

Migratory Bird Ecology and Management

Michael L. Schummer

Senior Research Associate

Department of Environmental Biology

SUNY ESF

204 Illick Hall

mlschumm@esf.edu





Waterfowl & Wetlands @ ESF



Waterfowl and Wetlands at SUNY ESF: Courses We Teach



Ornithology – every Spring

Ecology and Management of Waterfowl – Fall every other year (odd years)

Wetlands Conservation and Management for Wildlife - Spring every other year (even years)

Wetlands Monitoring and Assessment – Field Course – Summer every other year (even years)



Waterfowl and Wetlands at SUNY ESF: Hands-on experiences



Unique field experiences



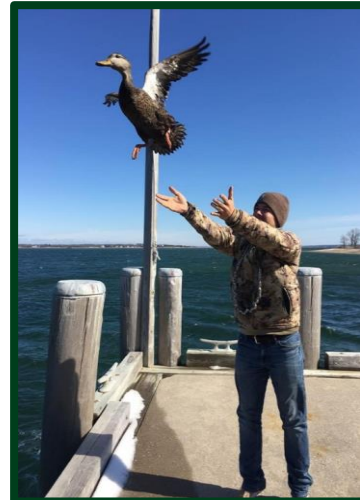
Waterfowl banding



Waterfowl and Wetlands at SUNY ESF: Honors, MS, MPS, PhD (not just ducks!)



The Rehabilitation and Release
of Lead Poisoned Bald Eagles in
New York State
Alexa Blunck's MPS Capstone
Department of Environmental Biology

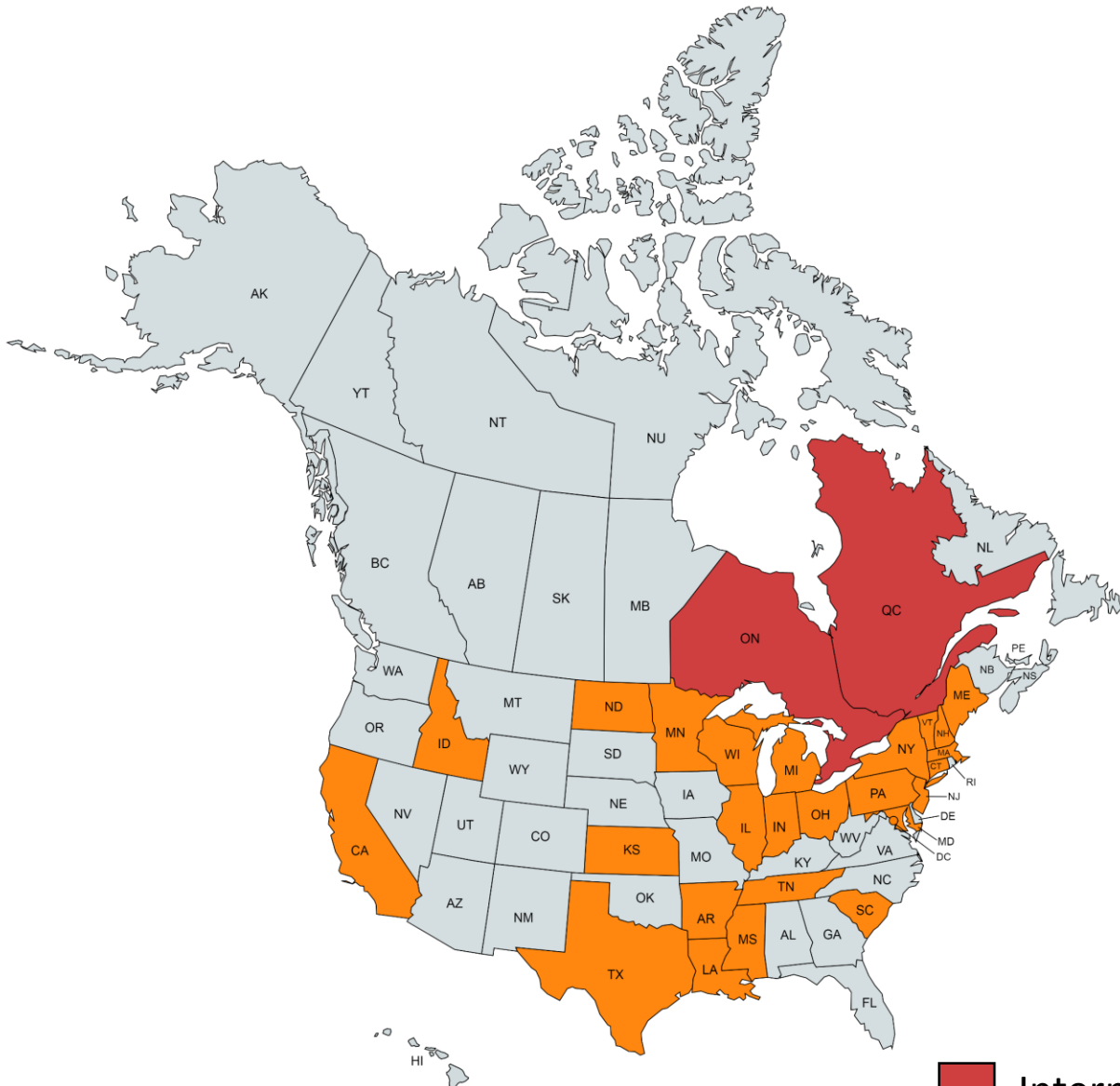




Thursday May 12th
148 Baker Lab
3:00-4:00pm
Major Advisor - Michael Schummer

Waterfowl and Wetlands at SUNY ESF: Collaborations and Placement of Graduates



Where we work

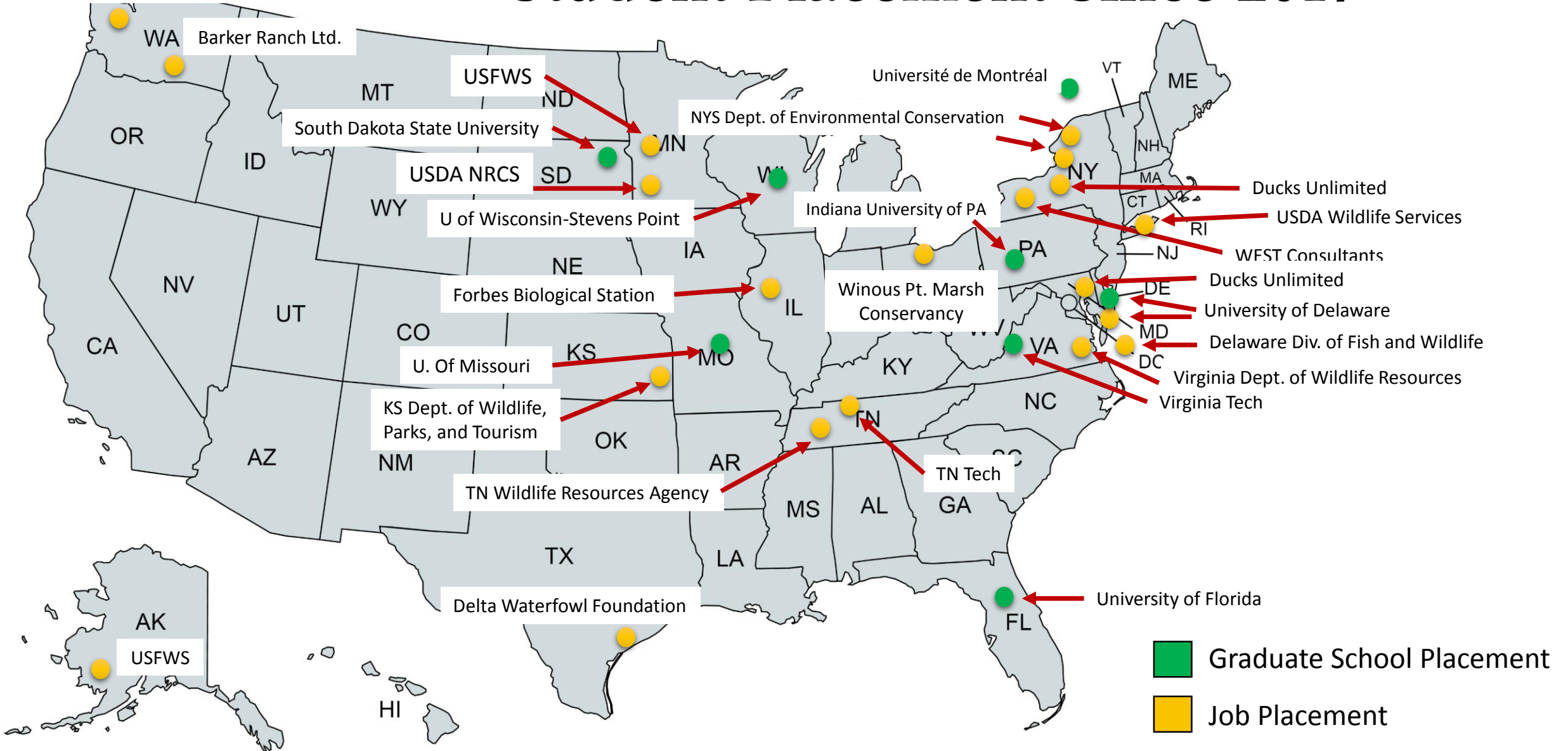


-  International Collaborators
-  United States Collaborators

Waterfowl and Wetlands @ ESF

Student Placement Since 2017

Washington Dept. of Fish and Wildlife

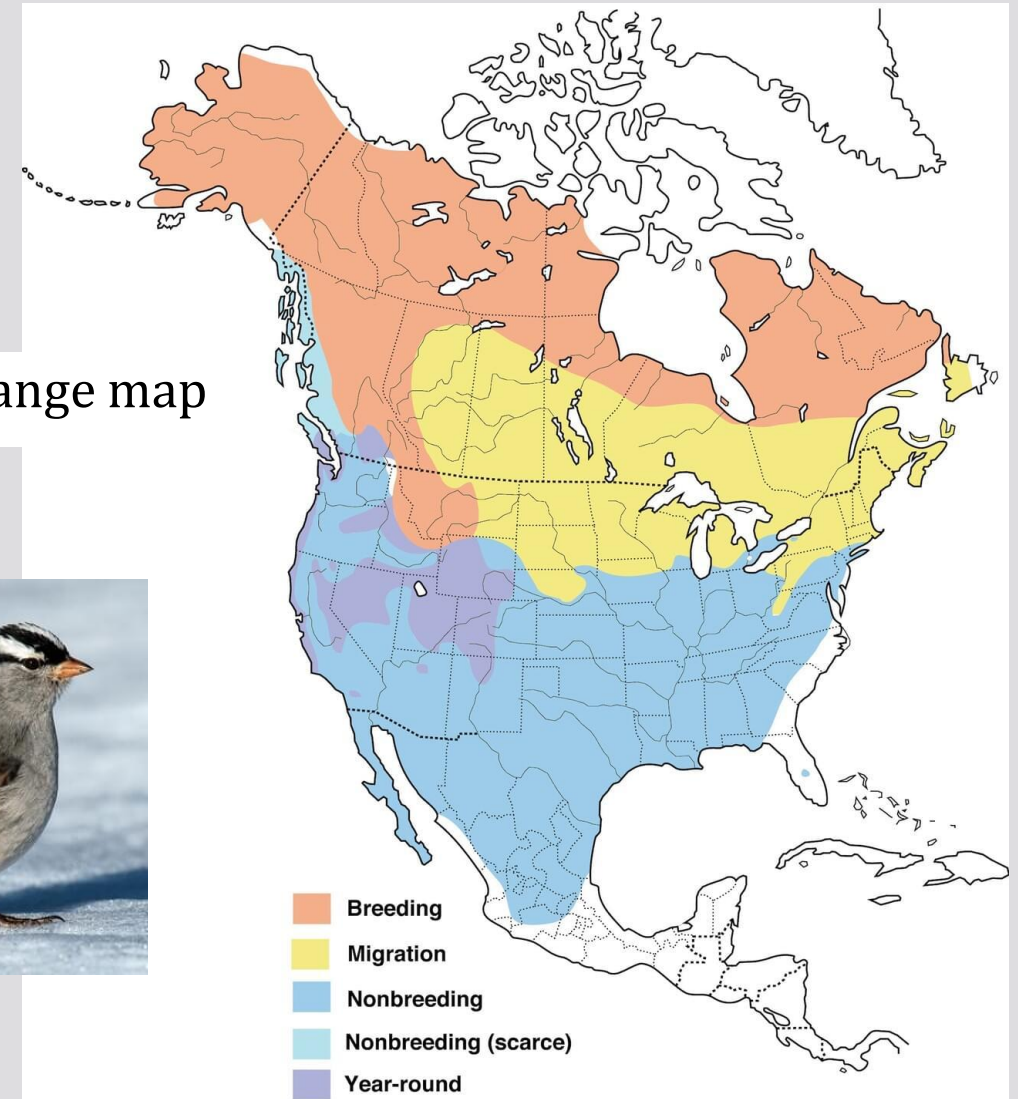


Migratory Bird Basics

Species migrate between breeding and non-breeding areas

Understanding habitat on breeding, migration, and non-breeding areas is vital to ensure their life history requirements are met

White-crowned sparrow range map



Migratory Bird Basics

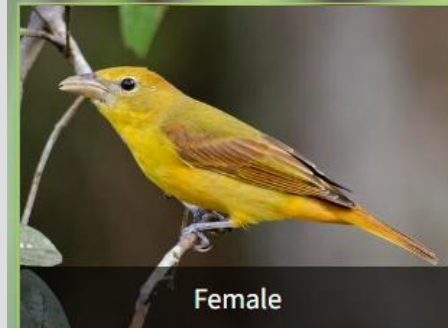
Species migrate between breeding and non-breeding areas

Understanding habitat on breeding, migration, and non-breeding areas is vital to ensure their life history requirements are met

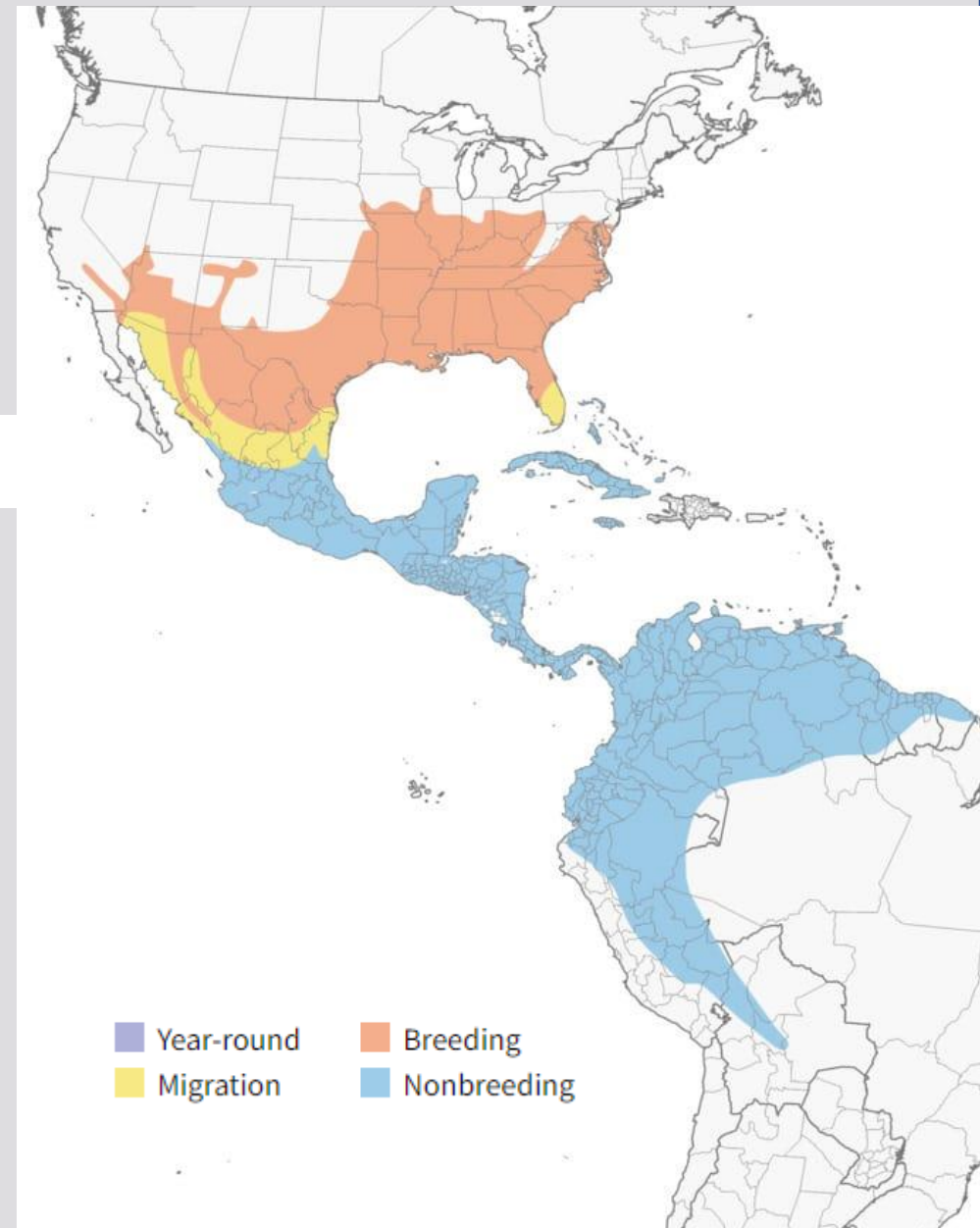
Summer tanager range map



Adult male



Female



Migratory Bird Basics

Species migrate between breeding and non-breeding areas

Understanding habitat on breeding, migration, and non-breeding areas is vital to ensure their life history requirements are met

Some are harvested like the American wigeon – 600,000 per year in the U.S. alone

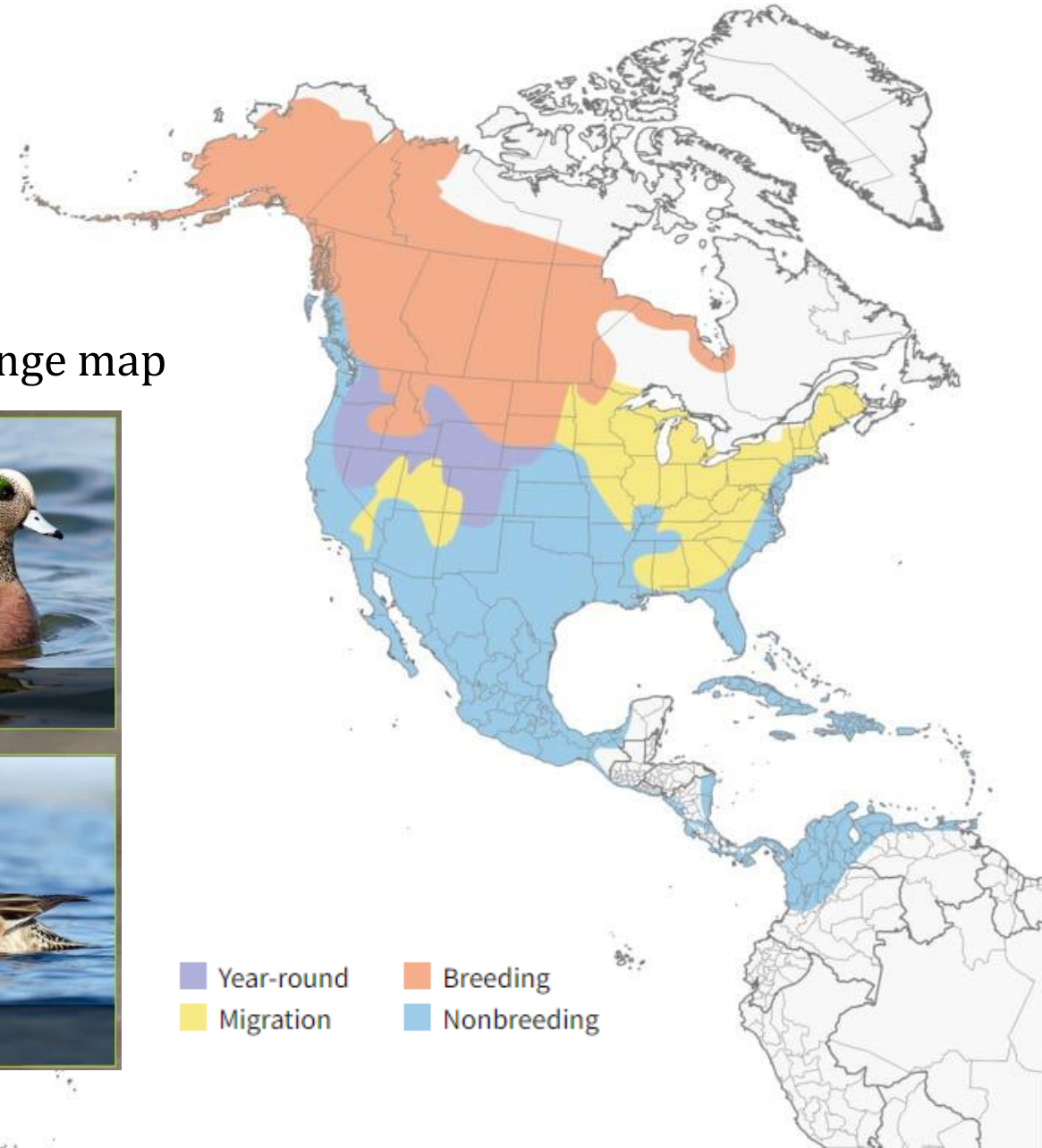
American wigeon range map



Male



Female



Year-round

Migration

Breeding

Nonbreeding

Migratory Bird Basics

Species migrate between breeding and non-breeding areas

Understanding habitat on breeding, migration, and non-breeding areas is vital to ensure their life history requirements are met

Mourning dove harvest about 11 – 9 million annually!

