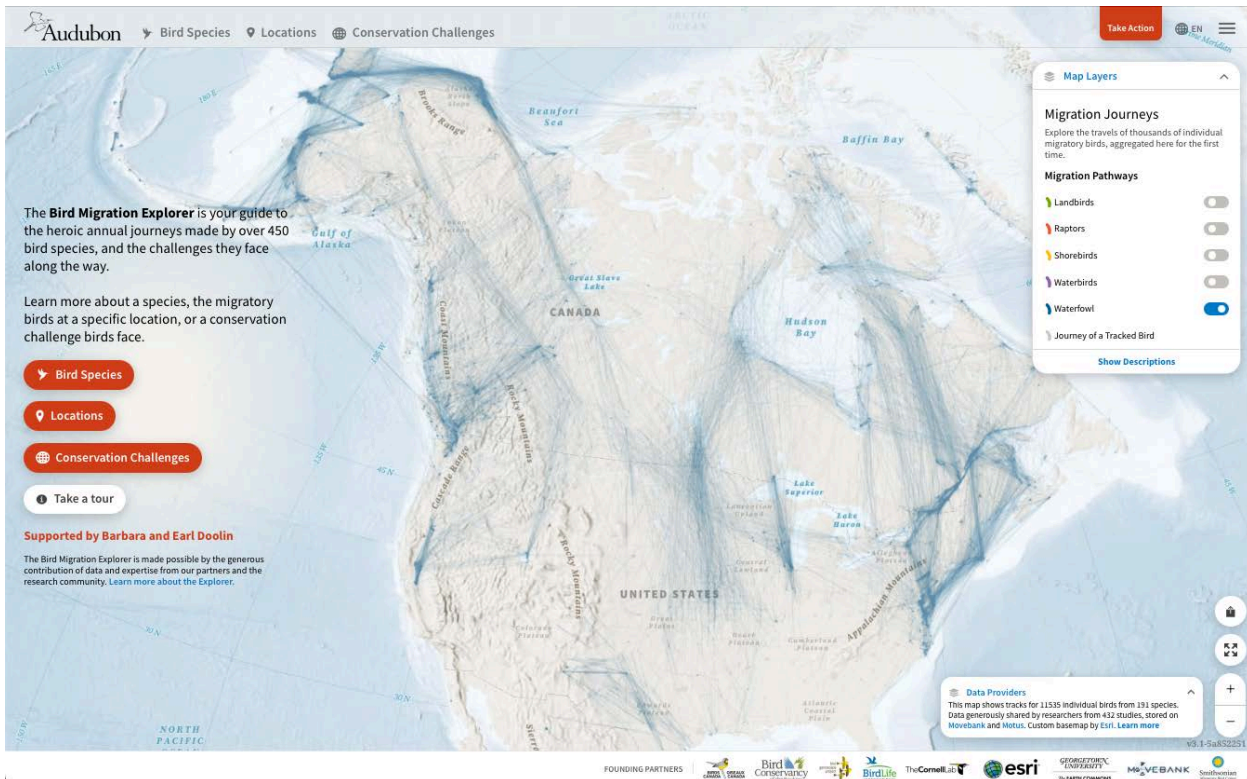


Bird Migration Explorer: Tool to support Fall Flights



The [Bird Migration Explorer](#) is an interactive platform that combines different types of migration science to visualize the journeys of more than 450 North American migratory bird species, how they connect places and people across the western hemisphere, and the widespread conservation challenges they face. It was produced by Audubon with nine founding partners and hundreds of researchers from across the globe. The Bird Migration Explorer helps users understand where, when and how we need to take action to protect migratory birds.

