey Hot Spot Analysis

Karen Devitt, BC Program Coordinator

Data collected by the BC Coastal Waterbird Survey volunteers has been put to good use in the last year. The dataset was downloaded by various government, university, and non-profit agencies for a wide range of projects including the distribution of birds in relation to climate change and to inform marine protected area planning processes throughout BC.

Bird Studies Canada has also been working with the data and our partners to update a hot spot analysis that was done in 2013. Hot spot analysis are used to visualize data and to help identify areas of high use or activity. This type of analysis is often used to understand crime, traffic, and disease patterns and rates. In the environmental realm, hot spot analysis is incredibly useful for identifying areas of high conservation value, investigating the seasonality of biodiversity, and understanding threats to wildlife. The maps created from the most recent analysis will be used to inform spill response planning and management, community development and planning, and environmental assessments.

The series of maps created in the most recent analysis focus on the seasonal uses of our coast line by different guilds and species groups (Figure 1). In addition to

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maps that outline the guilds, we have also created maps that show the distribution of species that demonstrated declines during the 2016 analysis of the BC Coastal Waterbird Survey data. Some of those species include White-winged Scoter, Common Loon, and Red-necked Grebe (Figure 2). Maps that highlight hot spots for species at risk were also created for various times of year. These types of maps will improve how resource managers respond and manage threats in various regions.

Though these maps will be incredibly helpful, its important to remember that they are biased to where survey coverage is greatest. There are still large parts of the coastline that have never been surveyed.

The interest and use of the high quality data collected by volunteers continues to grow. Sincere thanks to all who have contributed to this important monitoring program. Keep an eye on www.birdscanada.org for an interactive version of these maps in 2018.

