



# PACIFIC BIRDS

HABITAT JOINT VENTURE



**Coastal Wetlands Strategic Plan**  
2024-2034

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Cover photo: Western Sandpipers (*Calidris mauri*) rest during spring migration. Ken Archer

# Acknowledgments

Pacific Birds Coastal Wetlands Strategic Plan benefited from the expertise and dedication of many collaborators. Development of the plan was facilitated by Pacific Birds staff and Coastal Wetlands Committee, with additional input from numerous partners, experts, and reviewers.

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# Executive Summary



Potter Marsh Bird Sanctuary, Alaska. *Laura Farwell*

Development of this plan was driven by a goal to generate momentum around a shared path forward to conserve healthy coastal wetlands in the North Pacific Flyway, for the benefit of birds, other wildlife, and people. Coastal wetlands provide critical breeding, migration and non-breeding habitats for millions of migratory birds each year. These habitats have been dramatically reduced and degraded, diminishing their capacity to support birds and people. As we look to the near future, sea level rise and increased flooding and storm surge will dramatically alter coastlines – and how people and wildlife use coastal lands and waters.

The intended audience for this plan includes any regional agencies, Tribes, organizations, communities, and individuals with a shared interest in coastal wetland conservation. We envision that this plan may be leveraged to convene regional partnerships, to pursue funding opportunities, and to help inform conservation outreach, priorities, and investments at local to regional scales.

This plan is a step towards more collaborative conservation across the continental Pacific Birds region. Here, we use a modified approach to the Conservation Standards to conduct a situation analysis centered on priority habitats that Pacific Birds and partners will focus on over the next ten years. The plan describes overarching conservation strategies, priority coastal bird species, and associated population and habitat objectives.

This plan also includes a list of knowledge gaps and acknowledges that additional and adaptive work is needed to build momentum, achieve objectives, and ensure that the best available information is guiding actions and investments.

## Priority coastal habitats considered in this plan include:

- ▶ Tidal Wetlands, Intertidal Mudflats, and Sandspits
- ▶ Eelgrass Meadows
- ▶ Freshwater Wetlands and Lakes
- ▶ Bird-Friendly Working Lands and Waters

## Across these habitats, five overarching strategies are identified to support conservation, each complemented by a suite of recommended actions:

- ▶ Protect and restore coastal wetlands and watershed function
- ▶ Build habitat and community resilience to climate change
- ▶ Strengthen monitoring, research, and knowledge transfer
- ▶ Increase awareness and engagement
- ▶ Increase funding and capacity



We incorporated human values, well-being, and perspectives in the planning process and emphasize the need for continued engagement for successful implementation. Human communities likely to be impacted by coastal conservation decisions, as well as groups with key perspectives and influence were engaged. A combined review of Tribal Wetland Plans and conversations with Indigenous coastal partners identified high-level themes at the intersection of Tribal priorities and coastal conservation efforts including: (1) supporting Tribal treaty rights and sovereignty over ancestral lands, waters, and resources, (2) protecting and restoring coastal wetlands to sustain the many benefits and services they provide, (3) bolstering Tribal capacity to plan for and adapt to coastal impacts of climate change, and (4) improving Tribal wetland inventories and staff capacity.

Bird-friendly working lands provide important habitat for many birds and other wildlife, and often occur in coastal areas previously influenced by tides. We provide a general recommendation to support continued agricultural production when it is bird-friendly and continued production is viable. Where working lands are at risk of imminent sea level rise and/or costs of replacing failing infrastructure (e.g., tide gates) are prohibitive, we recommend exploring alternative potential outcomes. In some cases, restoration of tidal influence may be the most supportable option.

Of the 193 coastal bird species regularly occurring in this region, 89% were identified at some level of conservation priority with 44% identified as high or very high priorities. This reflects both the steep declines experienced by coastal birds, as well as increasing pressures on the coastal wetland habitats on which they rely. Ultimately, this plan seeks to catalyze positive change for Pacific coastal wetlands over the next decade, emphasizing the interconnectedness between habitat conservation, species recovery, and human well-being.