The Bird Migration Explorer provides a tool to support conservation investments through the Fall Flights Program

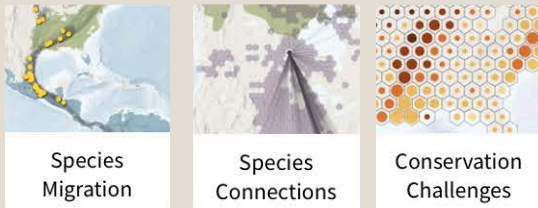
State fish and wildlife agencies can quickly and easily access maps and data on the Explorer to inform decisions about conservation investments in Canada that will complement and enhance the benefits of their local conservation actions for protecting North American waterfowl and other migratory bird species that depend on habitats in both locations.



Waterfowl species migration, connectivity and conservation challenge maps

Three ways to explore species on the Bird Migration Explorer to inform Fall Flight investments:

1. Migration maps
2. Connection maps
3. Conservation challenge maps



Example use case: Northern Pintail

Northern Pintail is included in SWAPs for several states in the Central Flyway and is of concern in places along the Pacific Flyway that are vulnerable to environmental changes, like Great Salt Lake.



Accessing species maps on the Bird Migration Explorer

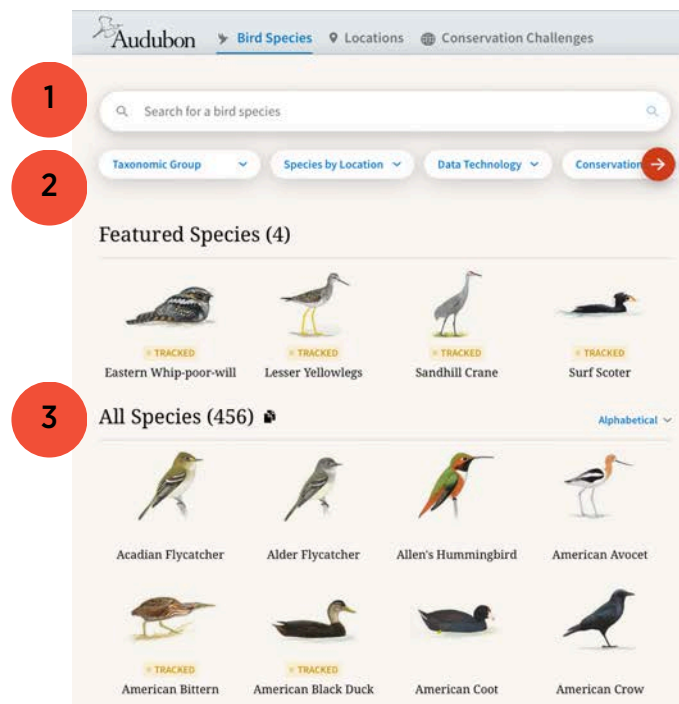
Step 1

On the Explorer landing page, click on the “Bird Species” orange icon on the left or the tab at the top.



Step 2

On the Species exploration page: (1) enter a species name into the search field to find it rapidly, (2) use the filter options to find species that meet specific criteria or (3) scroll through species thumbnails.