Mourning dove



Migratory Bird Basics

Threats to European–African migrants

Bird populations are in steep decline despite not migrating across the blackspots of illegal killing. Habitat degradation and loss are likely the most important causes, but climate change also affects populations.

Climate change

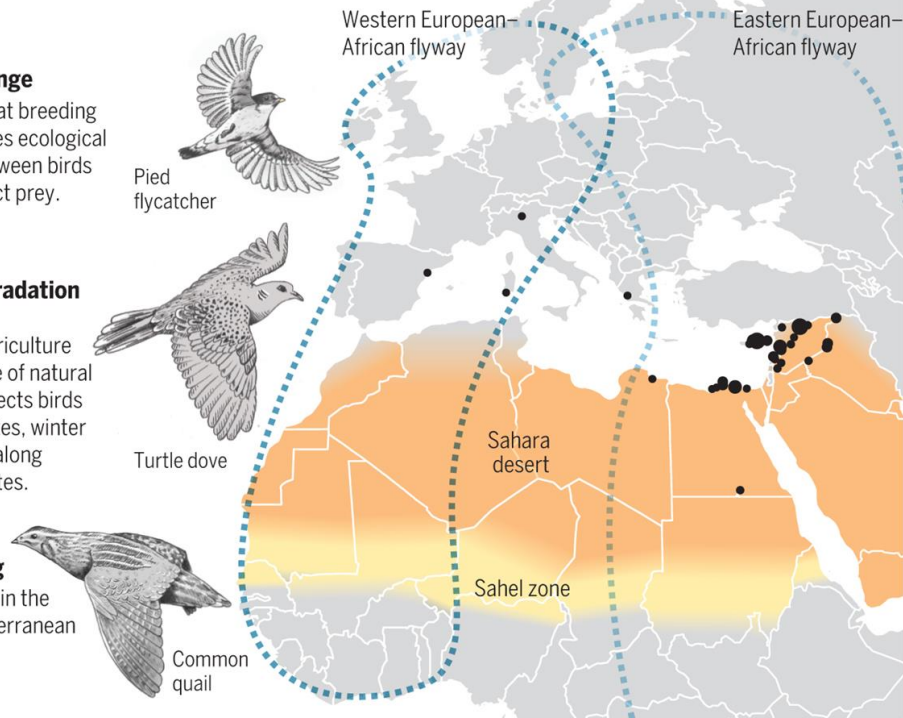
Earlier arrival at breeding grounds causes ecological mismatch between birds and their insect prey.

Habitat degradation and loss

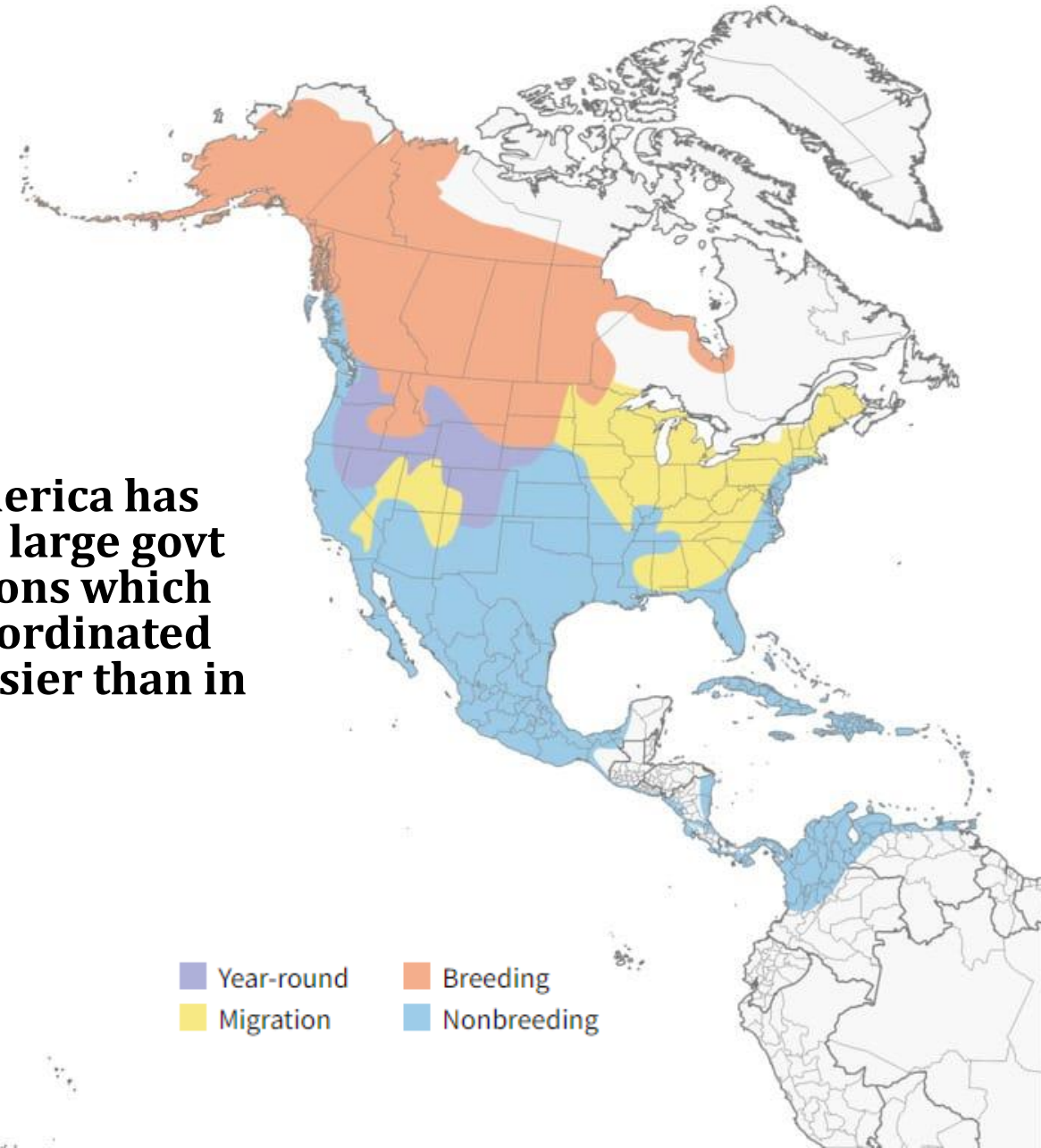
Increase in agriculture at the expense of natural vegetation affects birds at breeding sites, winter habitats, and along migratory routes.

Illegal killing

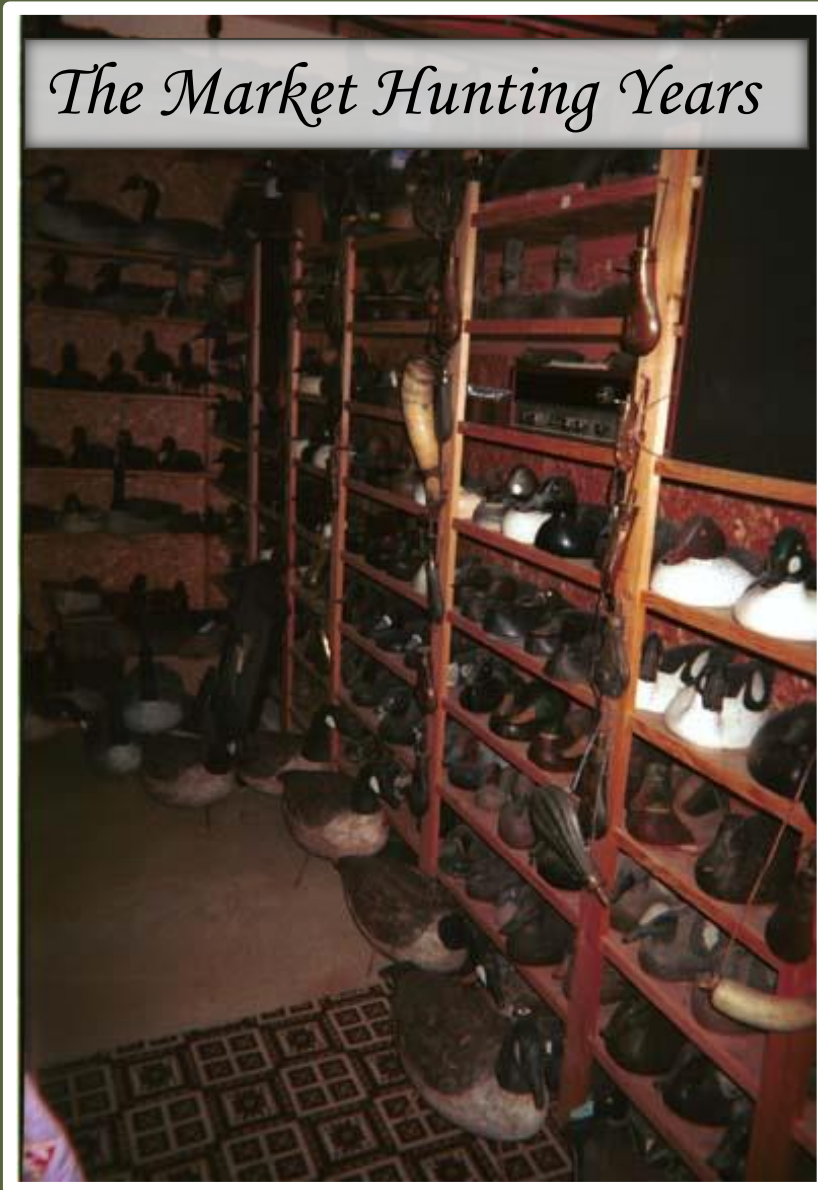
Concentrated in the eastern Mediterranean (black dots)



North America has relatively large govt jurisdictions which makes coordinated efforts easier than in Europe.



Roots of Bird Conservation Movement





—≡— MENU —≡—

•••••

Blue Points.

Soup.

Venison a la Chasseur.

Consomme of Prairie Chicken.

Fish.

Baked White Fish, Port Wine Sauce.

Boiled Trout, Lobster Sauce.

Boiled.

Wild Turkey.

Leg of Mountain Sheep.

Roast.

Saddle of Antelope.

Mountain Sheep.

Leg of Venison.

Pheasants.

Wild Goose.

Blue Grouse.

Mallard Duck.

Quail.

Prairie Chicken.

Red-Head Duck.

Sage Hen.

Wild Turkey.

Jack Rabbit.

Spotted Grouse.

Black Tail Deer.

Plover.

Canvass-Back Duck.

Black Bear.

Wood Duck.

English Hare.

Blue-Wing Teal.

Sand-Hill Crane.

Squirrel.

Opossum.

Ruffed Grouse.

Coon.

Leg of Elk.

Partridges.

Brandt.

Cinnamon Bear.

Saddle of Black-Tail Deer.

Widgeon.





At The Table

MARKET PRICES

	<u>Retail Price (1884)</u>	<u>w/inflation</u>
● <i>Pair of Canvasback</i>	<i>\$1.00 to \$2.75</i>	<i>\$64.83</i>
● <i>Pair of Redheads</i>	<i>50¢ to \$1.60</i>	<i>\$37.72</i>
● <i>Pair of Ruddy Ducks</i>	<i>25¢ to 90¢</i>	<i>\$21.22</i>
● <i>Canada Goose</i>	<i>50¢</i>	<i>\$11.79</i>

RESTAURANT PRICES

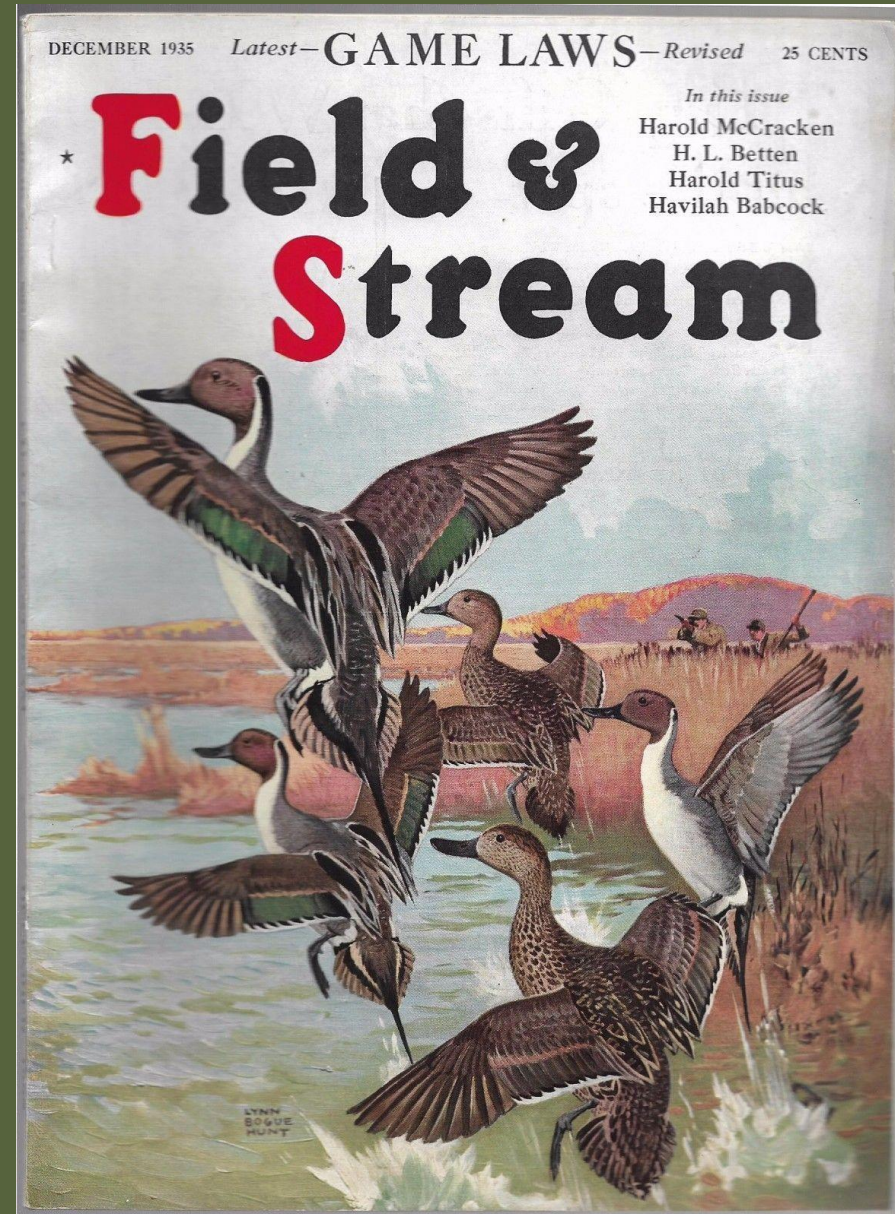
	<u>Table Price (1901)</u>	<u>w/inflation</u>
● <i>Canvasback</i>	<i>\$4.00</i>	<i>\$101.79</i>
● <i>Redhead</i>	<i>\$3.00</i>	<i>\$76.34</i>
● <i>Mallard</i>	<i>\$2.50</i>	<i>\$63.62</i>
● <i>Ruddy Duck</i>	<i>\$2.00</i>	<i>\$50.89</i>
● <i>Teal</i>	<i>\$1.25</i>	<i>\$31.81</i>

- Feathers for women's hats had an equal impact on different birds
- the number of birds being killed in Florida alone each year was as high as five million.



- *Forest and Stream* magazine was an early and influential advocate for the elimination of spring shooting, and in 1894 the publication declared that the sale of game should be outlawed. The magazine's editor, George Bird Grinnell, was a prolific writer and avid hunter who helped bring together sportsmen, other bird enthusiasts, and the scientific community in support of new wildlife conservation laws.

<https://www.ducks.org/conservation/public-policy/the-migratory-bird-treaty-centennial>





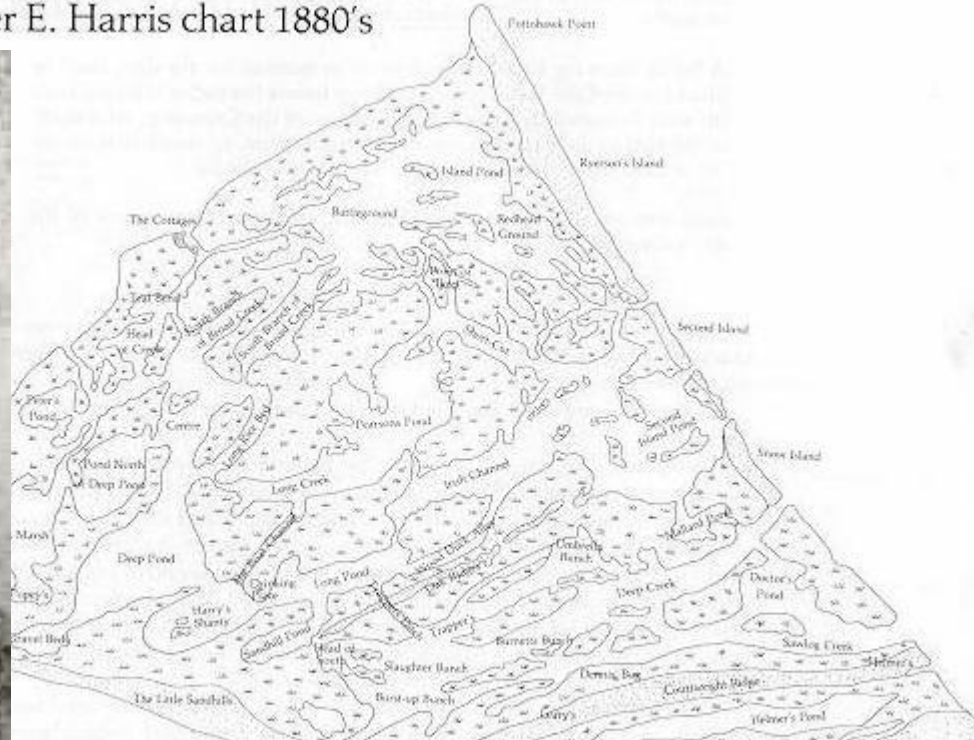
- Florence Merriam Bailey, who as a Smith College student in 1886 organized a local chapter of the Audubon Society, combined their activism with work that pushed others to appreciate the beauty of birds in their natural habitats. Bailey's *Birds Through an Opera-Glass*, published in 1899, helped non-experts spot, identify and appreciate bird life, and over the course of her ornithology career she'd write six birding books focused primarily on birds of the southwestern United States.