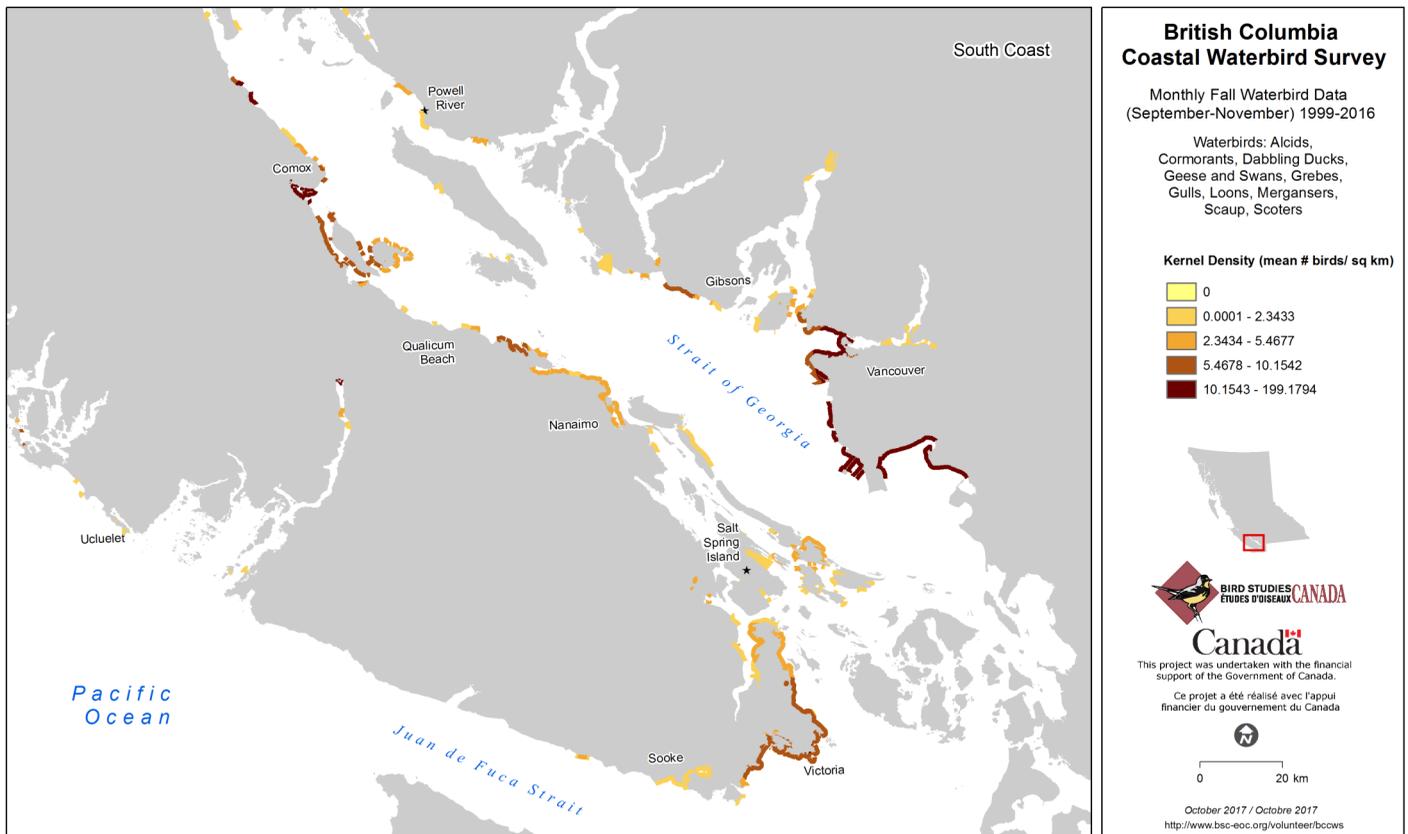


Figure 1: Average densities of coastal waterbirds along the south coast during the fall from 1999– 2016. Highest density areas appear red and lower density /zero data are in yellow.