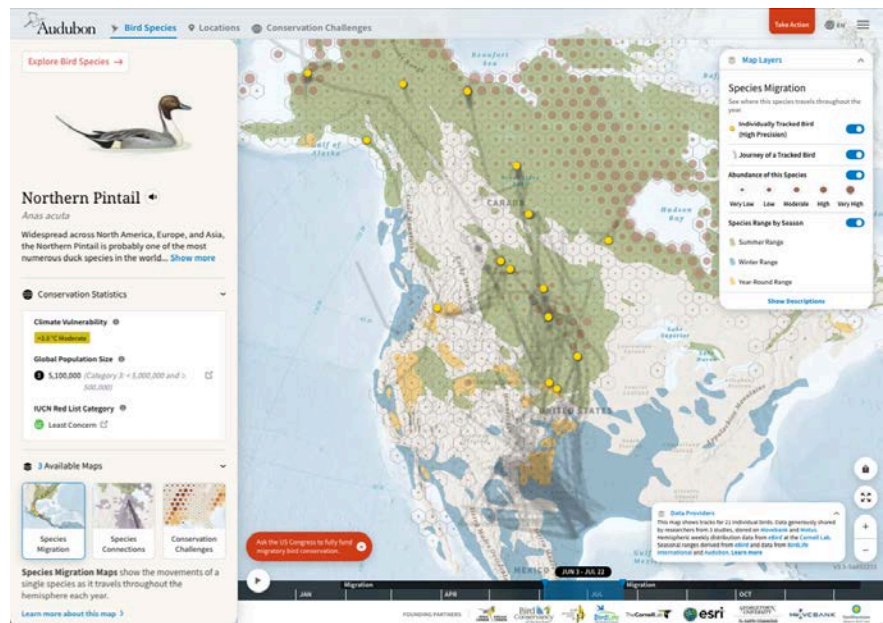


Species Migration and Species Connectivity Maps

- Provide science-based visualizations to illustrate the value of conservation investments in Canada for protecting North American waterfowl and other bird species that share habitats with them.
- Help identify regions used by waterfowl where conservation actions during breeding can improve the effectiveness of local conservation investments in other periods of the full annual cycle in the United States.

Species Migration Maps

combine tracking, abundance and seasonal ranges to show the places species use across the full annual cycle. Migration pathways (gray lines) show how individual Northern Pintails connect states along the central flyway to areas in Saskatchewan and Alberta. Yellow dots show locations of tracked pintails during the summer.



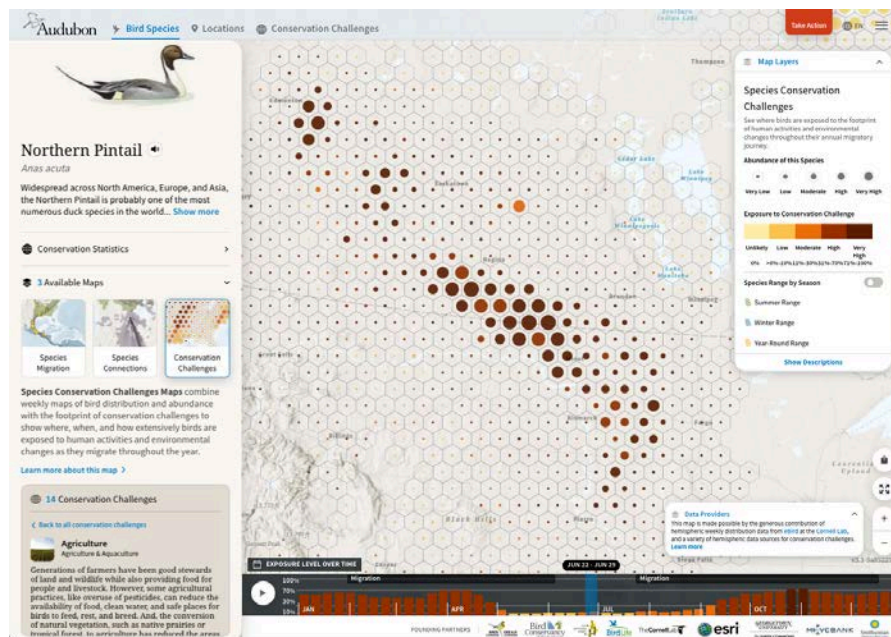
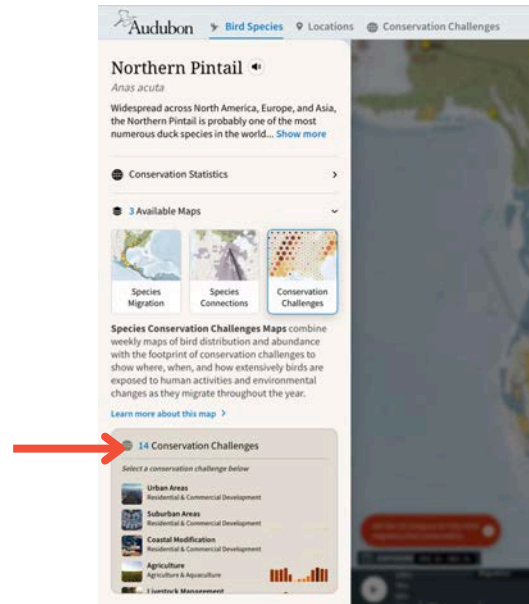
Species Connection Maps