Long Point Company By-laws June 7, 1881



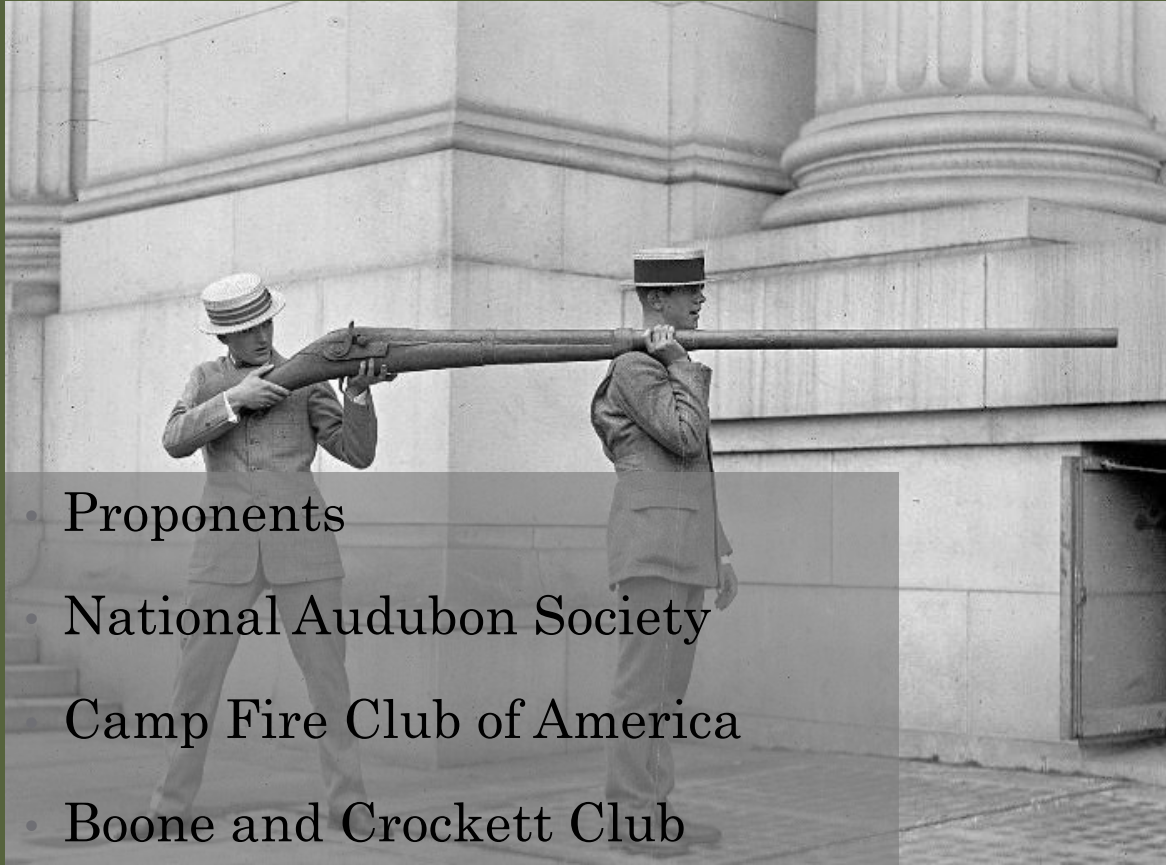
LONG POINT COMPANY MARSH
after E. Harris chart 1880's



Migratory Bird Treaty 1918

- Proponents
 - National Audubon Society
 - Camp Fire Club of America
 - Boone and Crockett Club
 - Prominent business leaders
 - e.g. Henry Ford

- Prior versions
 - Weeks-McLean Act 1913
 - 1916 (Canada and US)
 - Economic reasons – insect control for food for the war effort



Migratory Bird Treaty 1918



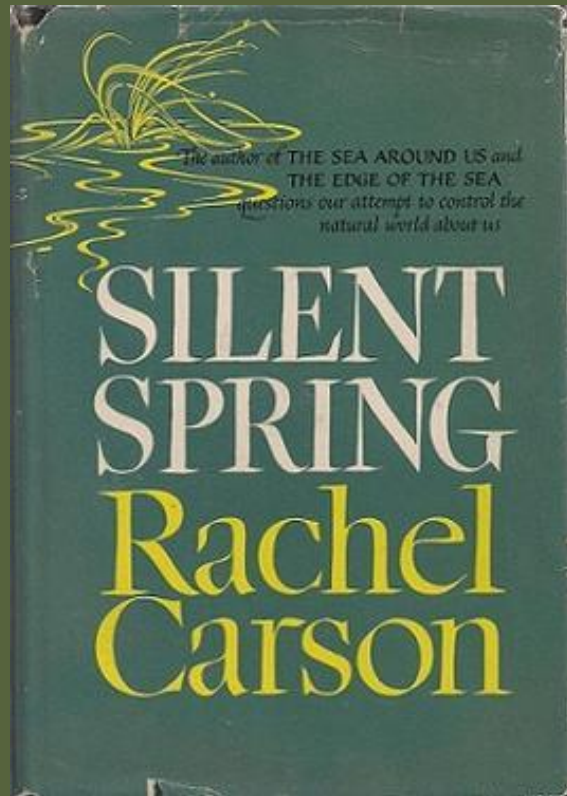
- In order to authorize the "taking" of waterfowl and other migratory birds, the law established the first federal hunting seasons and bag limits along with a permit system for scientific collections. In addition, it protected threatened species such as the wood duck, and banned market hunting, spring shooting, and the use of shotguns larger than 10-gauge.

1919- Missouri v. Holland,
the high court upheld the
MBTA



Environmental Movement

- Birds in the environmental movement



<https://www.scientificamerican.com/article/rachel-carson-silent-spring-1972-ddt-ban-birds-thrive/>

Environmental Movement

- Nixon creates EPA
- Clean Air and Clean Water acts
- Nixon's Endangered Species Act of 1973 that all endangered species — including grasses, flowers and trees — were included on the list.



Migratory Bird Law

- Incidental Take

The Trump Administration reinterpreted the MBTA to regulate only intentional acts that kill birds, and finalized an action to **exclude incidental take in the administration's final days in January 2021**. Dec 21, 2021

With the final rule, FWS has effectively reinstated its position that “incidental take” — **the harming or killing that results from, but is not the purpose of, carrying out an otherwise lawful activity** — is prohibited by the MBTA, and persons that cause incidental take can be prosecuted criminally. Oct 7, 2021

<https://www.natlawreview.com/article/revocation-trump-administration-s-migratory-bird-treaty-act-rule-takes-effect>

Migratory Bird Law

- Bald and Golden Eagle Protection Act of 1940 + amendments
- prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts (including feathers), nests, or eggs.



[https://www.fws.gov/law/bald-and-golden-eagle-protection-act#:~:text=The%20Bald%20and%20Golden%20Eagle,\)%2C%20nests%2C%20or%20eggs.](https://www.fws.gov/law/bald-and-golden-eagle-protection-act#:~:text=The%20Bald%20and%20Golden%20Eagle,)%2C%20nests%2C%20or%20eggs.)

Migratory Bird Law

- Endangered Species Act – initially 1966
- Definitions of T and E
- Broadly applied the term “Take” prohibitions
- Required Federal agencies to use their authorities to conserve listed species and on those of “Special Concern”
- Made matching funds available to states with cooperative agreements

Legislative Attacks on the Endangered Species Act

1996-2018

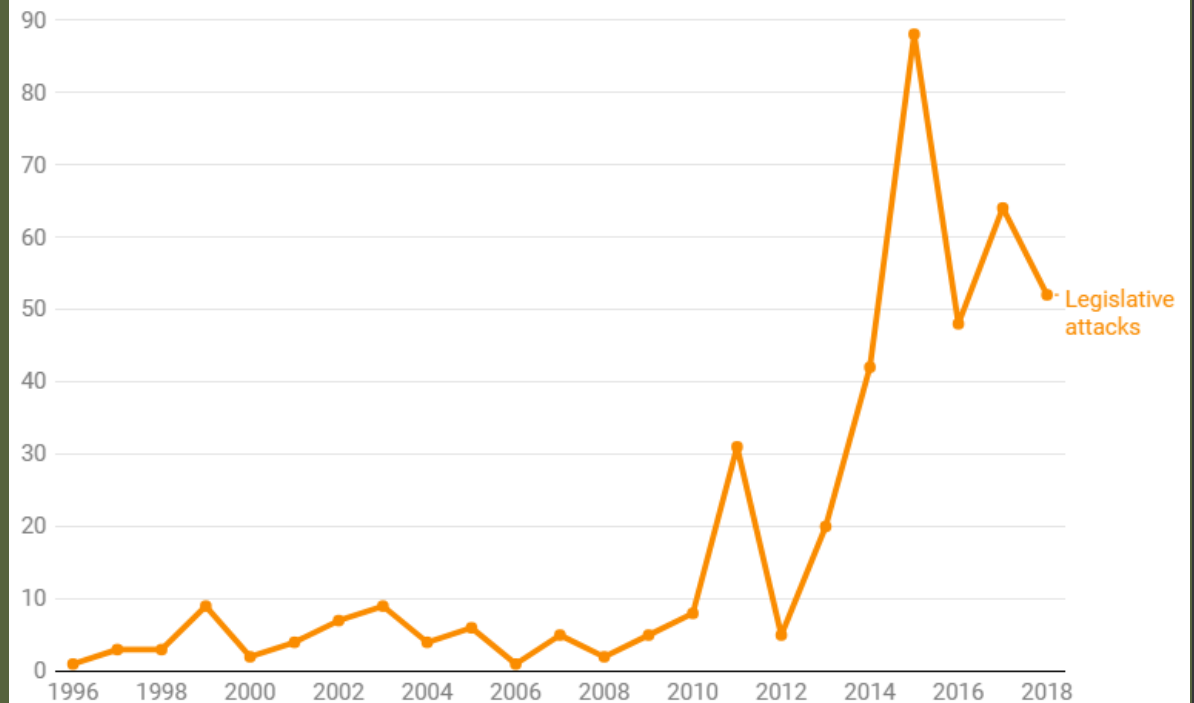


Chart: Mother Jones • Source: Center for Biological Diversity • Get the data • Created with Datawrapper

North American Waterfowl Mgmt Plan

- Initially in 1986 - <https://nawmp.org/>
- Many revisions thereafter – model for conservation partnerships



NAWMP2018

North American Waterfowl Management Plan



2018 Update ▾

Webinar Series

About

Timeline

Documents ▾

2012 Implementation ▾

2012 Revision Archive ▾

A model for international conservation.

Signed in 1986 by the United States and Canada and in 1994 by Mexico, the North American Waterfowl Management Plan is the foundational bird conservation partnership upon which many others have been built.

North American Waterfowl Mgmt Plan

- 2012 revision included people as the 3rd leg of the stool along with healthy waterfowl populations and conservation of habitat for waterfowl

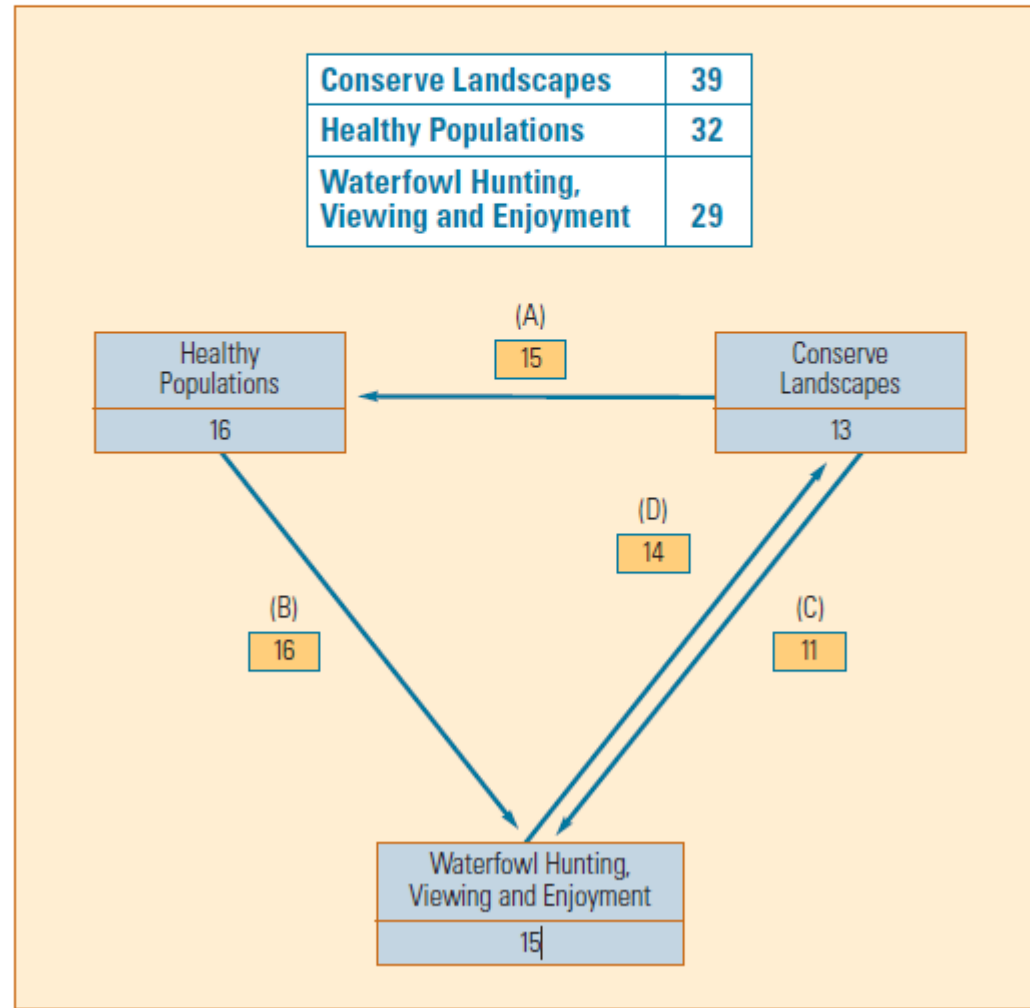
The utilities, reflected by arrows, convey the following relationships:

"A" represents the value that landscape conservation makes to healthy populations.

"B" reflects the value that healthy populations play in perpetuating waterfowl hunting, viewing and enjoyment.

"C" represents the value of conserving landscapes in helping to perpetuate waterfowl hunting, viewing and enjoyment.

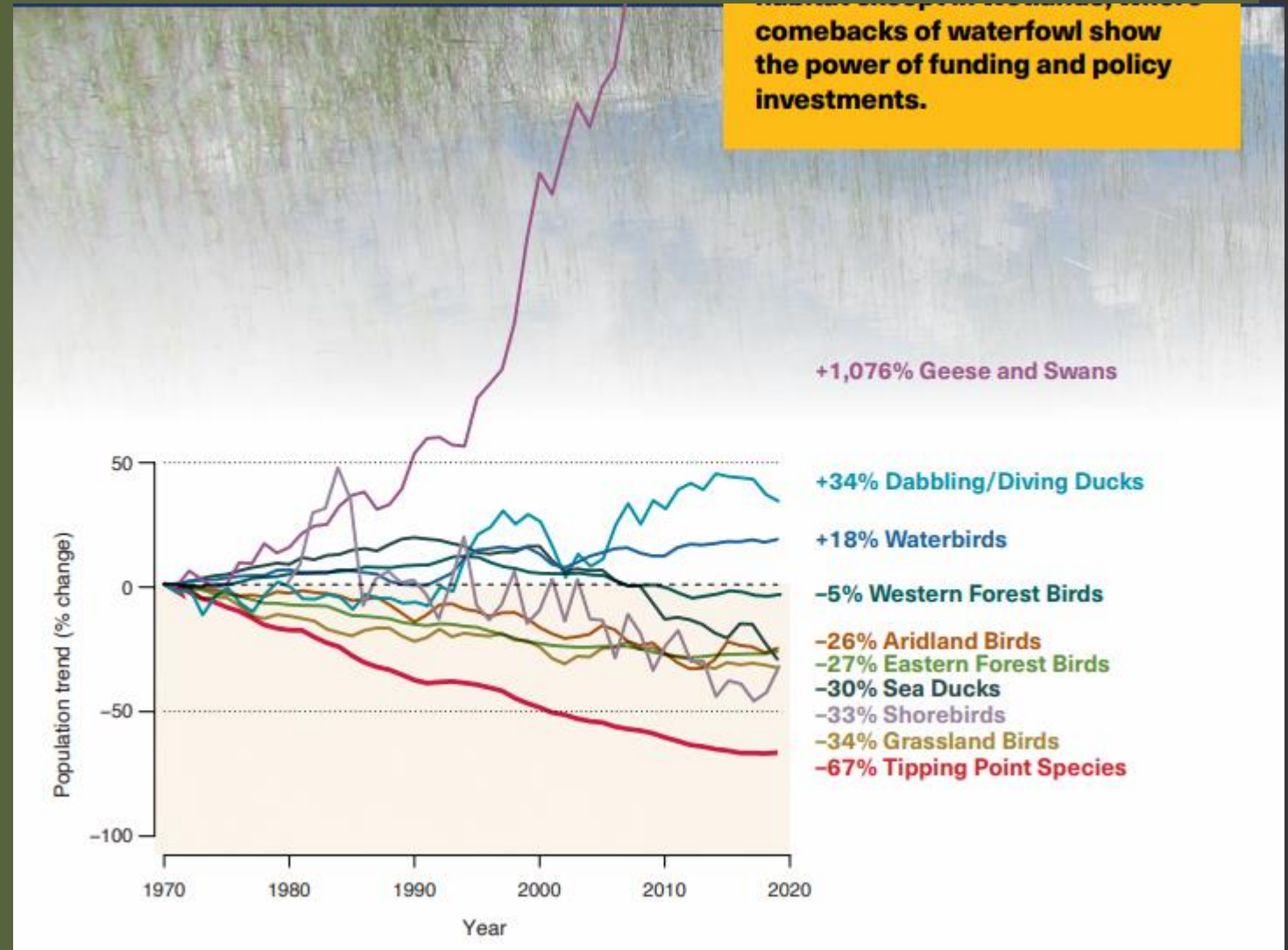
"D" represents the role that waterfowl hunting, viewing and enjoyment play in helping conserve landscapes.



North American Wetlands Conservation Act

- The funding vehicle to meet NAWMP objects
- This model has worked for waterfowl

- BUT – other birds are not doing as well



North American Wetlands Conservation Act

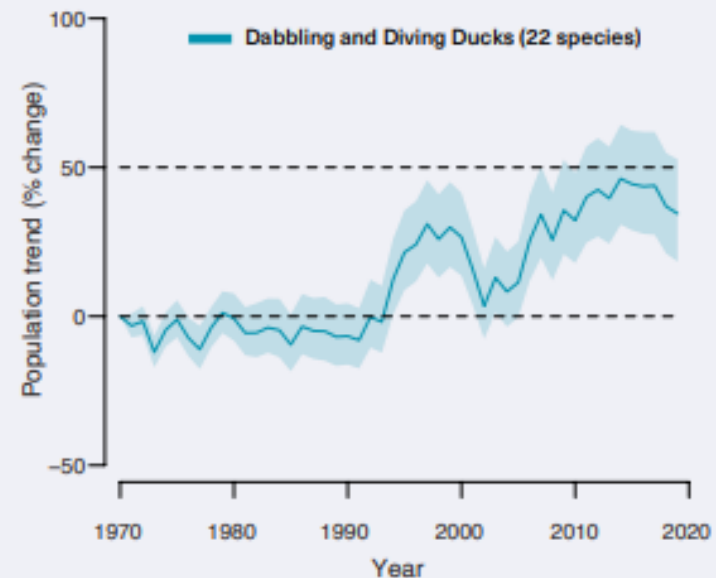
WATERFOWL AND WATERBIRDS

A Model Conservation Success Story

STATUS: Decades of population growth driven by conservation policy and cleaner water

The long-term recovery of waterfowl and waterbird populations is largely due to successful policy (such as the North American Wetlands Conservation Act and U.S. Farm Bill conservation programs), along with coordinated efforts by public-private partnerships under the North American Waterfowl Management Plan.

- Decades of dedicated funding for habitat conservation made possible by quality science



Despite their decades-long gains, ducks continue to face pressures from grassland habitat loss, wetland drainage, coastal wetland loss, and climate change impacts. Recent droughts have tipped duck populations downward—underscoring the need for continued conservation investments to keep duck populations healthy and resilient.