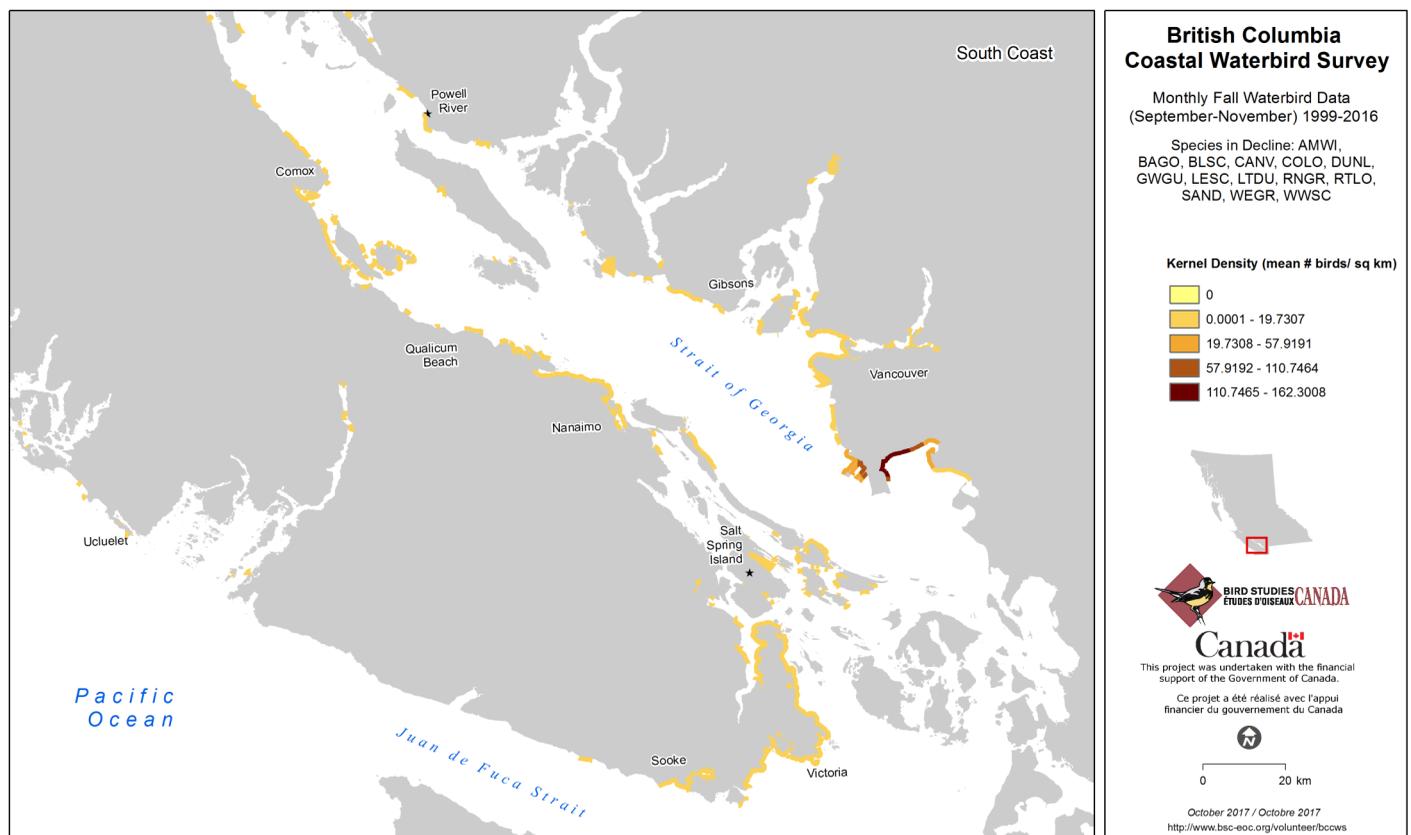


Figure 2: Average densities of coastal waterbird species in decline along the south coast during the fall from 1999– 2016. Data was combined for Red-necked Grebe, Canvasback, Sanderling, Black Scoter, White-winged Scoter, Dunlin, Red-throated loon, Common Loon, Lesser Scaup, Long-tailed duck, American Wigeon, Barrow's Goldeneye, and Glaucous-winged Gull.

Climate Change, Sea-level Rise and Coastal Birds in the Fraser Estuary IBA

James Casey, Fraser IBA Program Manager

The BC Coastal Waterbird and Beached Bird Surveys conducted over the last 18 years has created a valuable network of people that provide datasets that help understand and manage threats to coastal waterbirds. For instance, the response to the Rhinoceros Auklet Mortality Event in 2016 was only possible due to the network of volunteers. Time and again the Coastal Waterbird Survey data has proven to be one of the more useful datasets for people trying to understand and address threat to BC's coastal bird populations, most recently the data has been used to inform oil spill response planning and strategies. Climate change driven sea-level rise is another emergent threat where the Coastal Waterbird Survey data has proven useful as Bird Studies Canada has engaged in efforts to develop coastal adaptation strategies in BC's lower mainland.

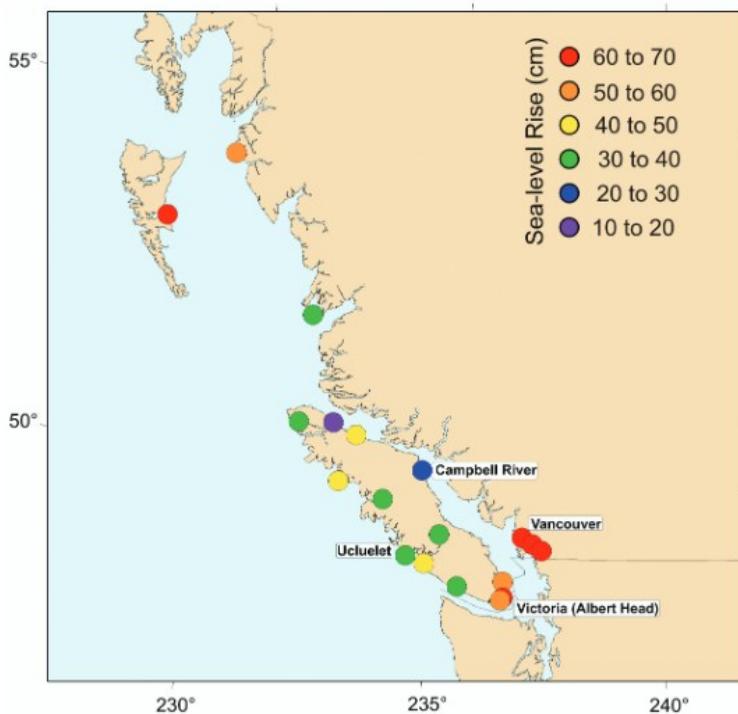


Figure 1 Projected relative sea-level changes to 2100 for 19 locations along the BC coast. Reproduced from Canada's Marine Coast in a Changing Climate, 2016.