show regions that are directly connected to each other based on bird banding re-encounter and tracking data. The hexagon outlined in white is Great Salt Lake. The purple shaded hexagons show where pintails in Great Salt Lake travel to, including large regions in Alberta and Saskatchewan, where wetland management, restoration and protection can complement and enhance benefits of conservation actions in UT.

Species Conservation Challenge Maps

illustrate where and when species exposure to human activities and environmental changes is highest. The maps can help states identify regions where conservation investments may have large impacts on mitigating risks to waterfowl species during breeding in Canada.

The Bird Migration Explorer provides information on 19 conservation challenges - human activities and environmental changes - that can impact North American migratory bird species. It does not include all the major issues they face. For each species, the Explorer lists which of the 19 conservation challenges are known to impact it at some point during its annual cycle based on a review of the literature and expert input. Northern Pintails are sensitive to 14 of the 19 conservation challenges, among them is agriculture.



Conservation Challenge Maps

combine species weekly abundance, derived from analyses of [eBird](#) data by the [Cornell Lab](#), with the footprint of conservation challenges to show where, when and how extensively a species is exposed to human activities and environmental changes across its full annual cycle.

Northern Pintails have high exposure to [agriculture](#) in southern Saskatchewan and Alberta in late June, denoted by the large dark dots on the map. The exposure maps do not show impact but rather the co-occurrence of birds and conservation challenges. They indicate areas where conservation efforts to engage farmers in agricultural practices that protect, manage or restore wetlands can have large benefits for pintails and other species that rely on them for breeding.

Location Connection Maps and migratory bird species lists

State fish and wildlife agencies can create connection maps and species lists for conservation locations of interest to:

- Learn which migratory bird species directly connect conservation investments between priority landscapes.
- Identify migratory bird species in addition to waterfowl that benefit from state's investments in Fall Flights and wetland conservation at the local level.

Creating Location Connection Maps

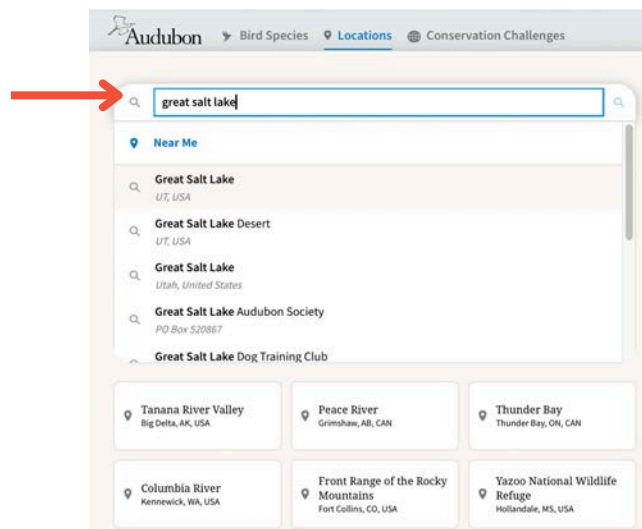
Step 1

On the Explorer landing page, click on the “Locations” orange icon on the left or the tab at the top.