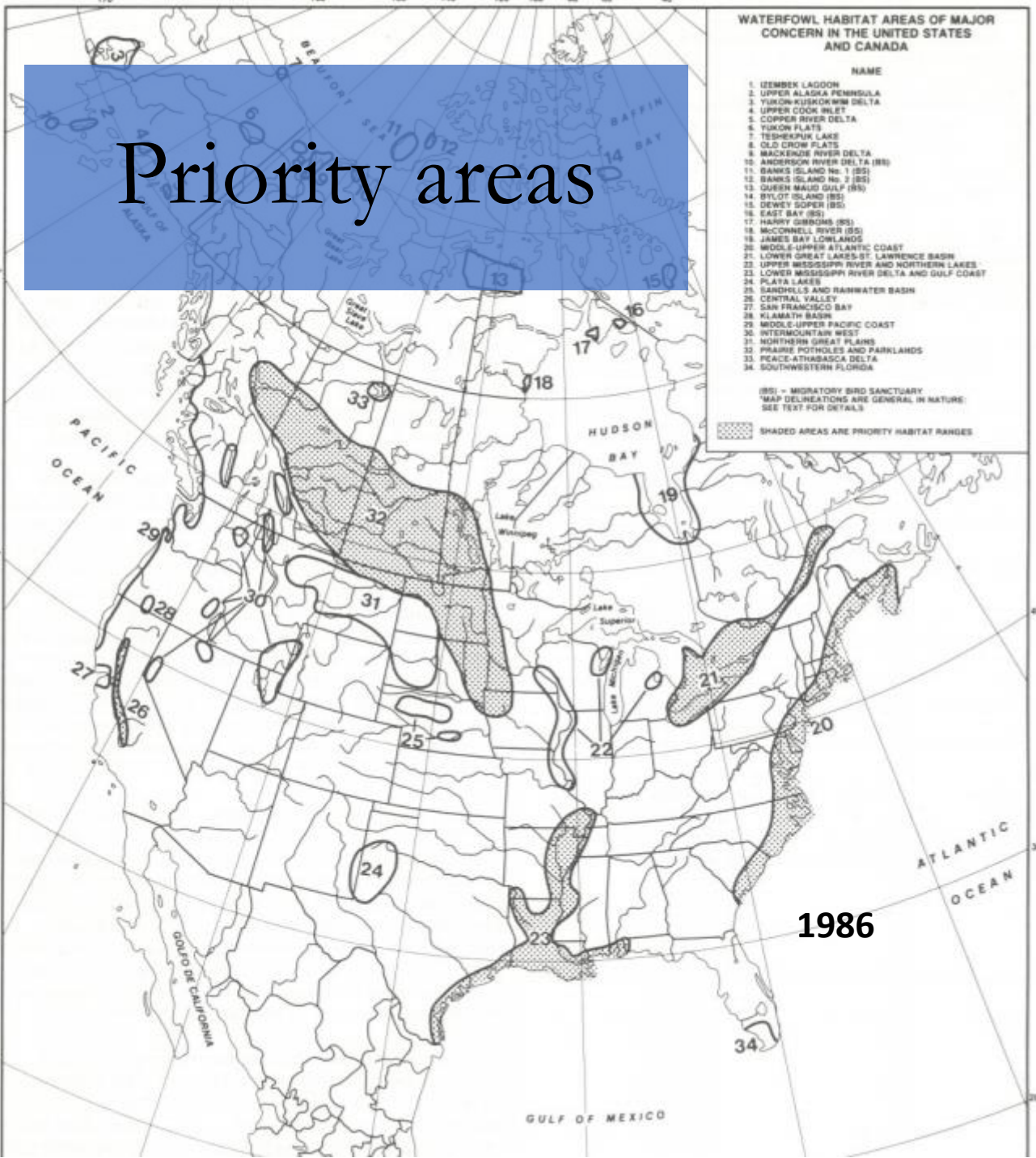
Priority areas

WATERFOWL HABITAT AREAS OF MAJOR CONCERN IN THE UNITED STATES AND CANADA

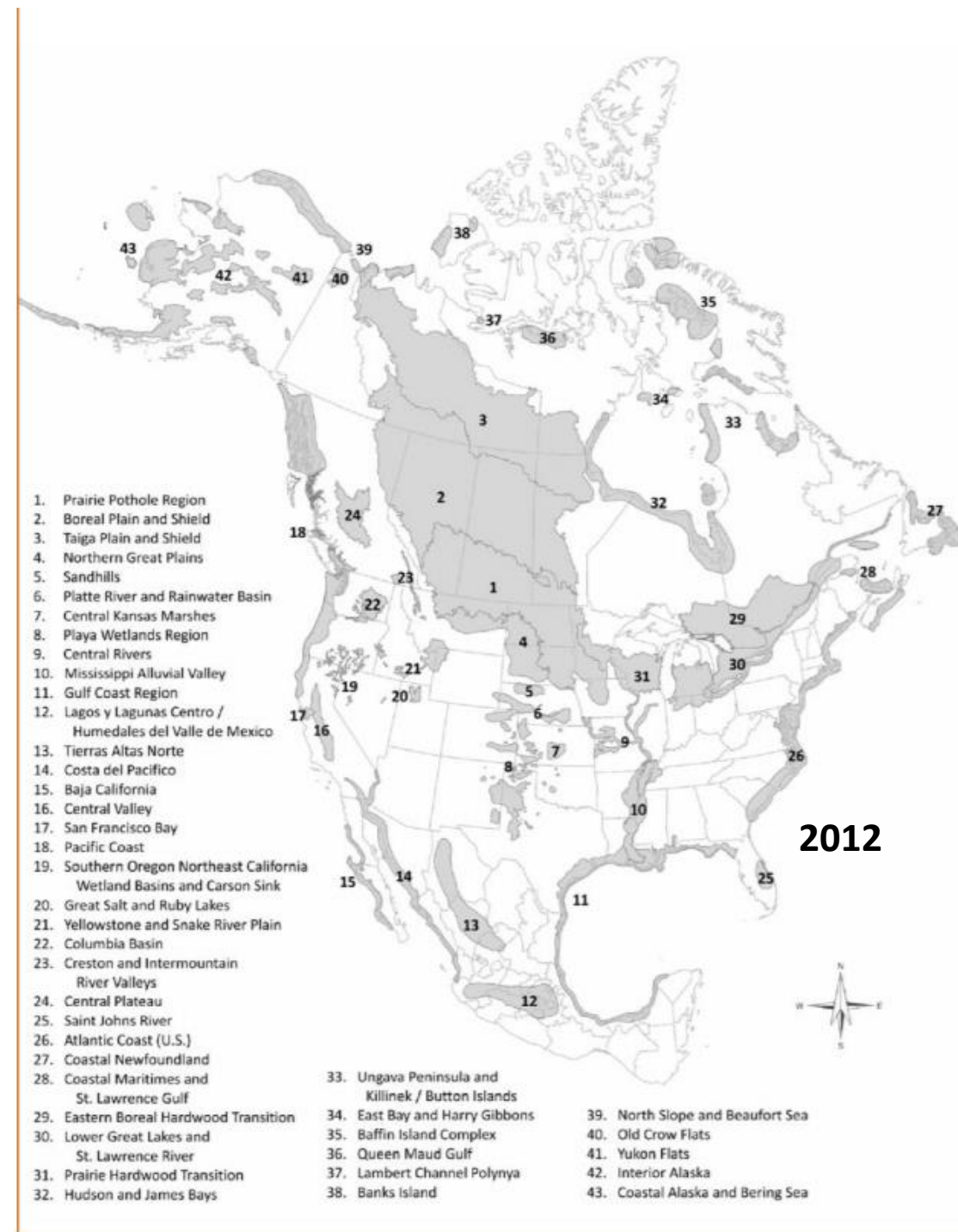
- NAME
1. IZEMBEK LAGOON
 2. UPPER ALASKA PENINSULA
 3. YUKON-KUSKOKWIM DELTA
 4. UPPER COOK INLET
 5. COPPER RIVER DELTA
 6. YUKON FLATS
 7. TESHERUK LAKES
 8. OLD CROW FLATS
 9. MACKENZIE RIVER DELTA
 10. ANDERSON RIVER DELTA (RS)
 11. BANKS ISLAND No. 1 (RS)
 12. BANKS ISLAND No. 2 (RS)
 13. QUERN MAUD GULF (RS)
 14. BYLOT ISLAND (RS)
 15. DEWEY SOOPER (RS)
 16. EAST BAY (RS)
 17. HARRY GIBBONS (RS)
 18. MCCONNELL RIVER (RS)
 19. JAMES BAY LOWLANDS
 20. MIDDLE-UPPER ATLANTIC COAST
 21. LOWER GREAT LAKES-ST. LAWRENCE BASIN
 22. UPPER MISSISSIPPI RIVER AND NORTHERN LAKES
 23. LOWER MISSISSIPPI RIVER DELTA AND GULF COAST
 24. PLAYA LAKES
 25. SANDHILLS AND RAINWATER BASIN
 26. CENTRAL VALLEY
 27. SAN FRANCISCO BAY
 28. KLAMATH BASIN
 29. MIDDLE-UPPER PACIFIC COAST
 30. INTERMOUNTAIN WEST
 31. NORTHERN GREAT PLAINS
 32. PRAIRIE POTHOLES AND PARKLANDS
 33. PEACE-ATHABASCA DELTA
 34. SOUTHWESTERN FLORIDA

(RS) - MIGRATORY BIRD SANCTUARY
 *MAP DELINEATIONS ARE GENERAL IN NATURE.
 SEE TEXT FOR DETAILS

SHADED AREAS ARE PRIORITY HABITAT RANGES



1986



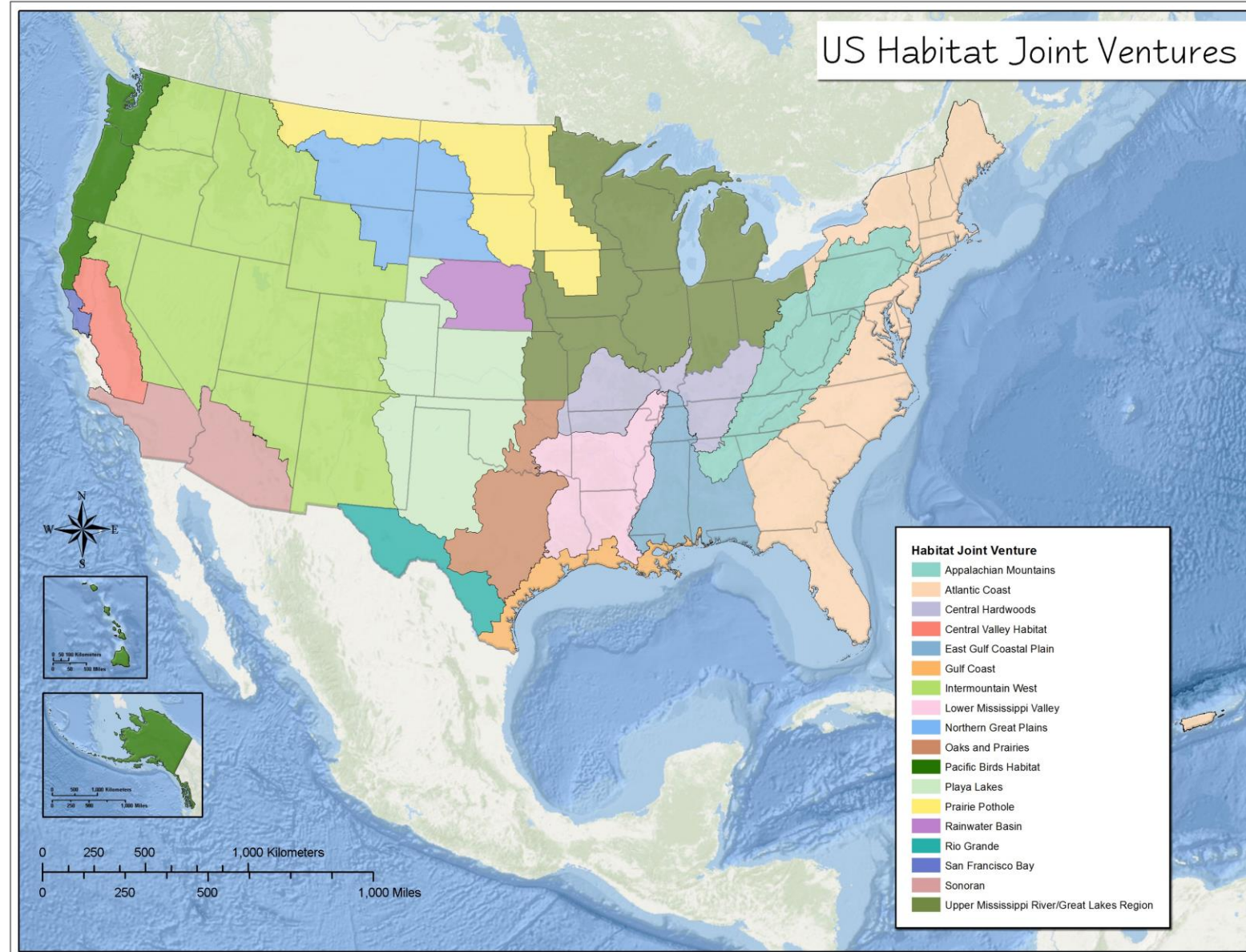
2012

1. Prairie Pothole Region
2. Boreal Plain and Shield
3. Taiga Plain and Shield
4. Northern Great Plains
5. Sandhills
6. Platte River and Rainwater Basin
7. Central Kansas Marshes
8. Playa Wetlands Region
9. Central Rivers
10. Mississippi Alluvial Valley
11. Gulf Coast Region
12. Lagos y Lagunas Centro / Humedales del Valle de Mexico
13. Tierras Altas Norte
14. Costa del Pacifico
15. Baja California
16. Central Valley
17. San Francisco Bay
18. Pacific Coast
19. Southern Oregon Northeast California Wetland Basins and Carson Sink
20. Great Salt and Ruby Lakes
21. Yellowstone and Snake River Plain
22. Columbia Basin
23. Creston and Intermountain River Valleys
24. Central Plateau
25. Saint Johns River
26. Atlantic Coast (U.S.)
27. Coastal Newfoundland
28. Coastal Maritimes and St. Lawrence Gulf
29. Eastern Boreal Hardwood Transition
30. Lower Great Lakes and St. Lawrence River
31. Prairie Hardwood Transition
32. Hudson and James Bays

33. Ungava Peninsula and Killinek / Button Islands
34. East Bay and Harry Gibbons
35. Baffin Island Complex
36. Queen Maud Gulf
37. Lambert Channel Polynya
38. Banks Island
39. North Slope and Beaufort Sea
40. Old Crow Flats
41. Yukon Flats
42. Interior Alaska
43. Coastal Alaska and Bering Sea

Joint Ventures

- Broad geographic areas with similar ecology, species, and threats
- Each Joint Venture functions independently and develops their own priorities and strategic plans unique to their region.



Joint Ventures

- Broad geographic areas with similar ecology, species, and threats
- Each Joint Venture functions independently and develops their own priorities and strategic plans unique to their region.

JV Implementation Plans

2007 Implementation Plan



Landbird Habitat Conservation Strategy



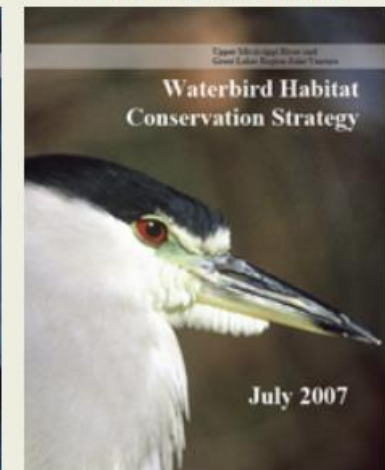
Shorebird Habitat Conservation Strategy



Waterfowl Habitat Conservation Strategy



Waterbird Habitat Conservation Strategy



Joint Ventures

- Each Joint Venture functions independently and develops their own priorities and strategic plans unique to their region.



Atlantic Coast Joint Venture

Partnering to restore and sustain native bird populations and habitats throughout the Atlantic Coast Joint Venture region.

Home

About Us

Conservation

Planning

Our Science

Funding

News

Resources

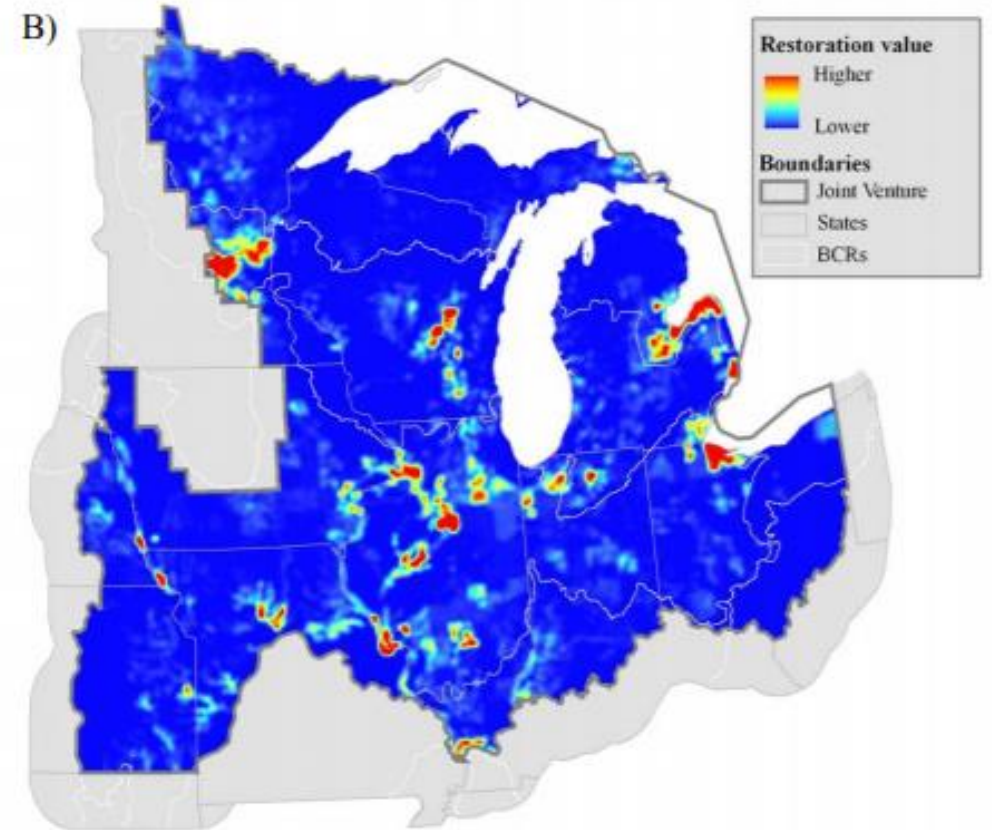


Species Initiatives

The ACJV is focused on three flagship species that represent the coastal marsh habitat we are working to conserve: American Black Duck, Black Rail, and Saltmarsh Sparrow.

How many acres and where?

- Priority species
- Representative species
- For waterfowl - Three components
 - 1/ Regional population goal for each species
 - 2/ Energy demand per individual
 - 3/ Energy supply per unit area of wetland



“Thunderstorm map” that uses county level harvest distribution and hydric soil availability to determine areas of greatest restoration value

How many acres and where?

- Priority species
- Representative species
- For waterfowl - MORE components
 - 1/ Ducks
 - 2/ Recreation
 - 3/ Water Quality
 - 4/ Great Lakes Coast

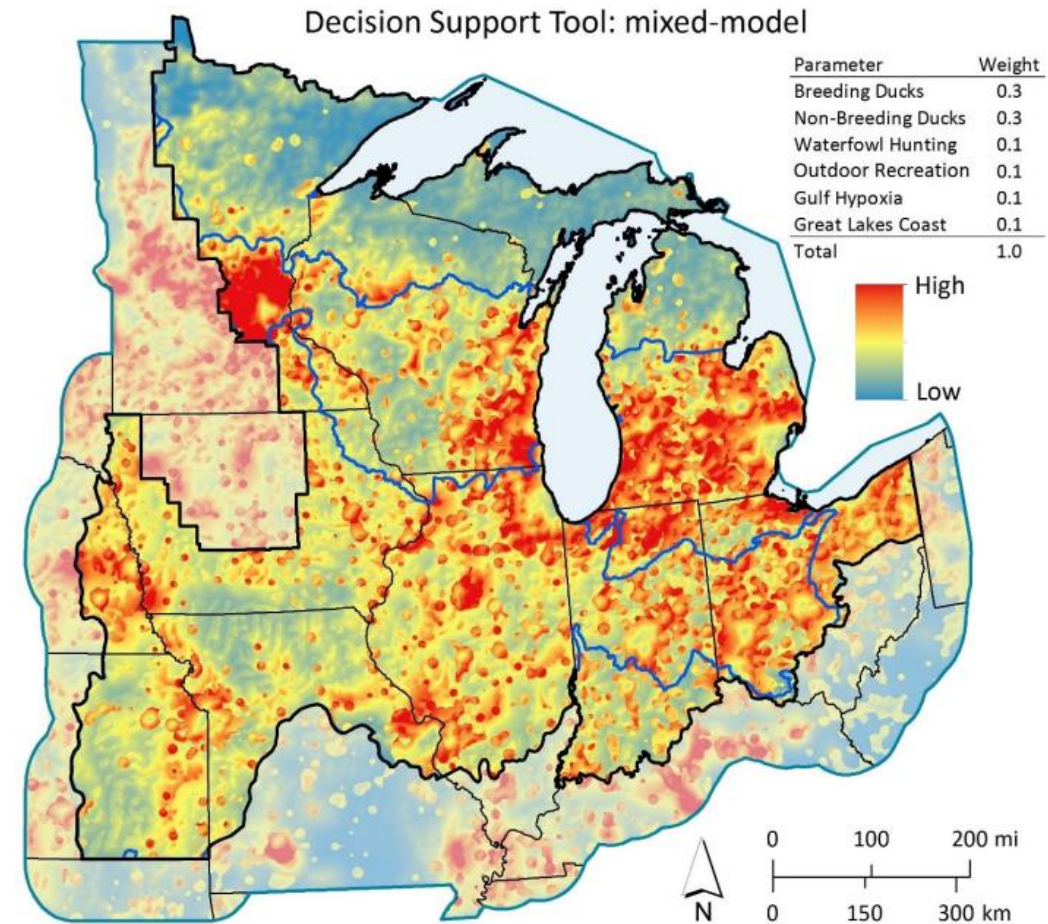


Figure 18. Decision support tool (DST) to target waterfowl habitat conservation in the Upper Mississippi River and Great Lakes Joint Venture (JV) region. The DST is a combination of six parameters, mixing biological (breeding and non-breeding waterfowl habitat) and social (waterfowl supporters and ecological goods and services) model-based maps weighted by regional waterfowl stakeholders. State and BCR boundaries (black and blue lines) designate the State x BCR polygons linked to JV waterfowl habitat retention and restoration objectives (see Tables 17 and 18 in Conservation Delivery).