Sea-level rise has been documented to have a negative impact on coastal birds around the world. Right here in BC one of the troubling manifestations of this impact is the concept of coastal squeeze. Coastal squeeze is a form of coastal habitat loss, where intertidal habitat is lost to sea level rise and flood or erosion protection structures such as dykes or sea walls. The combined actions of rising ocean water-levels and protection against coastal flooding squeezes out coastal habitat for birds, particularly populated areas along BC's coast like the Fraser Important Bird and Biodiversity Area. Years of surveys have established the saltmarsh and shallow intertidal habitat at Sturgeon Bank, Roberts Bank and Boundary Bay as some of the most important bird habitat in BC. Unfortunately, studies have also established the region as the location with the most at risk to sea-level rise in terms of people and infrastructure. Work conducted for the Lower Mainland Flood Management Strategy has established that the greater Vancouver area is estimated to currently have \$19.3 billion dollars at risk do to coastal flooding. This number grows to \$24.7 billion by the year 2100 due to climate change driven sea-level rise. The provincial Lower Mainland Dike Assessment Final Report released in 2015 found that in the Lower Mainland "71% of the dikes could be expected to fail by overtopping during the design event." This study did not include consideration of future sea level rise.

Due to the high level of risk to human safety and economic infrastructure, major investments are being made to further hardening the shoreline. In the process, coastal birds are being exposed to the gradual loss of wetland habitat due to coastal squeeze and also the immediate loss of habitat associated with the footprint of the dikes being raised. In the 2011 Climate Change Adaptation Guidelines for Sea Dikes and Coastal Flood Hazard Land Use issued by the BC government to coastal communities, it was advised that the dikes be raised to account for localized changes in the Designated Flood Level brought about by an additional meter of sea level rise.

Sea-level Rise and Coastal Birds (continued)

The problem is that due to the need to maintain a 3:1 slope when building a dike, every additional metre of vertical height requires an additional 6 metres of horizontal expansion of the base of the dike. Given that roughly 600 kilometres of dikes separates the Fraser delta from the coast, raising dikes by an additional meter would result in major loss of habitat in a region that has already lost more than 70% of its wetland habitat to other pressures.

Thankfully other options are being explored. In some places, softer approaches to protecting the shoreline such as Greenshores™ and living dikes are being considered. In other situations, the idea of welcoming the water back to where it has historically flowed through coastal realignment is even being considered. This could be considered a large scale coastal restoration undertaking that could re-establish important bird habitats along the coast. From orca to salmon to shorebirds, a web of life depends on the health of the

Fraser delta. There are billions of dollars' worth of infrastructure related funds on the table and if those funds can be directed towards projects that reconnect our coast through living natural infrastructure projects then perhaps the Fraser delta will continue to be an important stopover along the Pacific Flyway, even as sea-level rises.

Moving past dikes to a restorative approach to climate adaptation requires you be ready to reflect on what you've witnessed as Coastal Waterbird and Beached Bird surveyors and approach local, provincial, and federal governments with your insights on areas of the coast that would benefit from a more holistic approach. For those living in the Lower Mainland, the Lower Mainland Flood Management Strategy is one such opportunity as is the City of Surrey's Coastal Flood Adaptation Strategy. For those located in other parts of the province, check with your local government about how they are preparing for sea-level rise and be sure they are aware of the Coastal Waterbird Survey data as an important input into their planning.



Coastal Waterbird Surveyors at Stanley Park. Photo By S. Valderrama.

Summary of the 2016-2017 Coastal Waterbird Survey

Karen Devitt

It was another successful season with 1284 surveys completed at 201 sites along BC's coast, amassing 16,651 records. The largest flock reported was of 17,000 Dunlin in Boundary Bay. Unusual species spotted this past season include a Black-necked Stilt on Hornby Island and a Sooty Shearwater off of Mayne Island

Massive thanks to the 493 dedicated volunteer who

participated last year and welcome to the new volunteers who have recently started participating. As always, we are looking for more volunteers to improve our coverage. If you know of anyone that might be interested or if you are interested in becoming a BC Coastal Waterbird Survey mentor and helping to train budding birders, please contact Karen at BCvolunteer@birdscanada.org. Please also let us know if there is anything we can do to make participation more enjoyable!