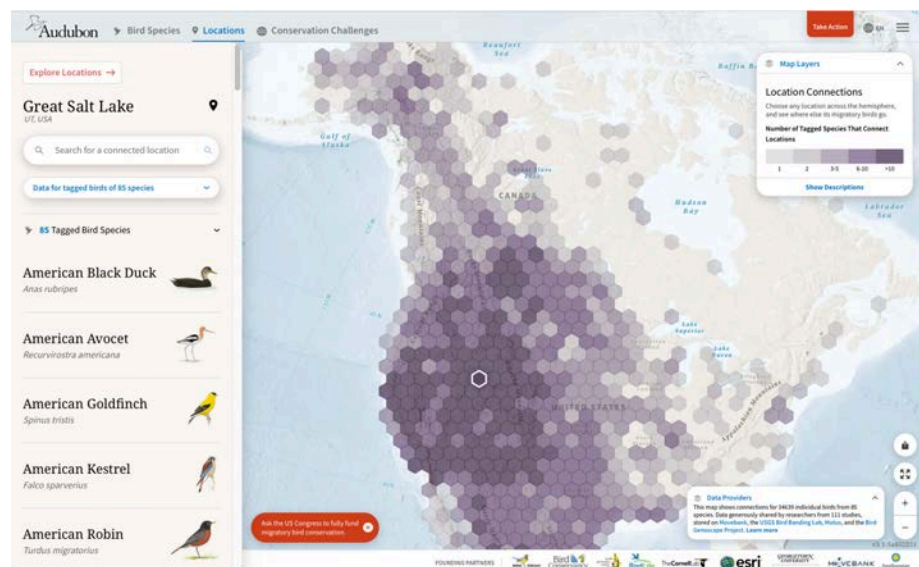
Step 2

On the Locations exploration page, enter the name of a conservation site or location of interest into the search field.

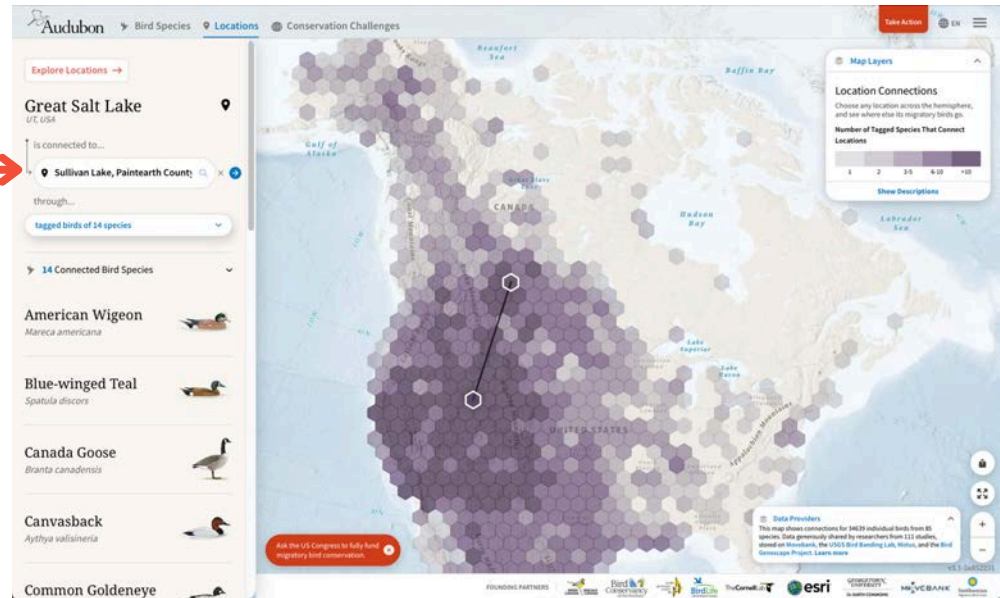


Location Connection Maps

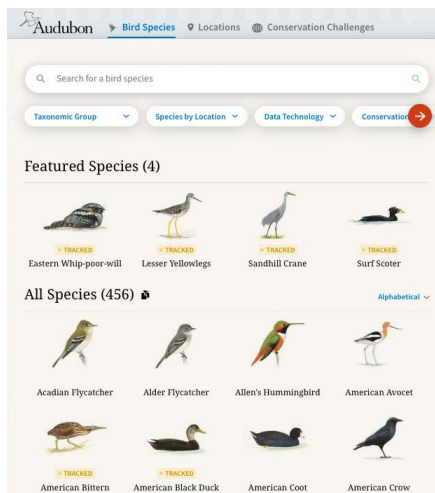
reveal where migratory birds in a location travel to and the species that directly connect that location to other places across Canada based on bird banding re-encounter and tracking data. Eighty-five migratory species, shown on the left, have been tagged in Great Salt Lake (hexagon outlined in white). Shaded hexagons show where those birds travel; darker purple indicates a larger number of species connecting the location to Great Salt Lake.