Table 9. Spring migration and winter use-day goals (current needs + deficit needs) for species commonly occurring in the Upper Mississippi River and Great Lakes Joint Venture (JV) region. Numbers are based on continental population estimates (average for 1994–2003, NAWMP 2004) and estimates of the duration of stay in the JV region during each season (Appendix G).

Guild/foraging habitat	Species	Use days		
		Spring	Winter	Total
Wet mudflat / moist soil plants				
	Blue-winged Teal	41,625,029	0	41,625,029
	Northern Shoveler	7,633,091	0	7,633,091
	Northern Pintail	19,686,675	0	19,686,675
	Green-winged Teal	21,939,032	0	21,939,032
	Total	90,883,827	0	90,883,827
Shallow semi-permanent marsh				
	Wood Duck	38,083,080	10,476,180	48,559,260
	Gadwall	11,137,685	0	11,137,685
	American Wigeon	12,658,056	0	12,658,056
	American Black Duck	10,455,602	9,585,437	20,041,039
	Mallard	129,691,043	167,383,620	297,074,663
	Total	202,025,466	187,445,237	389,470,703
Deep water marsh				
	Mute Swan	954,000	484,200	1,438,200
	Trumpeter Swan	216,000	175,410	391,410
	Tundra Swan	1,000,000	0	1,000,000
	Ring-necked Duck	19,336,412	4,221,450	23,557,862
	Hooded Merganser	6,125,873	6,150,870	12,276,743
	Ruddy Duck	6,437,548	274,050	6,711,598
	Total	34,069,833	11,305,980	45,375,813
Extensive open water				
	Canvasback	7,443,585	11,702,970	19,146,555
	Redhead	12,849,990	7,121,070	19,971,060
	Greater Scaup	14,301,019	3,996,135	18,297,154
	Lesser Scaup	60,578,203	23,400,009	83,978,212
	White-winged Scoter	3,374,657	12,004	3,386,661
	Black Scoter	3,001,785	7,875	3,009,660
	Long-tailed Duck	8,193,905	16,597,629	24,791,534
	Bufflehead	20,298,053	8,673,210	28,971,263
	Common Goldeneye	21,296,386	37,316,160	58,612,546
	Common Merganser	12,453,643	17,614,080	30,067,723
	Red-breasted Merganser	2,174,109	4,193,820	6,367,929
	Total	165,965,335	130,634,962	296,600,297
All cover types	Total	495,458,161	329,398,150	824,856,311

Duck use days

- Residency time × abundance

So 100 ducks for 10 days =

1,000 Duck use days (DUDs)

Table 10. Body mass, estimated resting metabolic rate (RMR), and daily energy requirement (DER) for waterfowl commonly occurring in the Upper Mississippi River and Great Lakes region during migration and winter.

Species	Body mass (kg) ^a	RMR (kJ/day) ^b	DER (kJ) ^c
Mute Swan	11.36	2,549	7,646
Trumpeter Swan	12.68	2,765	8,294
Tundra Swan	7.26	1,831	5,492
Wood Duck	0.68	317	952
Gadwall	0.97	413	1,238
American Widgeon	0.82	364	1,093
American Black Duck	1.25	498	1,493
Mallard	1.25	498	1,493
Blue-winged Teal	0.46	238	713
Northern Shoveler	0.68	317	952
Northern Pintail	1.03	431	1,294
Green-winged Teal	0.32	182	545
Canvasback	1.25	499	1,496
Redhead	1.11	455	1,366
Ring-necked Duck	0.74	338	1,013
Greater Scaup	1.05	439	1,316
Lesser Scaup	0.83	366	1,099
Surf Scoter	1.00	422	1,266
White-winged Scoter	1.59	594	1,783
Black Scoter	1.14	463	1,390
Long-tailed Duck	0.95	407	1,222
Bufflehead	0.48	245	735
Common Goldeneye	1.08	445	1,336
Hooded Merganser	0.73	334	1,003
Common Merganser	1.65	611	1,834
Red-breasted Merganser	0.71	327	981
Ruddy Duck	0.54	269	808

Daily Energy Requirements

← 358.32 kcal/day

← 130.80 kcal/day

^aBody mass (kg) based on adult males (Bellrose 1980).

^bRMR = 422*W^{0.74} where W is body mass in kg (Miller and Eadie 2006). One kiloJoule (kJ) = 0.24 kilocalories (kcal) or 4.18 kJ / kcal.

^cDER = RMR*3 (Prince 1979).

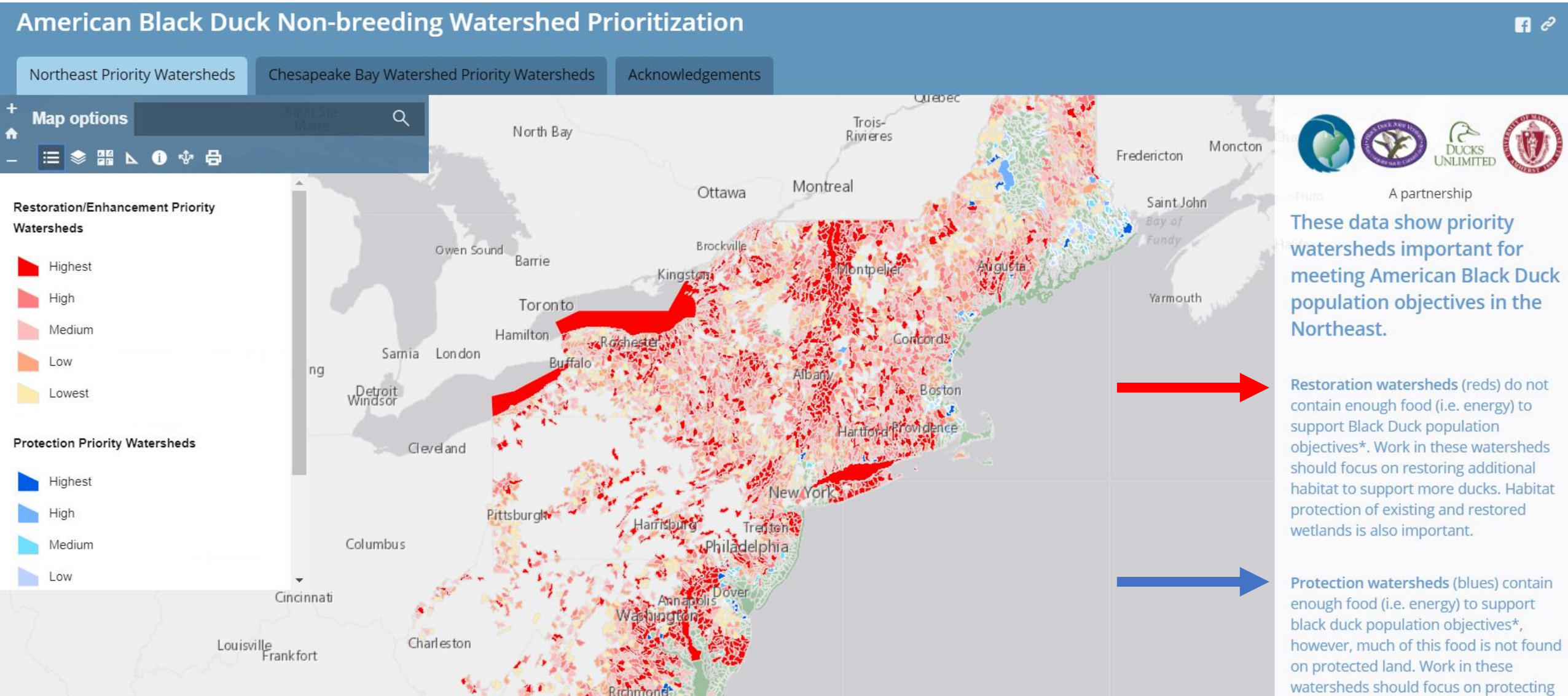
DUD X DER = Duck Energy Days Needed

Table 4.1 Energetic carrying capacity of selected foraging habitats (expressed as duck-energy days/ha [DEDs]) for dabbling ducks

Habitat	Food abundance ^a	Foraging threshold ^a	Food available ^a	TME ^{b,h,n}	DED ^{c,o}
Moist soil^d					
Unmanaged ^c	403	200	203	2.47	1,784
Managed ^f	751	200	551	2.47	4,705
Restored WRP ^g	306	200	106	2.47	970
Harvested crops					
Rice ⁱ	80	50	30	3.34	384
Soybean ^j	45	50	0	2.65	3
Corn ^j	75	15	60	3.67	748
Milo ^j	156	50	106	3.49	1,258
Unharvested crops					
Rice ^k	6,030	50	5,980	3.34	67,899
Soybean ^j	2,190	50	2,140	2.65	19,299
Corn ^j	6,260	15	6,245	3.67	77,864
Milo ^j	3,051	50	3,001	3.49	35,583
Millet ^l	1,300	10	1,290	2.61	11,472
Bottomland hardwood^m					
10 % red oak	12	10	2	2.76	56
20 % red oak	38	10	28	2.76	302

- True Metabolizable Energy
- Determine how many acres are needed to satisfy the animals you plan on supporting for X number of days
- Help provide an objective decision-making framework for where and when to provide habitat

Decision support tools – habitat models



REMARKABLE RECOVERIES

Waterfowl serve as a model for how habitat protection and restoration can reverse bird declines.

Waterfowl



56% increase since 1970



WOOD DUCK BY LINDA RUDOLPH/MACAULAY LIBRARY

Waterfowl are one of America's best wildlife success stories, thanks to federal investments such as the Duck Stamp and North American Wetlands Conservation Act that powered waterfowl conservation efforts.

Raptors show what a big difference states can make in species protection.

Raptors



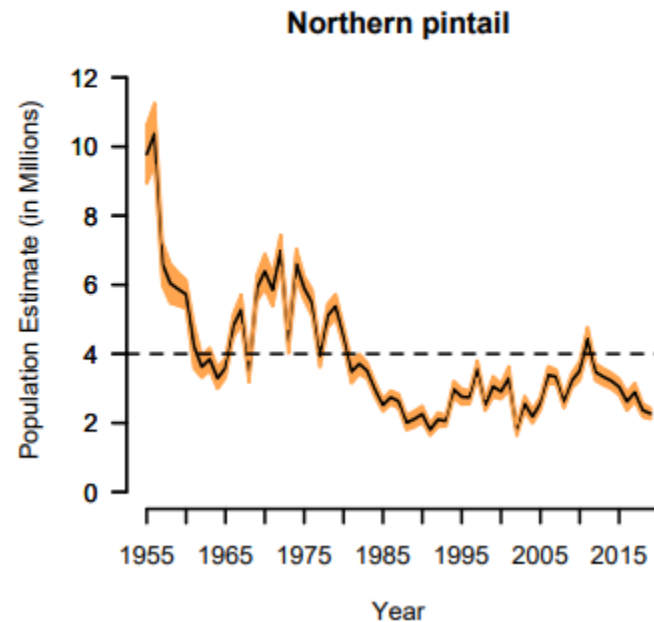
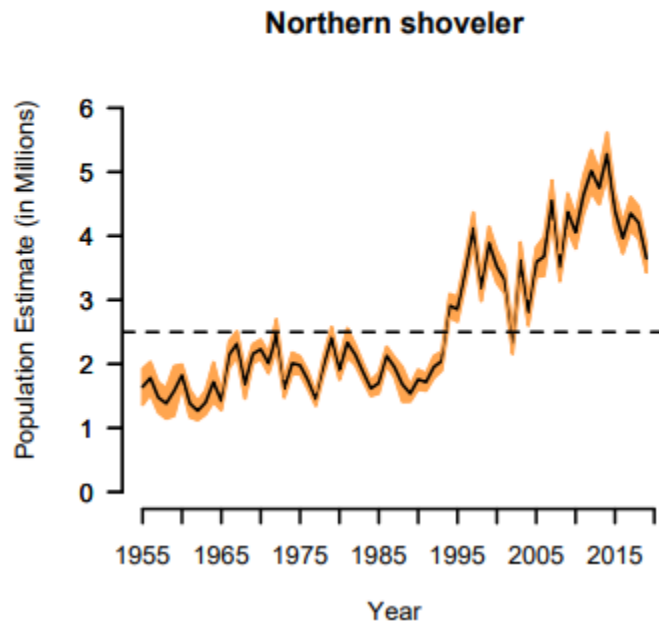
200% increase since 1970



COOPER'S HAWK BY JOHN BRUN/MACAULAY LIBRARY

Hawks, eagles and other birds of prey buck the general trend of declining birds thanks to bans on harmful pollutants such as DDT, as well as strong federal and state protections from shooting.

STATUS OF DUCKS

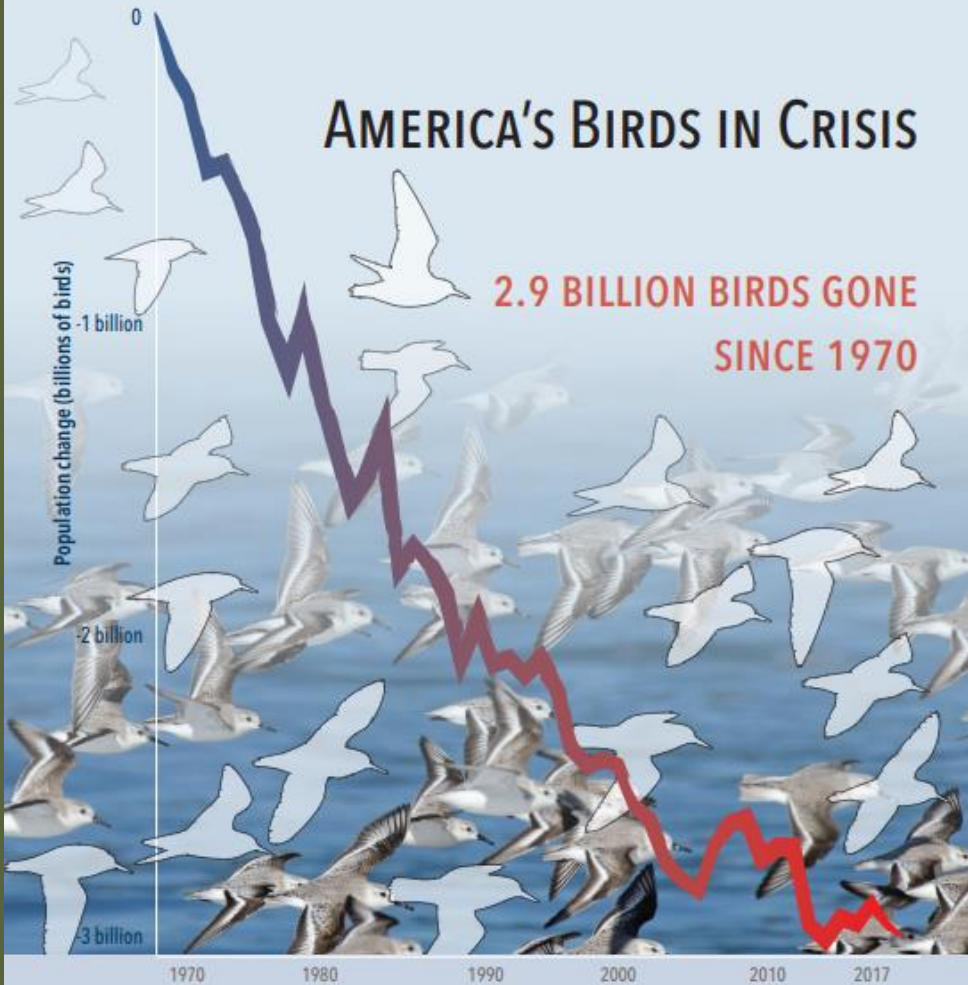


THE STATE OF THE BIRDS 2019

UNITED STATES OF AMERICA

AMERICA'S BIRDS IN CRISIS

2.9 BILLION BIRDS GONE
SINCE 1970



Nearly 30% of our birds have disappeared in the last 50 years: New research published in the journal *Science* shows massive losses among U.S. bird populations—with steep declines in every habitat.

BUT CONSERVATION WORKS!

RECOVERY IS
POSSIBLE
WHEN WE
INVEST IN BIRDS

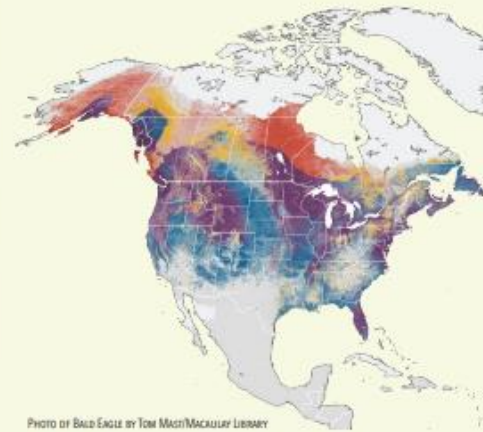
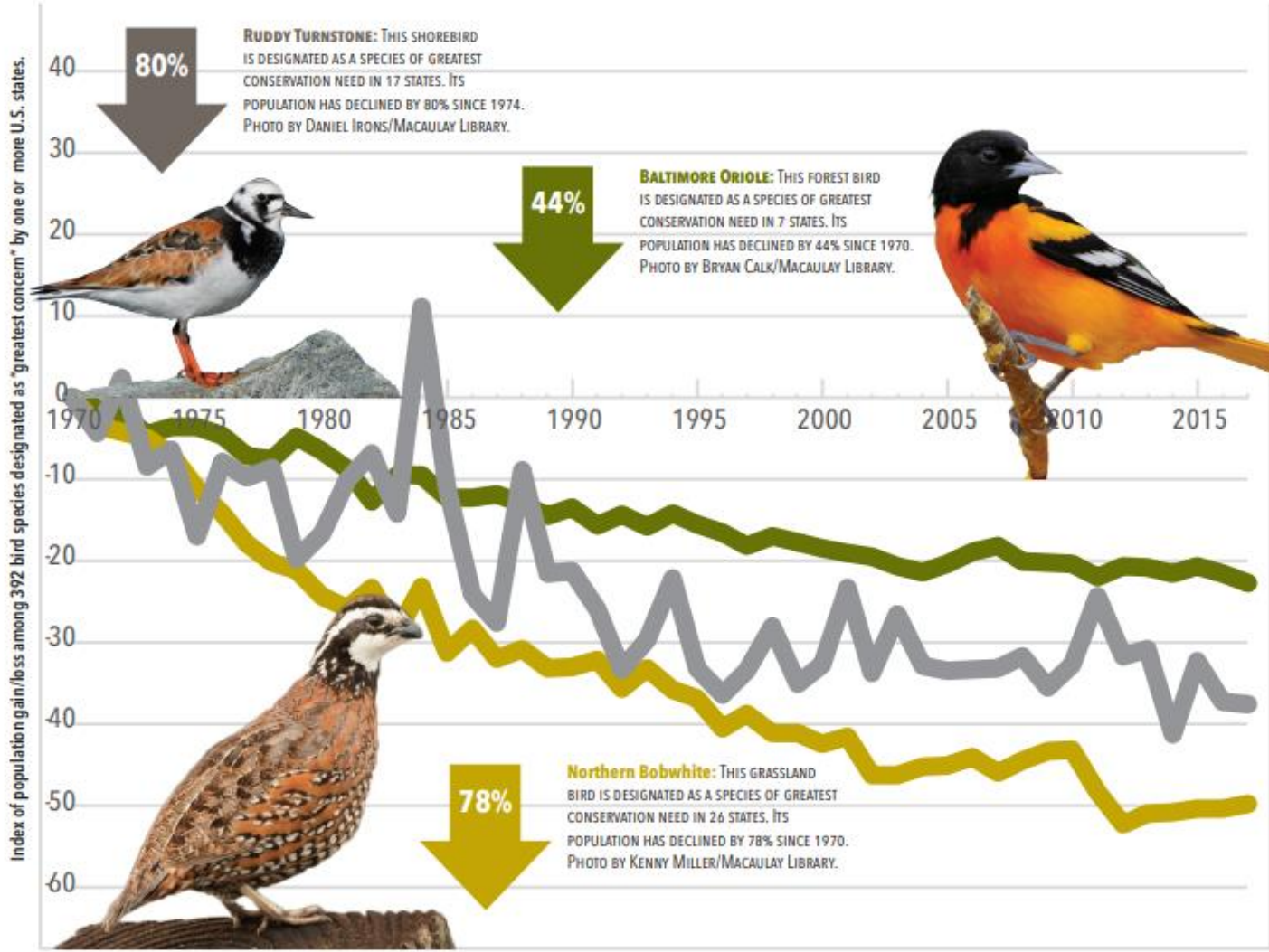


PHOTO OF BALD EAGLE BY TOM MAST/MACKALUP LIBRARY

Our national bird, an icon of wildlife recovery: In 1970 only a few hundred Bald Eagle pairs remained in the lower 48 states. Federal and state protections sparked a remarkable recovery. The Bald Eagle was delisted as an Endangered Species in 2007, and today 30,000+ eagle pairs live in the U.S.A.