Beached Bird Survey 2015 Summary

Karen Devitt

In 2016, 496 surveys were conducted at 72 beaches, amounting to over 681 km of beach surveyed (Table 1). Eighty-five beached birds were reported through the survey, more than what was found in 2015 (64) but far fewer than the baseline (111). Volunteers around Southern Vancouver Island found the most carcasses and had the highest carcass encounter rate (birds/km of beach surveyed). This is likely due to the Rhinoceros Auklet mortality event that occurred from May-September.

As a result of the Rhinoceros Auklet mortality event, Alcids were the most common group encountered

(Figure 1), with 26 Rhinoceros Auklets, two Common Murre, and one Pigeon Guillemot. Sixteen Gulls were encountered, most of which were Glaucous-winged Gulls or unidentified. Diving Duck species encountered this past year include Bufflehead (6), Common Merganser (1), Surf Scoter (1), and White-winged Scoter (2). Three Canada Goose and eleven dabbling ducks including American Wigeon (1), Scaup Sp. (1), Mallard (3), Green-winged Teal (1), and Northern Pintail (5) were also encountered. Other species found this past season include two Northern Fulmars, one Great Blue Heron, two Ravens, one Horned Grebe, two Red-necked Grebe, and two Pelagic Cormorant.

Table 1 Summary of Beached Bird Survey effort and carcass encounter rates in 2016

Region	Number of Sites	Number of surveys	Total beach length surveyed (km)	# of birds found	Carcass encounter rate (birds/km)
Boundary Bay	8	61	111.30	17	0.15
Gulf Islands	6	45	37.95	2	0.05
Lower Mainland	11	64	106.2	10	0.09
North and Central Coast	2	3	3.82	2	0.52
Southern Vancouver Island	15	112	121.53	30	0.24
Georgia Strait	21	167	220.59	17	0.07
West and North Coast Vancouver Island	9	44	79.76	7	0.08
Total	72	496	681.19	85	1.24



Pigeon Guillemot, Fred Gingell Park, M. Sirton



Rhinoceros Auklet, Coburg Peninsula, S. Vigneau

2016 Beached Bird Survey Results (continued)

The cause of death for the Rhinoceros Auklets was bacterial septicemia. Other carcasses that were submitted for necropsy died of predation and starvation. Oil was detected on 4 beaches in the Lower Mainland and Victoria, however no oil was reported on carcasses.

Sincere 'Thank You' to all of our dedicated volunteers for another successful year and 'Welcome' to new volunteers. A friendly reminder to still submit data, even if you do not find a beached bird. Please take photos of any carcasses encountered and send them by email. We are looking for new volunteers to help improve our coverage, if you know anyone that might be interested, please tell them to contact Karen at BCvolunteer@birdscanada.org.

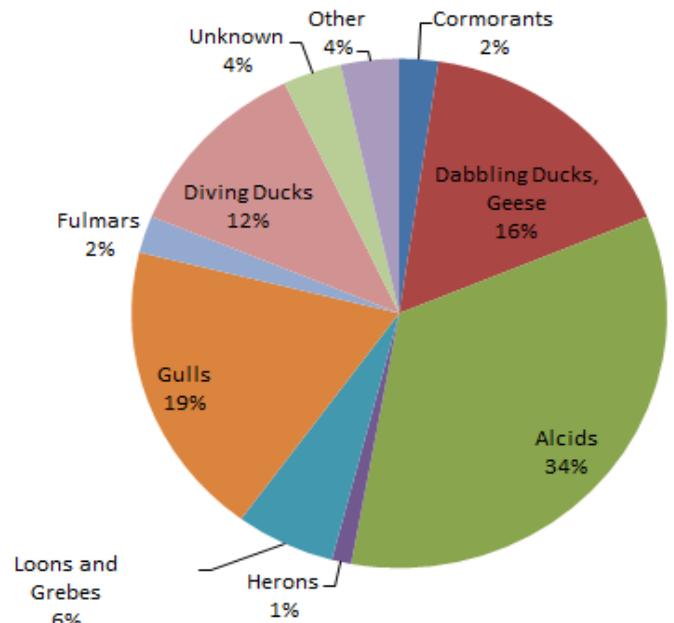


Figure 1 Carcasses found during the 2016 Beached Bird Survey

Sharing lessons of the BC Coastal Disturbance Project at the Western Hemisphere Shorebird Group biennial meeting in Paracas, Peru

Dr. David Bradley, BC Program Manager

This past November I was fortunate enough to attend the 7th biennial meeting of the Western Hemisphere Shorebird Group in Paracas, Peru. This year the meeting was convened by the Peruvian Birdlife International partner, Corbidi, who did a fantastic job organizing the complicated conference logistics – no easy task!