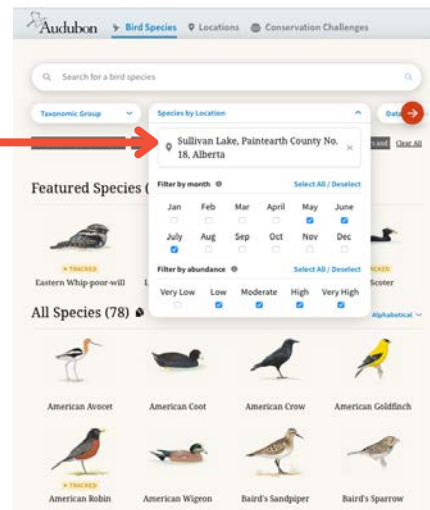
By entering a second location in the search field or manually selecting a second hexagon, the Bird Migration Explorer reveals the 15 migratory species that directly connect Great Salt Lake to Sullivan Lake and surrounding areas in Alberta (top hexagon outlined in white).



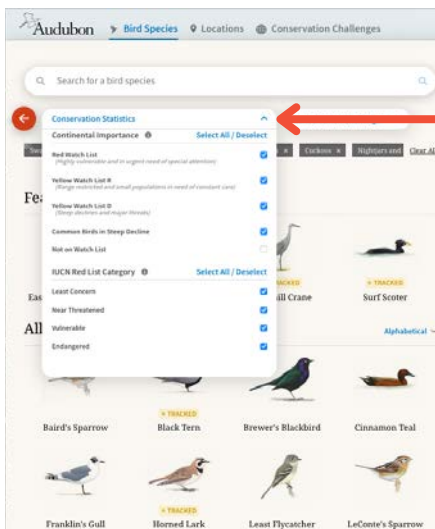
Creating a species list for a location



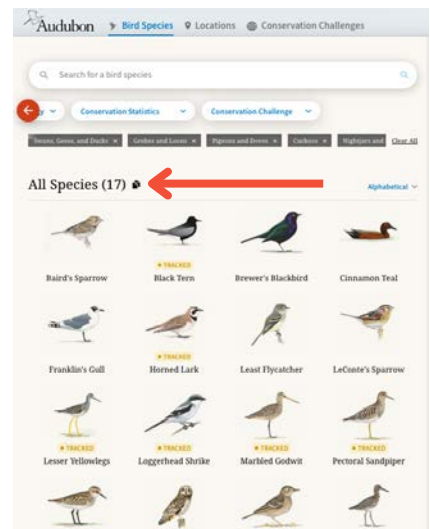
Step 1
Visit the Bird Species exploration page.




Step 2
Filter the 456 species by location, month, and abundance.



Step 3
Apply other filters, for example conservation status, to further customize the list.



Step 4
Click the  icon to copy the resulting list of species to paste into another document.

Visit the Bird Migration Explorer

- Learn more about how maps on the Explorer are created, our data providers, and our founding partners on our “[About the Explorer](#)” page.
- Learn about the specific scientists and partners who contributed data to each map and find details of the datasets by clicking on the “Data Providers” caption in the lower left of each map.
- Share tracking or connectivity data with Audubon’s Migratory Bird Initiative (migratorybirds@audubon.org) to provide state and federal agencies and conservation organizations with up-to-date comprehensive data on North American waterfowl and other migratory species.
- Share with Audubon’s Migratory Bird Initiative (migratorybirds@audubon.org) how you have used the Bird Migration Explorer in your work.

www.birdmigrationexplorer.org

Available in Spanish at www.exploraves.org