AMERICA'S BIRDS ARE IN STEEP DECLINE



Forest Birds



22% decrease since 1970

Forest birds have experienced consistent declines, with big losses among beloved species such as Wood Thrush and Baltimore Oriole. Altogether, forest bird populations have lost 1.2 billion birds since 1970.

Shorebirds



37% decrease since 1974

Shorebirds include many migratory species such as Ruddy Turnstone and Semipalmated Sandpiper that are declining fast, with critically low populations that may soon trigger Endangered Species Act listings.

Grassland Birds



53% decrease since 1970

Grassland birds have suffered the steepest losses, with a population decline of 700 million birds. Some of the biggest declines are among birds beloved by birdwatchers and hunters alike, such as Northern Bobwhite.

FUNDING FOR STATE WILDLIFE PROGRAMS AND JOINT VENTURES IS CONSERVATION MONEY WELL-SPENT

CONSERVATION WORKS!

When we invest in conservation, we see wildlife population increases and endangered species recovery. Additional funding will allow states to replicate conservation successes across thousands of other species of greatest conservation need.

WESTERN STATES: 5.6 million acres of sage-grouse habitat conserved on private lands

- Steep population declines put Greater Sage-Grouse on the brink of ESA listing
- The Sage Grouse Initiative (a USDA Natural Resources Working Lands for Wildlife program) and the Intermountain West Joint Venture led the restoration of millions of acres of sage-grouse habitat across 11 western states, thanks to collaborations between federal and state agencies and more than 1,100 private ranchers
- ESA listing avoided in 2015, saving local economies from California to the Dakotas up to \$5 billion in annual costs, according to Western Energy Alliance

Additional support would address the conservation needs of hundreds of other sage-brush wildlife species.

GREAT LAKES: Endangered Kirtland's Warbler population soars by 1,100%

- One of first birds to be listed by ESA in 1973; down to last 150 breeding pairs
- State and federal agencies partnered to implement a recovery program that restores jack-pine habitat and controls nest parasitism
- Population grew to 2,500+ breeding pairs in Michigan, with Kirtland's Warblers now expanding into Wisconsin and Ontario; successfully met delisting criteria

Additional support would continue state-led conservation work for Kirtland's Warblers after delisting, so they don't decline again.

APPALACHIA: 200 landowners become Cerulean Warbler champions

- With populations down more than 70%, this warbler is fast headed toward ESA consideration
- The Appalachian Mountains Joint Venture launched a sustainable forest management program to improve warbler habitat and forest health
- 200+ private landowners enrolled in the program to restore warbler habitat on thousands of acres of forestlands

Additional support would enable more private landowners to enroll and stop warbler declines in Appalachia.

COLORADO & NEBRASKA: 1,000+ Mountain Plover nests saved

- Plovers nest in farm fields, where eggs are at risk of being plowed under, or on ranching lands
- Mountain Plover declared a priority bird species for the Playa Lakes Joint Venture; several hundred landowners joined the program to find and flag nests, allowing farmers and ranchers to work their land without disrupting breeding plovers
- ESA listing avoided; landowners became birding tour-leaders for Mountain Plover Festival in Kanol, Colorado that has generated \$75,000 for local economy

Additional support would scale up this pilot program throughout the Mountain Plover's range.

ALASKA: Hunting tradition revived for Emperor Geese

- Unique goose species found only in Alaska and Russian Far East; but 50% population decline halted hunting in the 1980s
- Populations rebounded after federal and state agencies partner with native groups on Emperor Goose conservation program
- Population more than doubled by 2018; regulated sport and tribal traditional hunting reinstated

Additional support for state and tribal agencies would enable continued recovery for Emperor Geese.

TEXAS: Turkeys worth \$42 million to Lone Star State economy

- America's classic game bird was nearly extinct in North America 700 years ago
- Federal and nonprofit partners worked with state agencies on stocking and reintroduction programs; today Texas has the largest turkey population in the U.S. (600,000+ turkeys)
- Turkeys generate \$42 million in economic activity every year in Texas, and \$1.8 billion nationwide

Additional support would enable Texas and three related Joint Ventures to duplicate this success for Northern Bobwhite quail, another classic game bird trending toward extinction.

HAWAII: Endangered Paliia population stabilized

- Almost two thirds of native Hawaiian forest bird species, including the Paliia, are listed under the Endangered Species Act
- A coalition of federal, state, and private partners have restored 6,500 acres of forest to protect crucial Paliia habitat
- Invasive species control and habitat management are keeping Paliia and other Hawaiian forest bird species alive for now

Additional support would sustain programs essential to preventing extinctions on Hawaii.

EASTERN STATES: A total turnaround—American Oystercatchers up 23%

- 10 years ago, oystercatcher populations were plummeting along East Coast; ESA listing would have impacted coastline communities, including some of America's favorite beaches
- Instead, the USFWS Northeast Division of Migratory Birds and 13 state agencies coordinated a conservation strategy with 16 states that reversed oystercatcher declines; population now up +20%
- Benefits beyond birds include improved fish nursery habitat and cleaner public beaches

Additional support would build on the oystercatcher success, funding the Atlantic Flyway Shorebird Initiative to avert ESA listings for 15 other declining shorebirds.



The Flyways

Biological



Administrative



Flyway Structure

Two components:

- Technical Section (biologists)
 - Game and non-game sections
- Flyway Council (directors)



One official representative per state, province, or territory in each flyway

USFWS flyway representative and assistant

Associate members from the USFWS migratory bird office and joint ventures

Why have Flyway Councils and Tech Sections?

Migratory birds are a shared resource across states and countries

- All states and provinces are stakeholders

- Harvest parity is important

Dual regulatory authority

- However - USFWS ultimately responsible for the management of Migratory birds

Fosters collaboration between federal agencies, states, and provinces

Beyond the flyways...

Service Regulations Committee

- comprised of USFWS directors
- each flyway has two representatives to present recommendations

Joint Ventures

- non-regulatory
- 14 habitat oriented, 3 species oriented
- fund research and habitat improvement

SCHEDULE OF BIOLOGICAL INFORMATION AVAILABILITY, REGULATIONS MEETINGS AND FEDERAL REGISTER PUBLICATIONS FOR THE 2020-21 SEASONS

SURVEY & ASSESSMENT SCHEDULE

March - June, 2019
SPRING POPULATION SURVEYS

August 15, 2019
WATERFOWL STATUS REPORT

August 20, 2019
AHM REPORT w/OPTIMAL ALTERNATIVES, WEBLESS and CRANE STATUS INFORMATION, DOVE and WOODCOCK REGULATORY ALTERNATIVES, and HUNTER ACTIVITY and HARVEST REPORT

December 15, 2019 - January 31, 2020
FALL and WINTER SURVEY INFORMATION for CRANES and WATERFOWL

MEETING SCHEDULE

April 23, 2019 - Denver, CO
SRC Meeting

August 15 - September 30, 2019
Flyway Tech And Council Meetings

October 8-9, 2019 - Bloomington, MN
SRC Regulatory Meeting

March 2020 (at North Am. Conf)
Flyway Council Mtgs

September 1, 2020 and later
ALL HUNTING SEASONS

FEDERAL REGISTER SCHEDULE

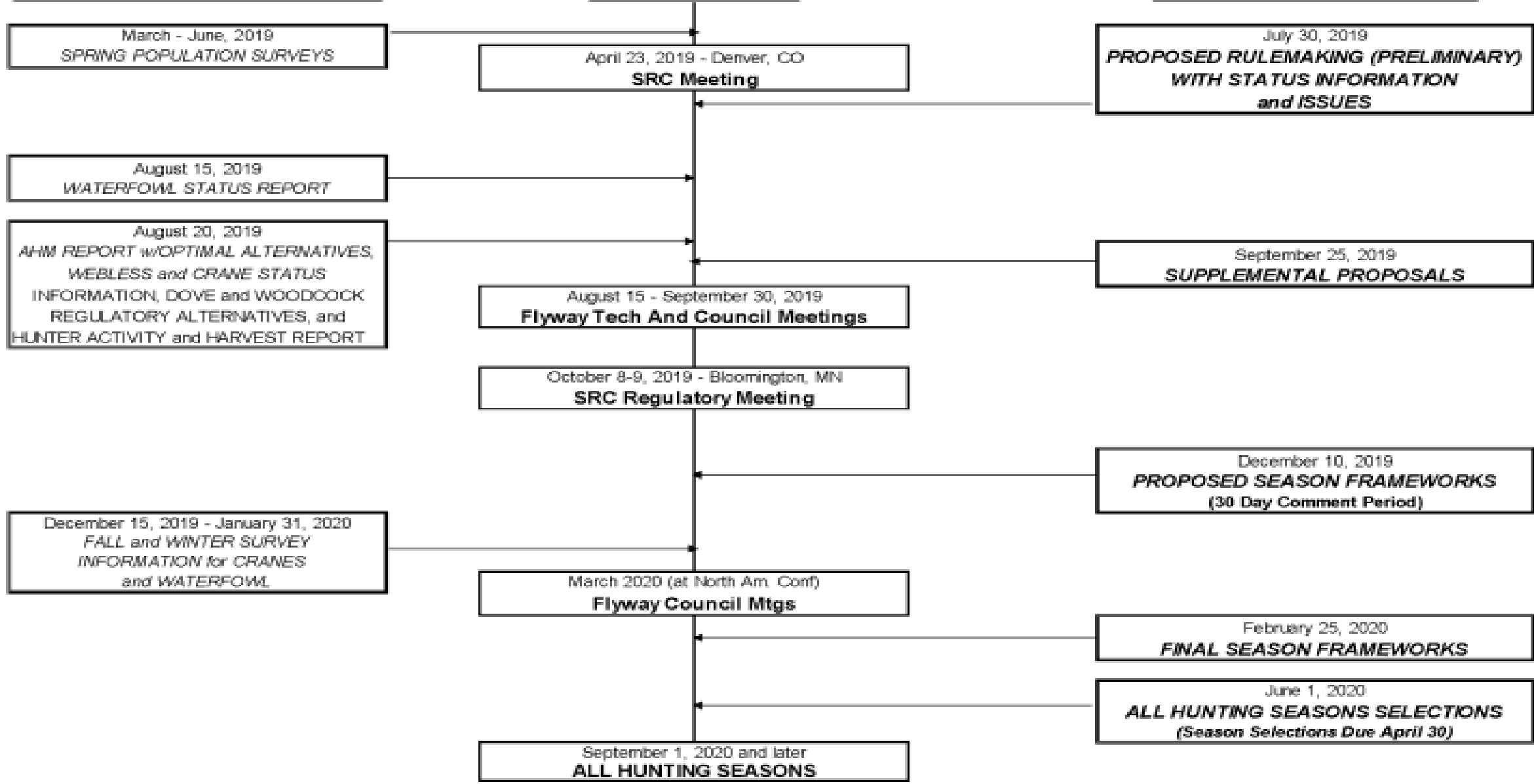
July 30, 2019
PROPOSED RULEMAKING (PRELIMINARY) WITH STATUS INFORMATION and ISSUES

September 25, 2019
SUPPLEMENTAL PROPOSALS

December 10, 2019
PROPOSED SEASON FRAMEWORKS (30 Day Comment Period)

February 25, 2020
FINAL SEASON FRAMEWORKS

June 1, 2020
ALL HUNTING SEASONS SELECTIONS (Season Selections Due April 30)



The challenge

Recover the T&E species while keeping the common species common



Whimbrels



Greater Sage-Grouse



Patrick Ricketson

Application of Migratory Bird Ecology and Management



WEATHER influences the.... distributions of ducks, geese, and swans, which

- Influences foraging pressure by waterfowl by latitude
- Influences opportunity to encounter waterfowl
- Influences waterfowl harvest
- Influences the economy and conservation dollars



Weather Severity Indices



For Mallards in Missouri,
published in 2010 as a
Cumulative WSI

Calculated daily and selected as
maximum between two
waterfowl surveys

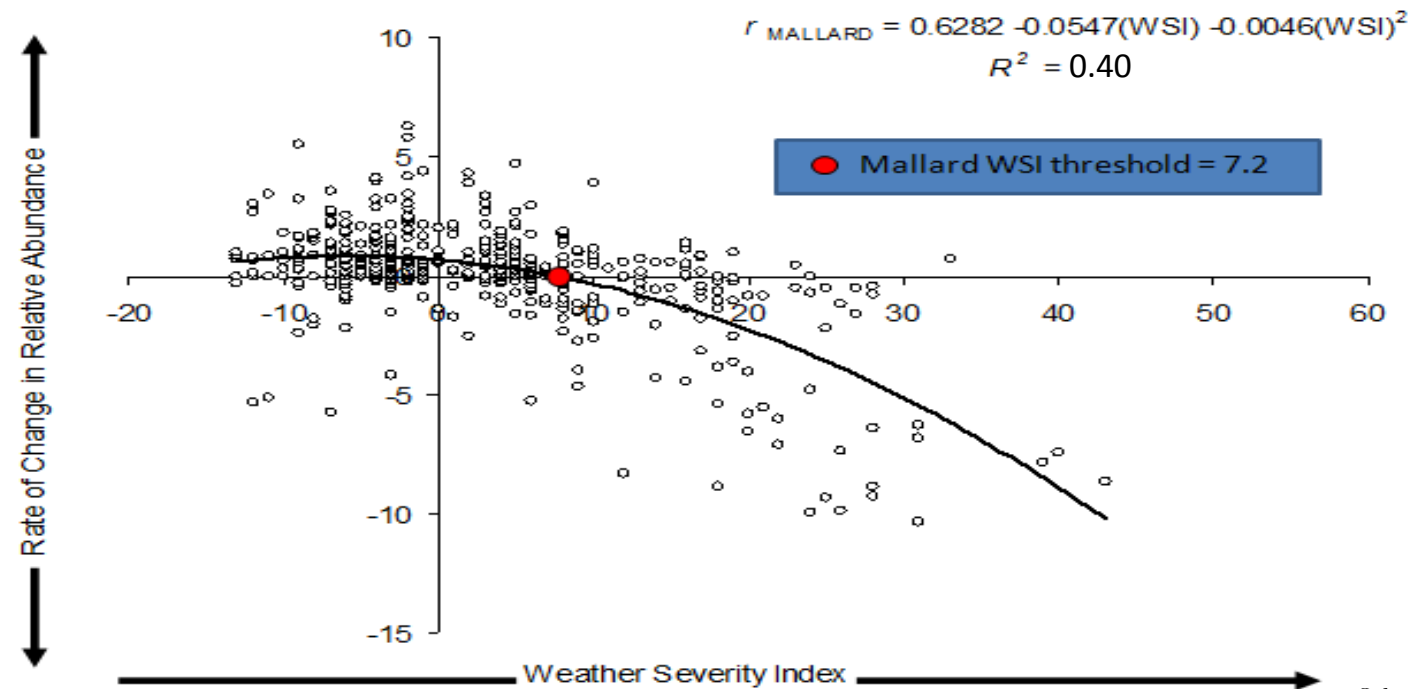
$$\begin{aligned} \text{WSI} = & \\ & -[\text{average daily temperature } ^\circ\text{C}] \\ & + \\ & \text{Snow depth in inches} \\ & + \\ & \text{Number of days below freezing} \\ & + \\ & \text{Number of days with snow } > 1'' \end{aligned}$$