*Note: Although the Pacific Birds region encompasses coastal British Columbia (BC), Canada, we focus here on the continental U.S. portion of this geography. Pacific Birds-Canada recently released a comprehensive [BC Implementation Plan \(2020-2030\)](#)<sup>1</sup> which describes detailed priorities, strategies, and objectives for bird and habitat conservation. Pacific Birds-Canada team members were also involved in this region-wide planning process to ensure coastal wetland priorities and strategies are representative of the broader region, including coastal B.C.*



Pacific Birds staff, board members, and partners at Stillaguamish River Delta, Washington. Amanda Summers

# Introduction

## About Pacific Birds

Migratory Bird Joint Ventures are voluntary, cooperative, regional partnerships that enhance work in the U.S., Canada, and Mexico to conserve habitat for the benefit of birds, other wildlife, and people. Joint Ventures facilitate and support collaboration among numerous partners – including state, federal, Tribal, non-profit and private organizations – to accelerate on-the-ground habitat conservation. Since 1987, Migratory Bird Joint Ventures have helped protect, enhance, and restore over 33 million acres of essential habitat across North America, thanks to the power of partners working together.

Pacific Birds Habitat Joint Venture (Pacific Birds) serves Alaska, Hawai'i and other U.S. Pacific Islands, and coastal regions of the U.S. Pacific Northwest and British Columbia, Canada (Appendix C1). This region encompasses over 473 million acres and is home to more than 10.5 million people. A variety of habitats support over one billion birds that migrate along multiple global flyways.



Coastal wetlands defined here as sub-basin level watersheds (HUC 8) that drain into the Pacific Ocean or major embayments.<sup>2</sup>

**On the continental coast, Pacific Birds is focused on advancing conservation of wetland habitats in coastal watersheds, from Northern California to the North Slope of Alaska.**



## Background

Tidal and freshwater wetlands within coastal lowlands throughout the northern Pacific Flyway have been a conservation priority for Pacific Birds since 2015. Coastal wetlands provide critical breeding, migration, and non-breeding habitat for millions of migratory birds each year. These habitats have been significantly reduced or degraded in most areas outside of Alaska and northern British Columbia. Historical habitat loss was driven by a variety of factors including conversion for agriculture, commercial development, forestry, and urban expansion. As we look to the near future, sea level rise and increased flooding and storm surge will dramatically alter coastlines – and how people and wildlife use coastal lands and waters.

Although there are numerous planning efforts and documents for coastal conservation on the Pacific Coast – and many coastal organizations and estuary programs carrying out effective conservation – these efforts tend to be limited in scope or restricted to species groups. A review process and series of listening sessions, held in collaboration with The Pew Charitable Trusts in 2019, highlighted a need for more effective coordination among programs across the region to promote multi-scale action and scaling up of current efforts. Some coastal partnerships have formed to deliver coordinated, multi-scale strategies, but gaps remain and emerging regional partnerships would benefit from additional support.

**The overarching goal of this work is to convene coastal conservation partners from across the region to build consensus around focused, shared strategies and generate momentum around a shared path forward.**

**By working together to conserve healthy wetlands and ecological processes in coastal ecosystems, we aim to ensure birds, other wildlife, and people thrive in abundant and diverse habitats that are safeguarded for future generations.**



Quillayute River, Washington. Barry Troutman



## Purpose and Intended Audience

The purpose of this plan is to identify shared conservation strategies and actions, developed in collaboration with partners across the region, to catalyze positive change for Pacific Coastal wetlands over the next ten years (2024-2034). This work is based on a guiding principle that coastal wetlands are most effectively conserved through an approach that transcends political boundaries, regulatory jurisdictions, and public and private ownerships to address habitat needs at an ecosystem level. This approach requires cooperation among a broad range of partners with a common interest in the future of coastal wetlands and the wildlife populations they support.

These strategies and actions are intended to apply generally to Pacific Coastal wetlands and are not intended to address specific sites or regulatory programs. Because Pacific Birds is a habitat-based Joint Venture, these strategies and actions are also not restricted to particular species. Some recommended actions are more defined while others describe areas of work that require further exploration.

Most are scalable actions that can be modified to fit the needs of local landscapes or watersheds. Pacific Birds and partners will periodically review and revise this plan to adapt to changing conditions and new information as it becomes available.