The meeting took place over 4 days, with 3 concurrent sessions of talks. Each 15-minute presentation, whether in English or Spanish, was translated in real time, something akin to the UN talks. Therefore, researchers from throughout the Americas could present their research in their native tongue. I was especially impressed by this, and it meant that I was able to take in the excellent work of many of the people I would otherwise probably never get to hear from.



Mixed shorebird flock in Paracas, D. Bradley

Each morning before the various symposia or sessions began there was a plenary presentation given by a prominent shorebird researcher. Most personally memorable of the four plenary speakers was Patricia Gonzales the coordinator of the International Conservation Fund of Canada's Shorebird Program. She is also an expert in population ecology, especially of the *rufa* subspecies of the Red knot, which has undergone dramatic population declines recently. Patricia gave an impassioned talk about her work to protect key non-breeding habitat for shorebirds from industrial development. This is an inspiring lesson for our work in the Fraser Estuary!

Another notable plenary presentation was given by Dr. Theunis Piersma, a professor of Global Flyway Ecology at the University of Groningen, Netherlands. He has extensive experience in habitat selection and distributional ecology, population and community ecology, evolutionary and molecular ecology, and evolutionary migration. Recently, Theunis and his collaborators have been unravelling the migration and physiology of Bar-tailed Godwits that breed in the Netherlands and over-winter on the coast of West Africa on Mauritania's Banc d'Arguin. He gave a fascinating talk about his decades of research into the lives of these stunning birds.

The symposium that I was invited to present in was "Community engagement for shorebirds conservation". My talk was titled "Reducing human recreation and wildlife conflict in the Fraser Estuary", and focused on some of the results from our BC Coastal Disturbance Project. For this project we have collected data on the type and extent of disturbance behaviour on birds throughout the Fraser River Estuary IBA, and assessed the attitudes of people recreating at the three most popular beaches to changes in their behaviour, particularly with regards to allowing dogs off leash. We found that while people are aware of the importance of the beaches to waterbirds and had a desire to see solutions to the issue, blame is often directed at other dog owners rather than people actively looking at how they can change their own behaviours. Some preferred solutions include having better enforcement of bylaws, improved education campaigns or increased signage on the beaches.

The talk was very well received by the audience, and useful suggestions were made based on some examples

of the other presenters, such as shorebird awareness campaigns like holding a local festival to celebrate the spring migration. Some techniques that I learned from some of the other presenters include producing a mascot such as a Western Sandpiper suit that can be worn by event organizers at schools and at media events to raise awareness of these birds that are not seen by many urban residents of BC. We could also promote the following of virtual sandpipers in local schools as they move along the Pacific Flyway from South and Central America to their breeding grounds in Alaska, and this lesson could be enhanced by the presence of the Western Sandpiper mascot in the classroom. This technique has been wildly successful at attracting the attention of the public in Argentina, to the extent that there were even "meet and greet" events between the Red Knot mascot and politicians. This was immensely powerful at achieving meaningful local conservation progress, and could be a model for shorebird conservation in BC.



Sign about disturbance on a beach in Paracas, D. Bradley

I learned a great deal about a wide range of different shorebird research projects, from community-led engagement and conservation to the satellite tracking of birds from their arctic breeding grounds to over-wintering sites to establish their degree of migratory connectivity. I also was able to meet some of our partners on projects like the Migratory Shorebird Project. The next WHSG meeting in 2019 will be held somewhere on the coast of Central America, and I hope to be there to share more about shorebird research in BC!

Photos From the Field



Discovery Beach, R. Fisher



Iona Beached Bird Survey, K. Devitt



Queen Charlotte Bird Club and Coastal Waterbird Survey, V. Pattison



Great Canadian Birdathon team at Iona, K. Devitt

In Memoriam: Leona Breckenridge was a dedicated volunteers for the Beached Bird Survey and Coastal Waterbird Survey, who passed away in 2017. She was a champion for coastal conservation in the Lower Mainland and will be greatly missed.

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