Weather Severity Indices



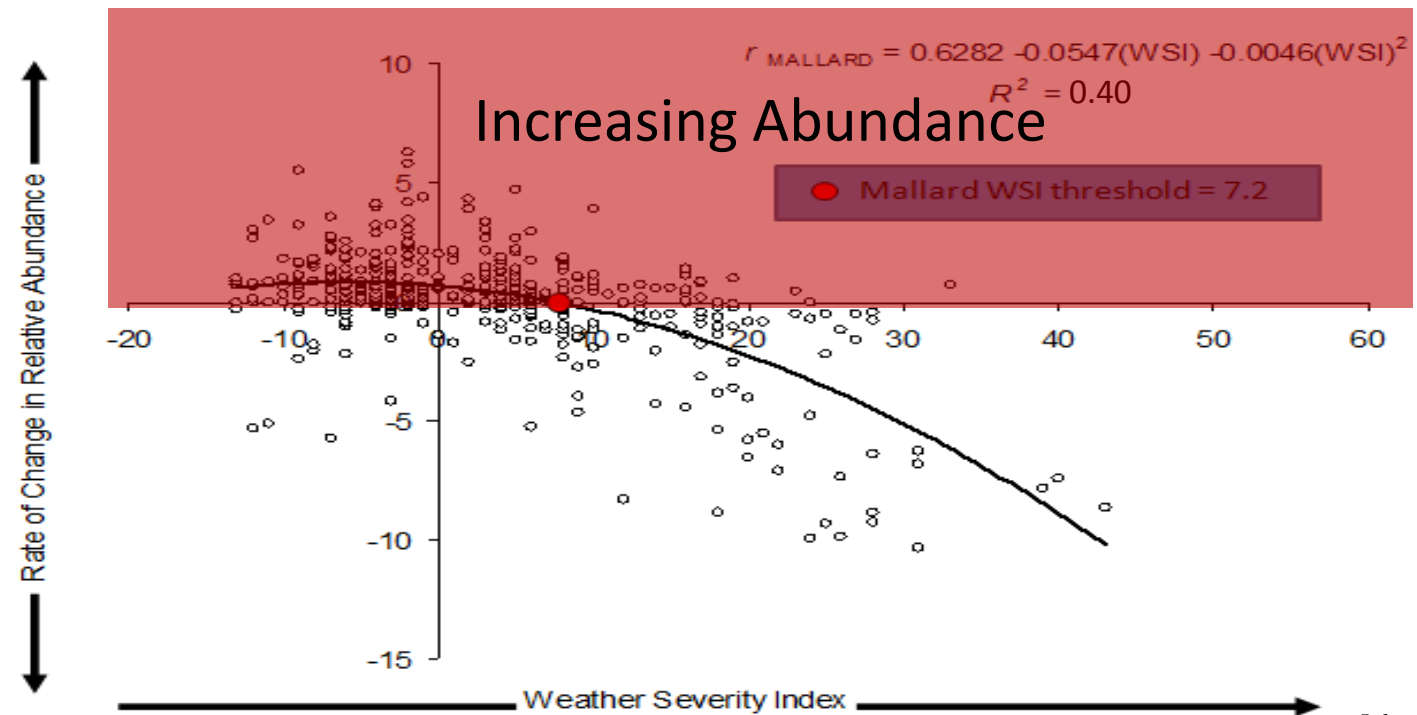
- For Mallards,
Cumulative WSI



Weather Severity Indices



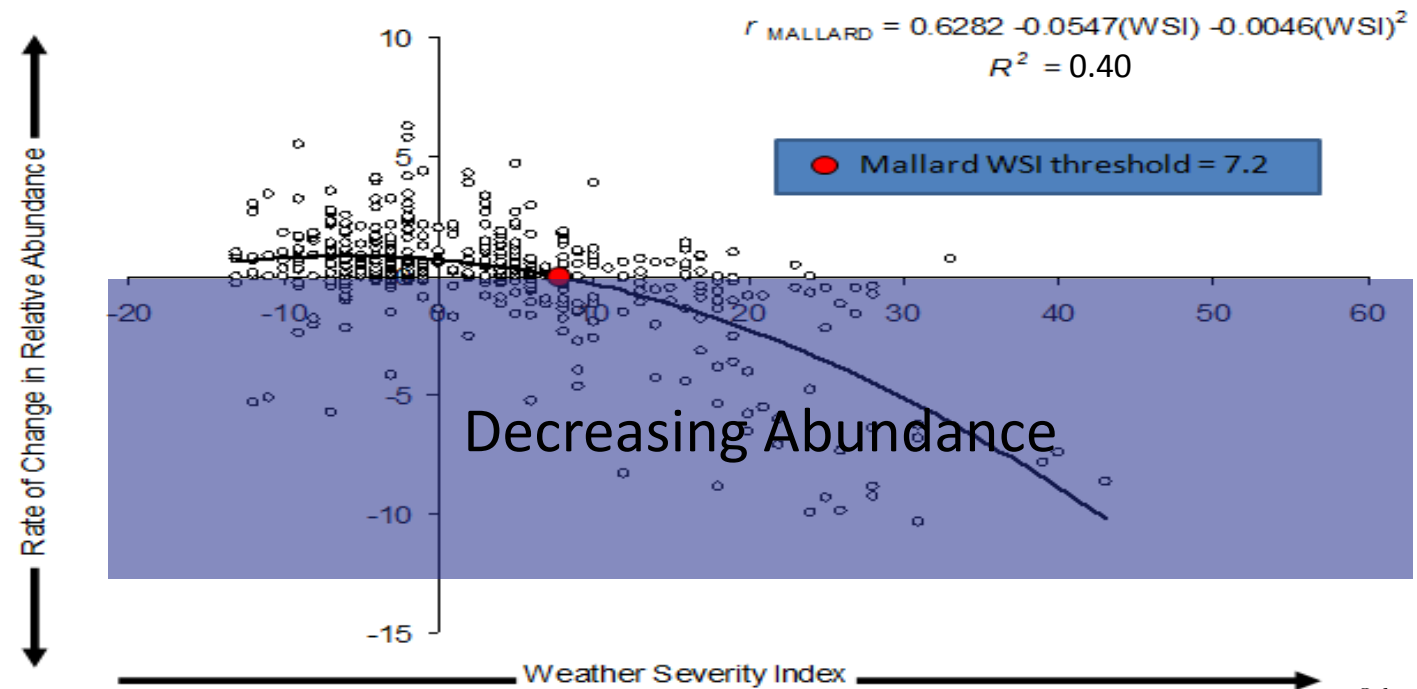
- For Mallards,
Cumulative WSI



Weather Severity Indices



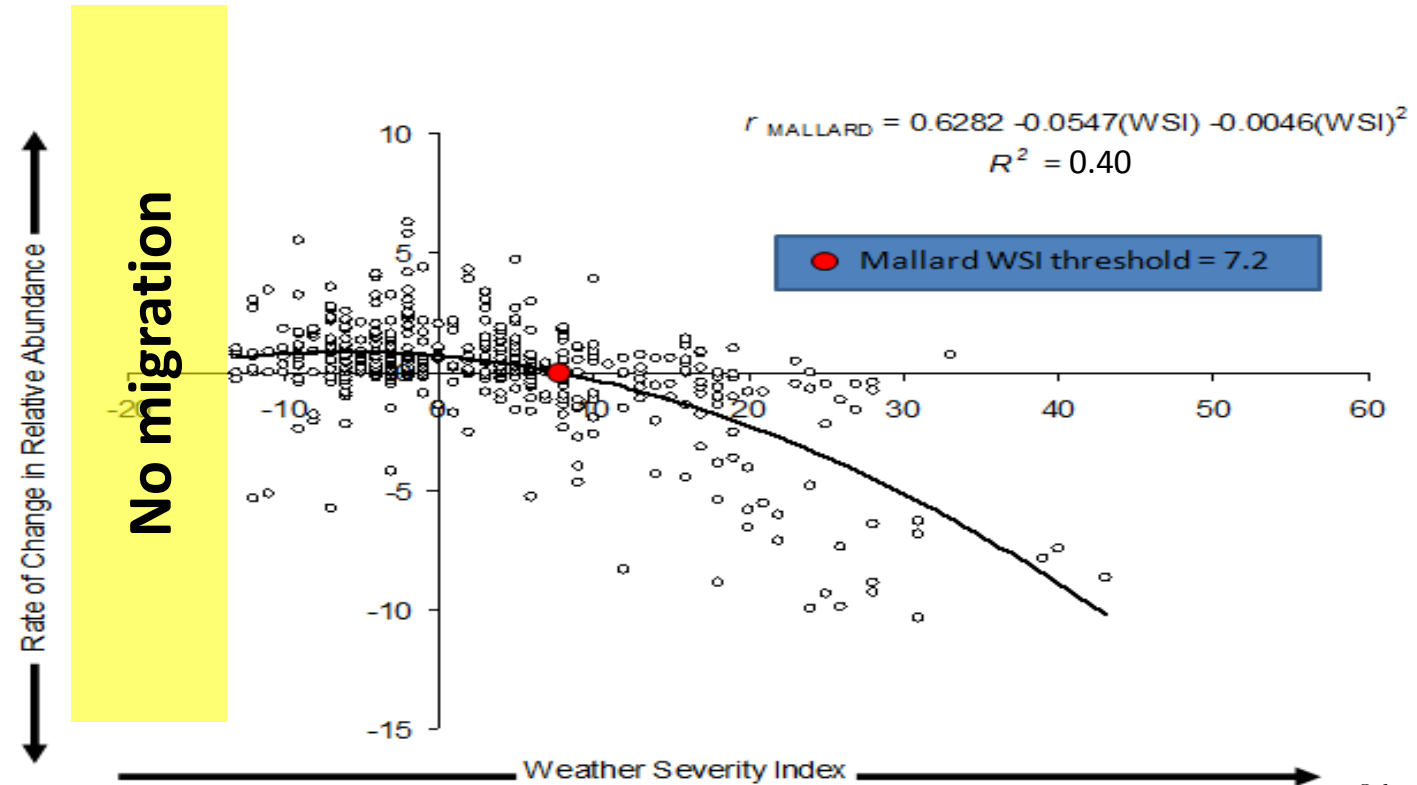
- For Mallards,
Cumulative WSI



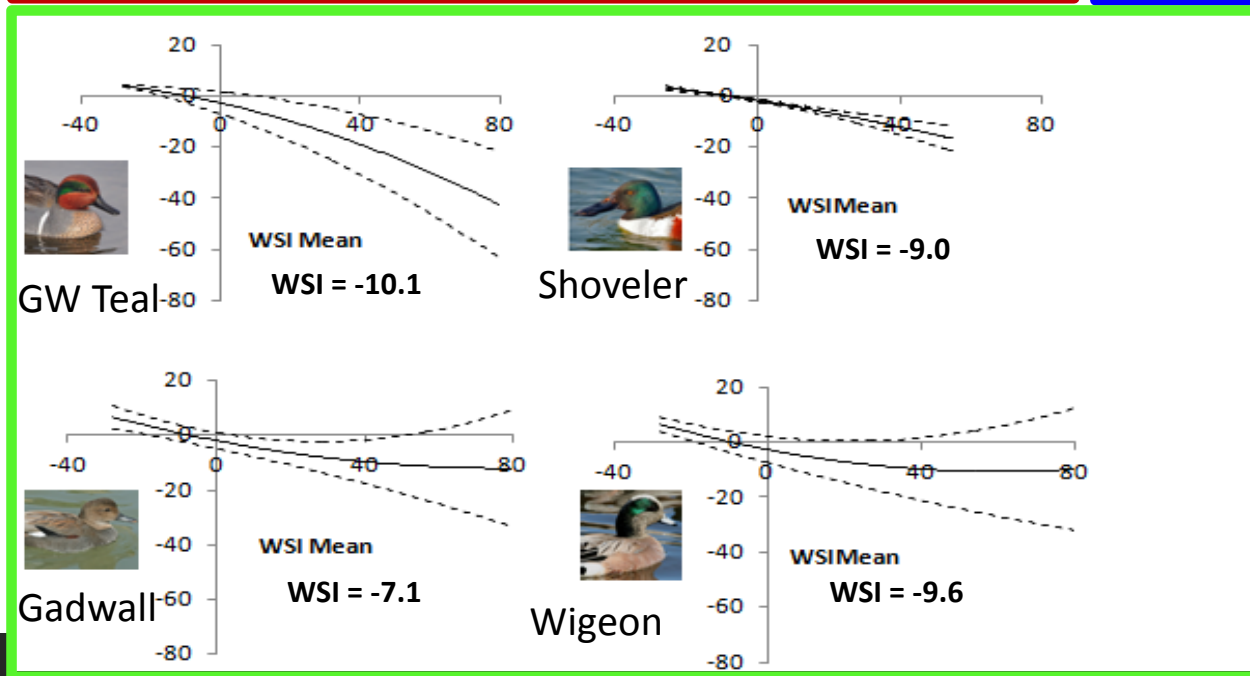
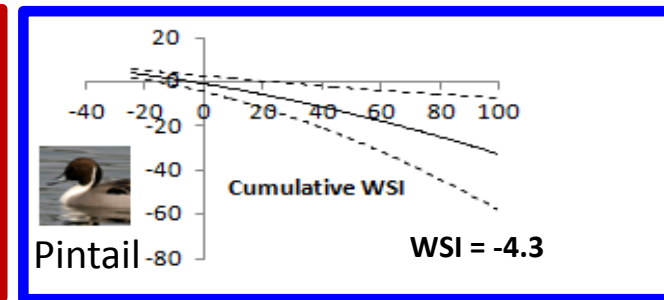
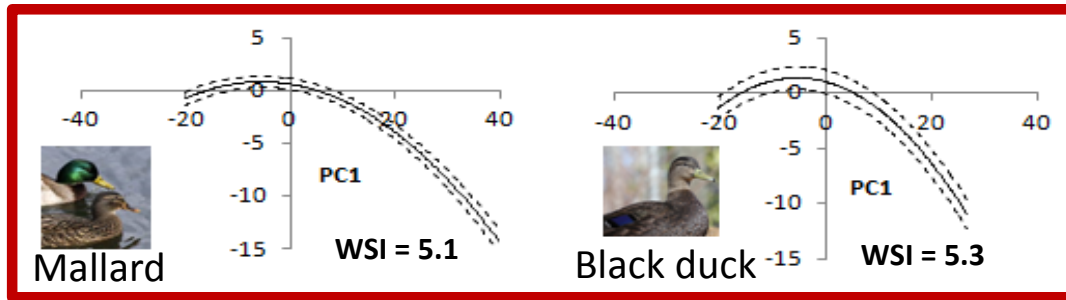


Weather Severity Indices

- For Mallards, Cumulative WSI



Weather Severity Indices



PC1 and Cumulative WSI

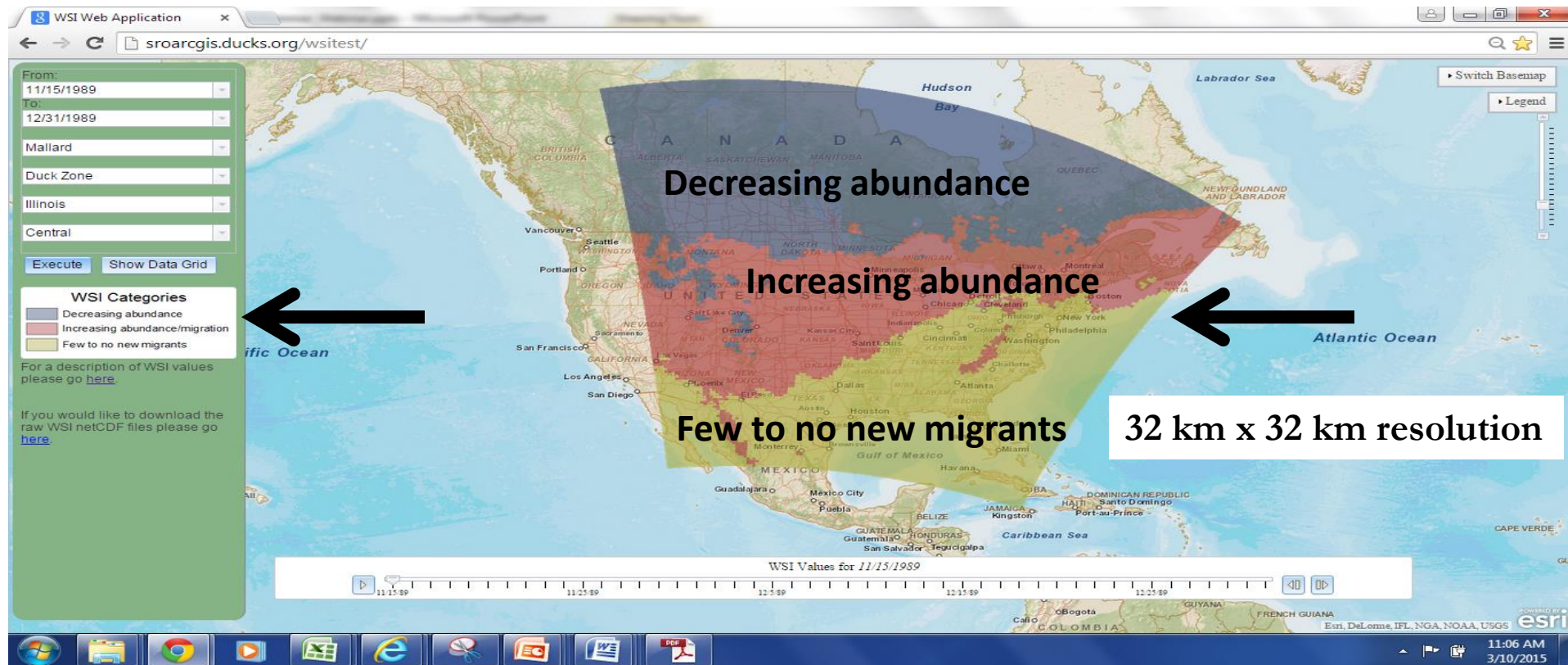
- Temperature
- # days < 0° C
- Snow depth
- # days with > 1" snow

WSIMean

- Mean Temp. between two surveys
- # days < 0° C
- Snow depth
- # days with > 1" snow

Van Den Elsen 2016

WSI Web Application Data Output



Square kilometers > WSI threshold



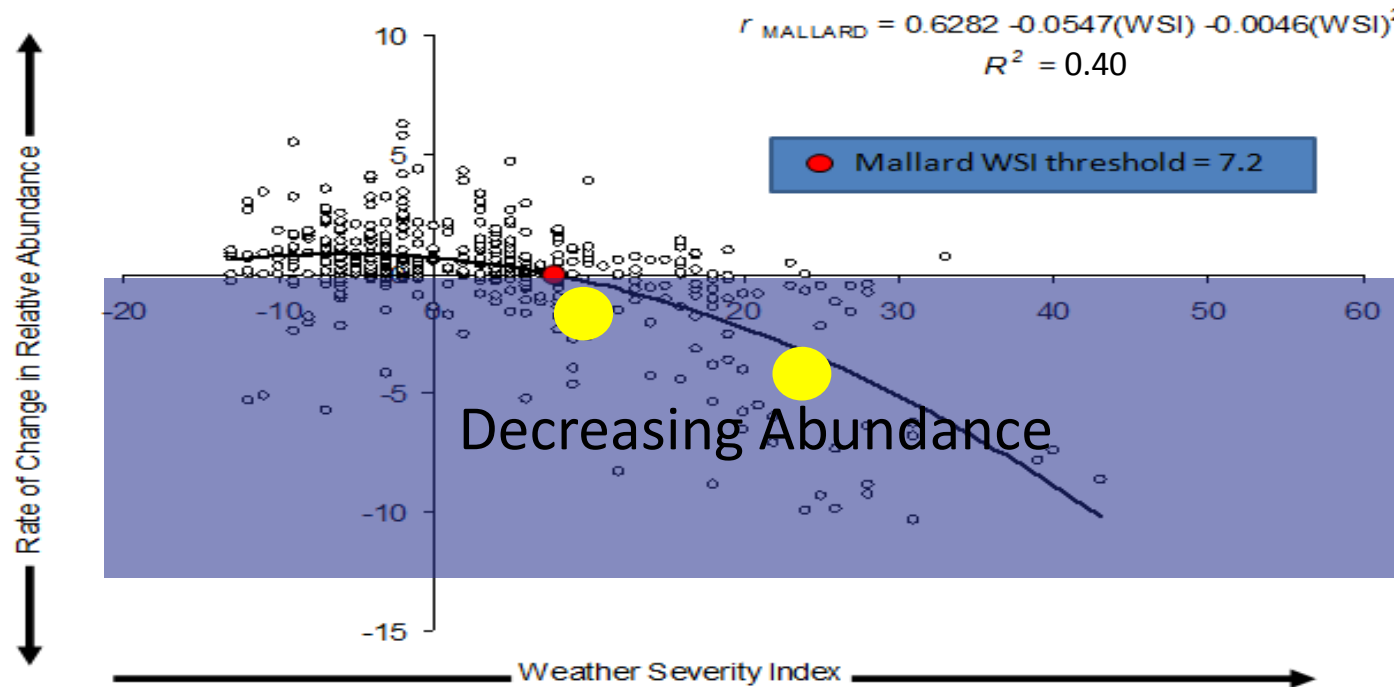
The screenshot shows the WSI Web Application interface. On the left, there are input fields for 'From' (11/15/1989), 'To' (12/31/1989), 'Mallard', 'Duck Zone', 'Illinois', and 'Central'. Below these are 'Execute' and 'Show Data Grid' buttons. A legend titled 'WSI Categories' shows three categories: 'Decreasing abundance' (blue), 'Increasing abundance/migration' (red), and 'Few to no new migrants' (yellow). The main map displays a large area of Canada shaded in blue and red, with labels for 'Hudson Bay', 'Labrador Sea', and 'Atlantic Ocean'. A data table is overlaid on the map, showing the following data:

Species	Date	Category	Subcategory	Duck Zone	Square Kilometers
Mallard	12/6/1989	Duck Zone	Illinois	Central	234
Mallard	12/7/1989	Duck Zone	Illinois	Central	0
Mallard	12/8/1989	Duck Zone	Illinois	Central	7373
Mallard	12/9/1989	Duck Zone	Illinois	Central	10650
Mallard	12/10/1989	Duck Zone	Illinois	Central	12990
Mallard	12/11/1989	Duck Zone	Illinois	Central	819
Mallard	12/12/1989	Duck Zone	Illinois	Central	41779
Mallard	12/13/1989	Duck Zone	Illinois	Central	80750
Mallard	12/14/1989	Duck Zone	Illinois	Central	80750
Mallard	12/15/1989	Duck Zone	Illinois	Central	80750
Mallard	12/16/1989	Duck Zone	Illinois	Central	80750

-- Available at LCC, JV, Flyway, or State spatial scales --
-- Outputs daily km² > WSI threshold for AOI --



Mean daily sq km > WSI threshold for Oct-Nov-Dec (OND) and Nov-Dec-Jan (NDJ)



Treated Similar

Mississippi

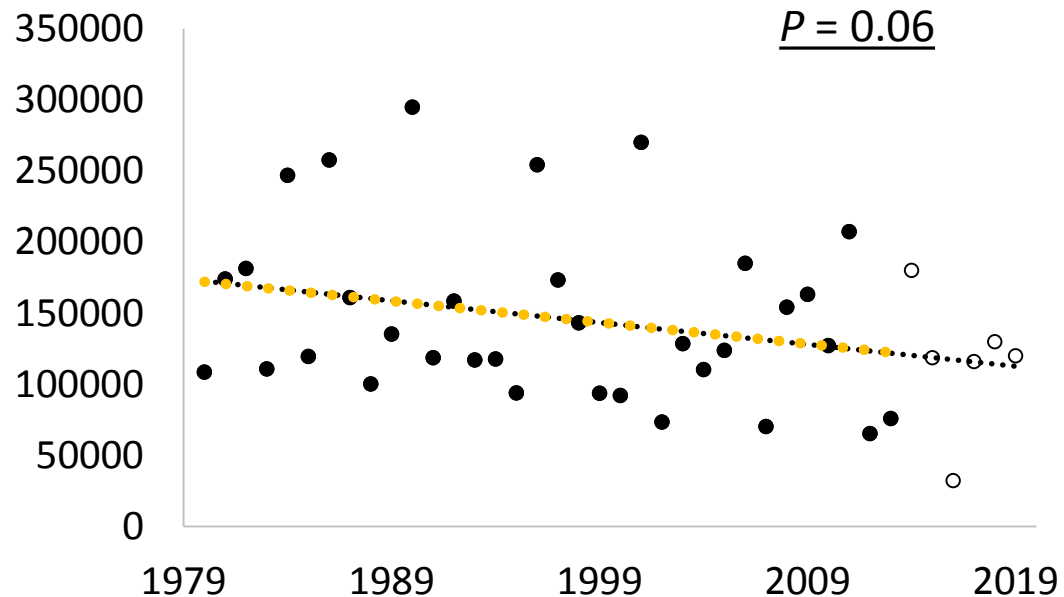
Atlantic





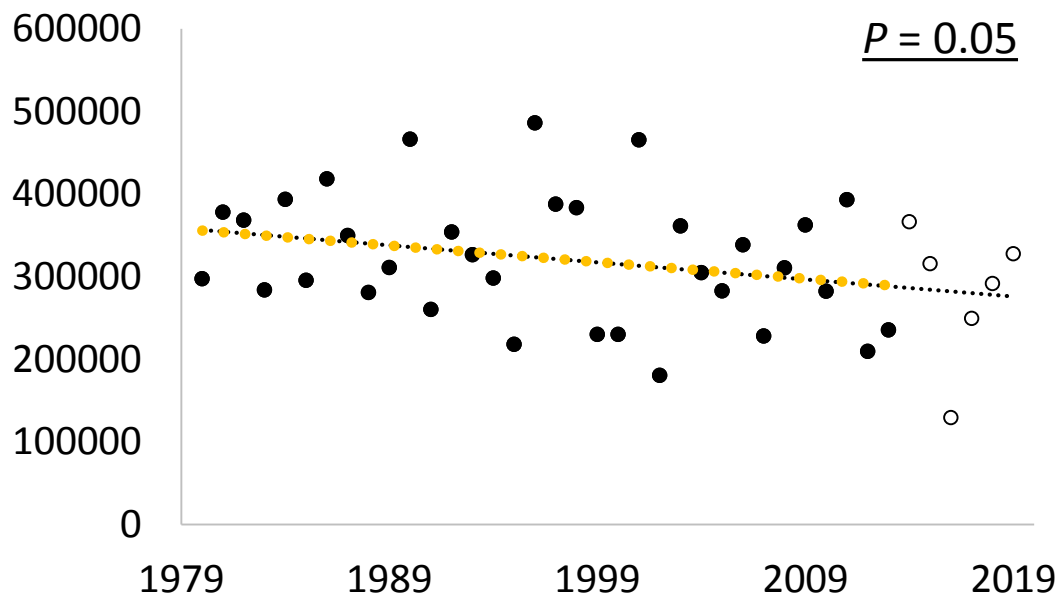
Black Duck – Oct, Nov, Dec

$P = 0.06$



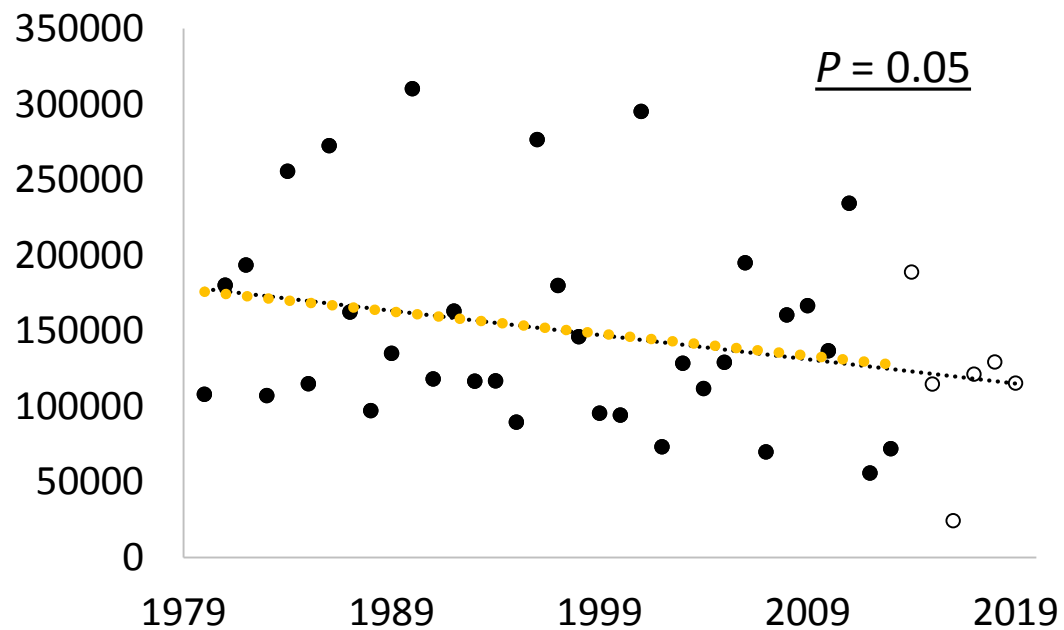
Pintail – Oct, Nov, Dec

$P = 0.05$



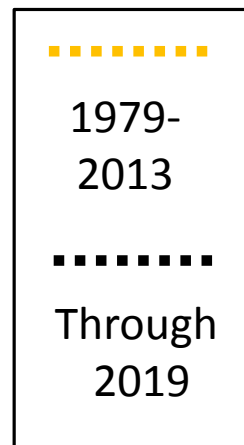
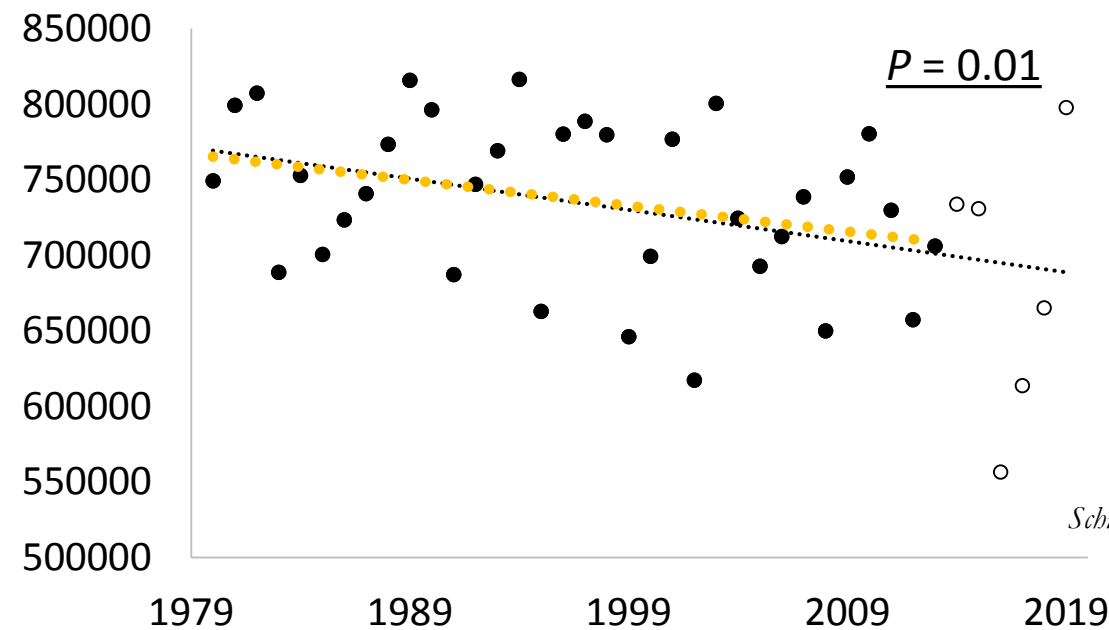
Mallard – Oct, Nov, Dec

$P = 0.05$



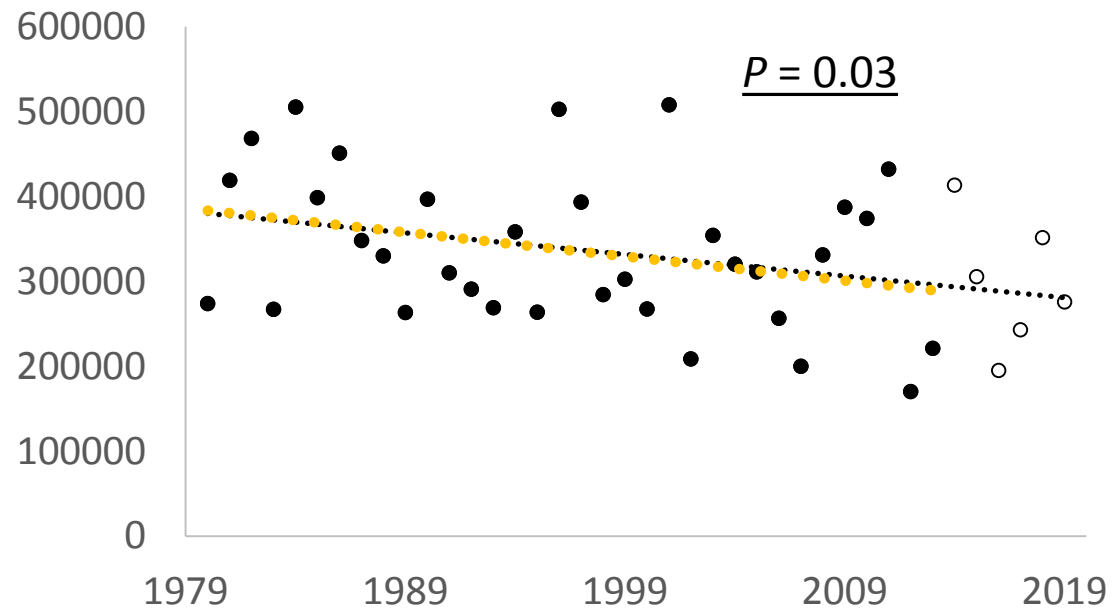
Green-winged teal – Oct, Nov, Dec

$P = 0.01$

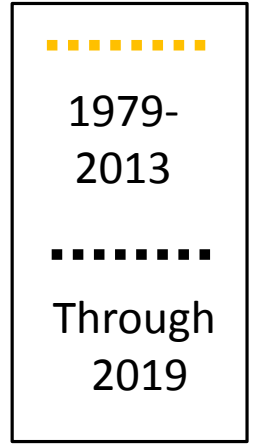
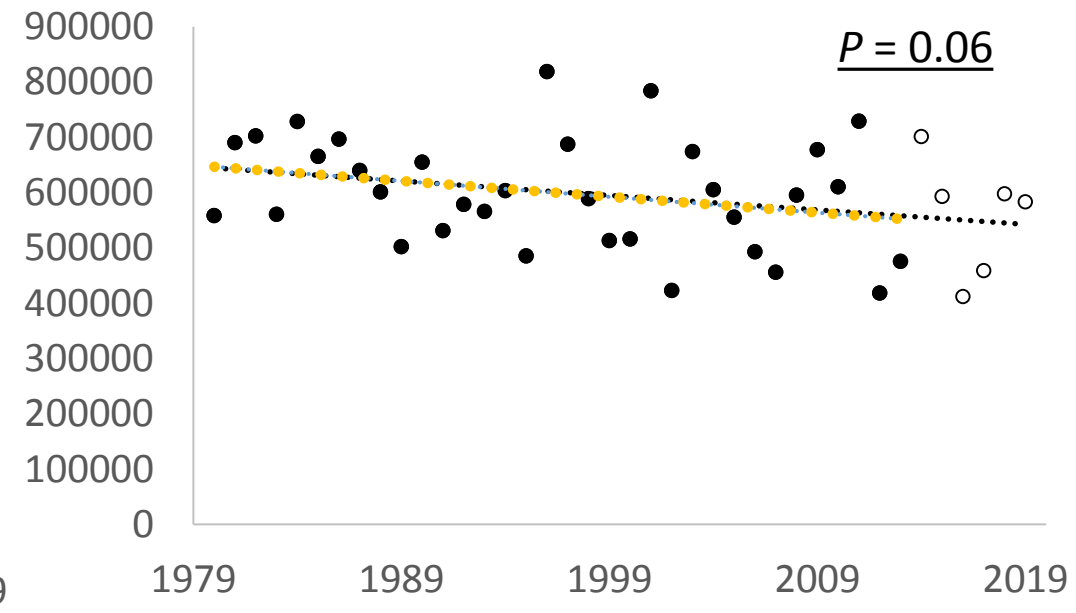




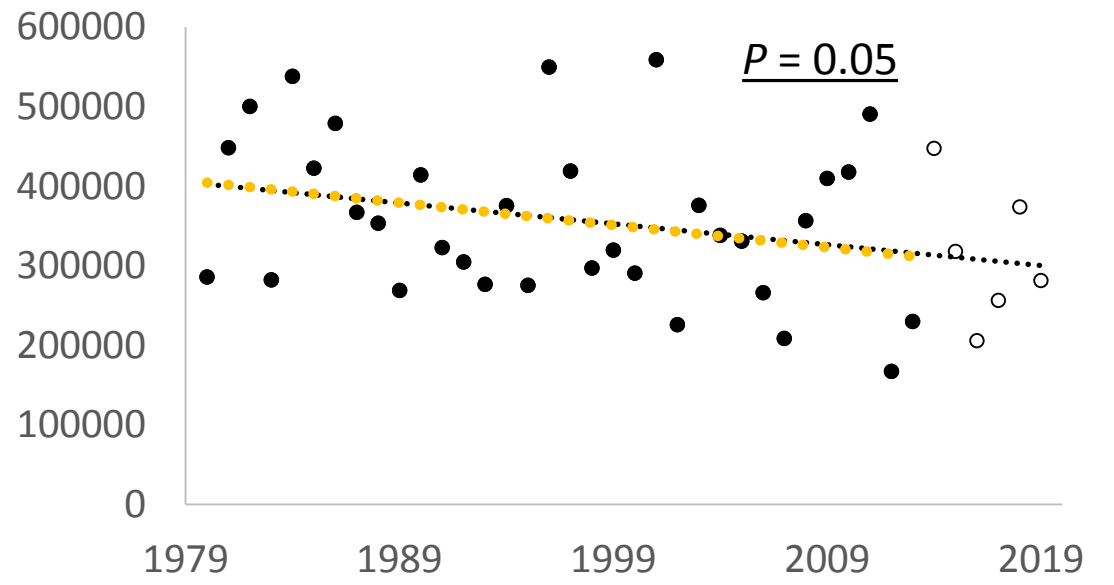
Black Duck – Nov, Dec, Jan



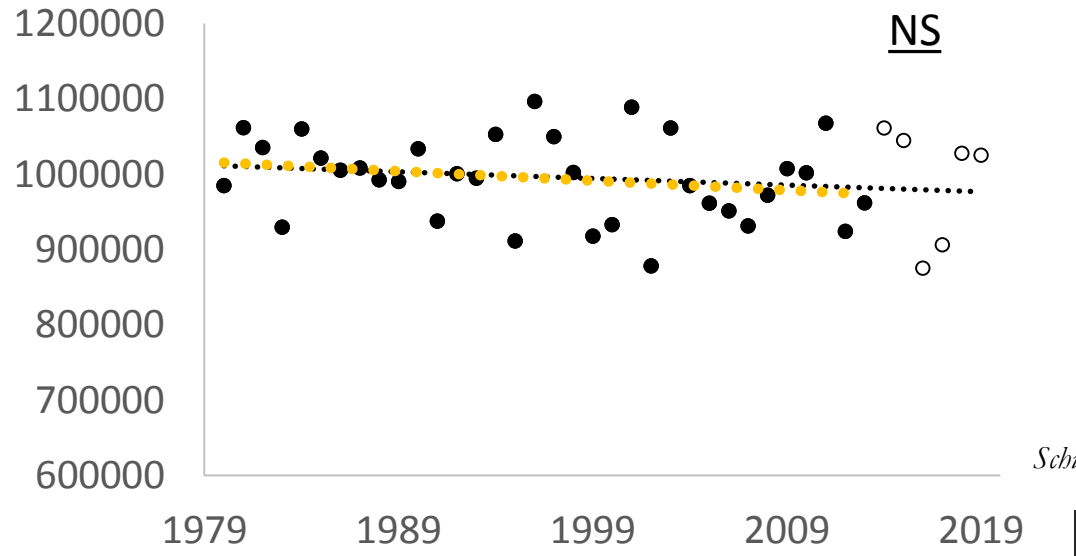
Pintail – Nov, Dec, Jan



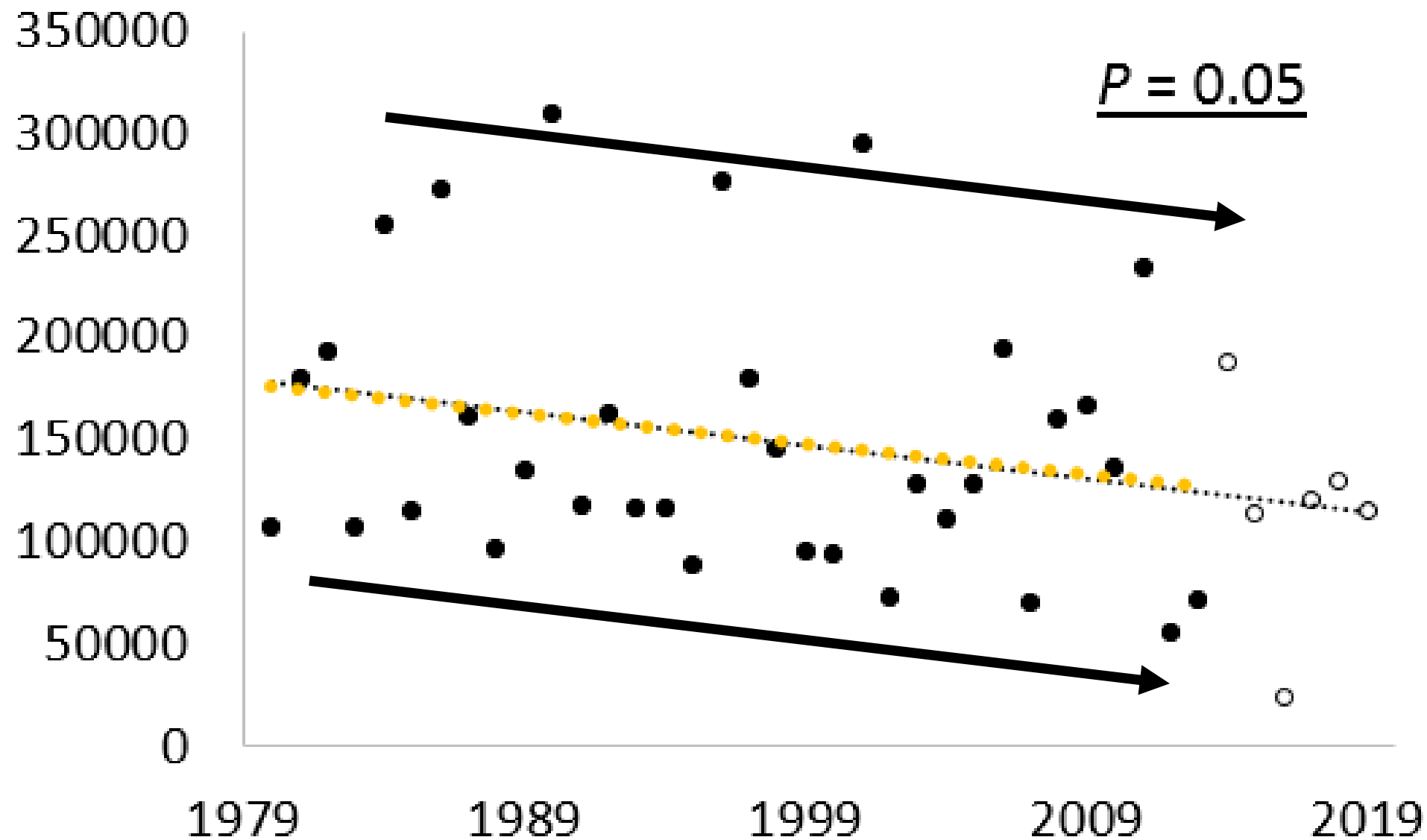
Mallard – Nov, Dec, Jan



Green-winged teal - Nov, Dec, Jan



Mallard – Oct, Nov, Dec



Changes in WSI - Mississippi & Atlantic Flyways 1979 – 2013

EXAMPLE: Nov-Dec-Jan for Mallard, Black Duck, Pintail

- Available area for ducks to winter increased annually by 2,866 sq km
- Or 96,798 sq km, 1979 - 2013
- Using mean of 1,572.70 duck use days/sq km for UMRGLJV
- 152,234,215 DUDs or

**An additional 1,654,720 ducks to feed each day
for this 92-day period, Nov through Jan**

Schummer et al. 2017 Wildlife Society Bulletin



Thank you - Questions