The intended audience for this plan includes any regional agencies, Tribes, organizations, communities, and individuals with a shared interest in coastal wetland conservation. This plan was co-developed with many regional partners, and the actions are intended to be carried out by partners as well as Pacific Birds. The plan may be leveraged to convene regional partnerships, to pursue funding opportunities, and to help inform conservation outreach, priorities, and investments at local to regional scales. Coastal scientists and research teams may be guided by applied research needs and knowledge gaps described. Lastly, funding entities may consult this plan to develop targeted grant opportunities and scoring criteria, to address coastal wetland conservation challenges and opportunities identified as priorities by Pacific Birds and partners across the region.



# Case for Conservation

Coastal wetlands are among the most productive ecosystems on Earth, providing clean water, increased resilience to climate change, and billions of dollars in recreational and economic benefits annually. They also provide essential habitats for millions of migratory birds.<sup>3, 4, 5</sup>

## Supporting Biodiversity

Coastal wetlands encompass a variety of habitats, including estuaries, tidal and subtidal flats, marshes, swamps, and freshwater wetlands, all unique and productive environments that support diverse plant and animal species. Saltwater from the ocean mixes with freshwater from rivers and streams to create highly productive habitats with unique conditions. These habitats serve as vibrant feeding grounds and nurseries for numerous species of birds, fish, mammals, invertebrates and other wildlife – many of which are uniquely adapted to these environments.

## Benefits to Birds

Across the northern Pacific Flyway and beyond, coastal wetlands form a critical network of stopover sites for migratory birds. From Humboldt Bay to the Beaufort Sea, coastal wetlands are used by millions of migrating birds to breed, rest, refuel, and overwinter. When these habitats are lost or degraded, migratory birds lose vital parts of this network and have fewer safe places to land.

## Role in Mitigating Climate Change

Coastal wetlands play an essential role in reducing impacts of climate change on coastal communities and bolstering resilience to natural disasters. Coastal wetlands act as natural buffers against storms, flooding, and sea level rise, helping to absorb and dissipate the energy of waves and holding excess water during heavy rains and high tides. Wetland vegetation helps stabilize soil and prevent erosion along coastlines. Vegetated coastal habitats also efficiently trap suspended organic matter during tidal inundation, capturing carbon at a rate ten times greater than tropical forests.<sup>6</sup>

American Wigeon  
(*Mareca americana*).  
Ken Archer



## Social and Cultural Benefits and Ecosystem Services

Coastal wetlands hold significant cultural value to Indigenous Peoples and local communities, and are important for spiritual practices and well-being, cultural heritage, traditional harvests, and subsistence. Many coastal species and habitats under existing or proposed conservation management are also protected under Tribal treaty rights. Coastal wetlands also provide enormous economic benefits by sustaining commercial fisheries and shellfish farms, and by supporting recreational tourism activities like birdwatching, hunting, fishing, boating, and photography. They also provide a number of vital ecosystem services and improve water quality and maintain the health of coastal ecosystems by filtering pollutants, sediment, and excess nutrients from water before it enters the ocean.

## Urgency

Global change is driving alarming declines in migratory bird populations, with a cumulative loss of nearly three billion birds since 1970 in North America alone.<sup>7</sup> Birds that overwinter in coastal areas are facing the steepest proportional losses; a third of shorebird species have experienced cumulative population losses exceeding 70% since 1980.<sup>8</sup> These declines coincide with increasing pressures on coastal areas where human populations continue to expand, and storms and sea level rise pose increasing threats to coastal ecosystems. Efforts to protect and restore coastal wetlands are critical to slow or reverse declines of coastal birds, and to maintain the many benefits and essential services these ecosystems provide for humans and wildlife, which are vital for a sustainable future.

**Flyways are ancient migration routes, or 'avian superhighways', used by large numbers of birds traveling between their breeding and non-breeding grounds.**



# Planning Framework

Pacific Birds, led by a Coastal Wetlands Committee, underwent a planning process for wetland habitats within coastal watersheds of the Pacific Birds region from Northwestern California to Alaska. This process involved a series of collaborative planning sessions and interviews with partners and experts from across this region, in tandem with Pacific Birds staff planning and synthesis of available literature. Pacific Birds was well-positioned to facilitate this process and to help identify shared conservation needs and strategies at a region-wide scale – Joint Ventures think at the scale of migratory flyways and focus on multi-scale, multiple-benefit habitat conservation. At the same time, we work closely with on-the-ground partners to ensure regional conservation strategies are relevant and actionable at local scales.

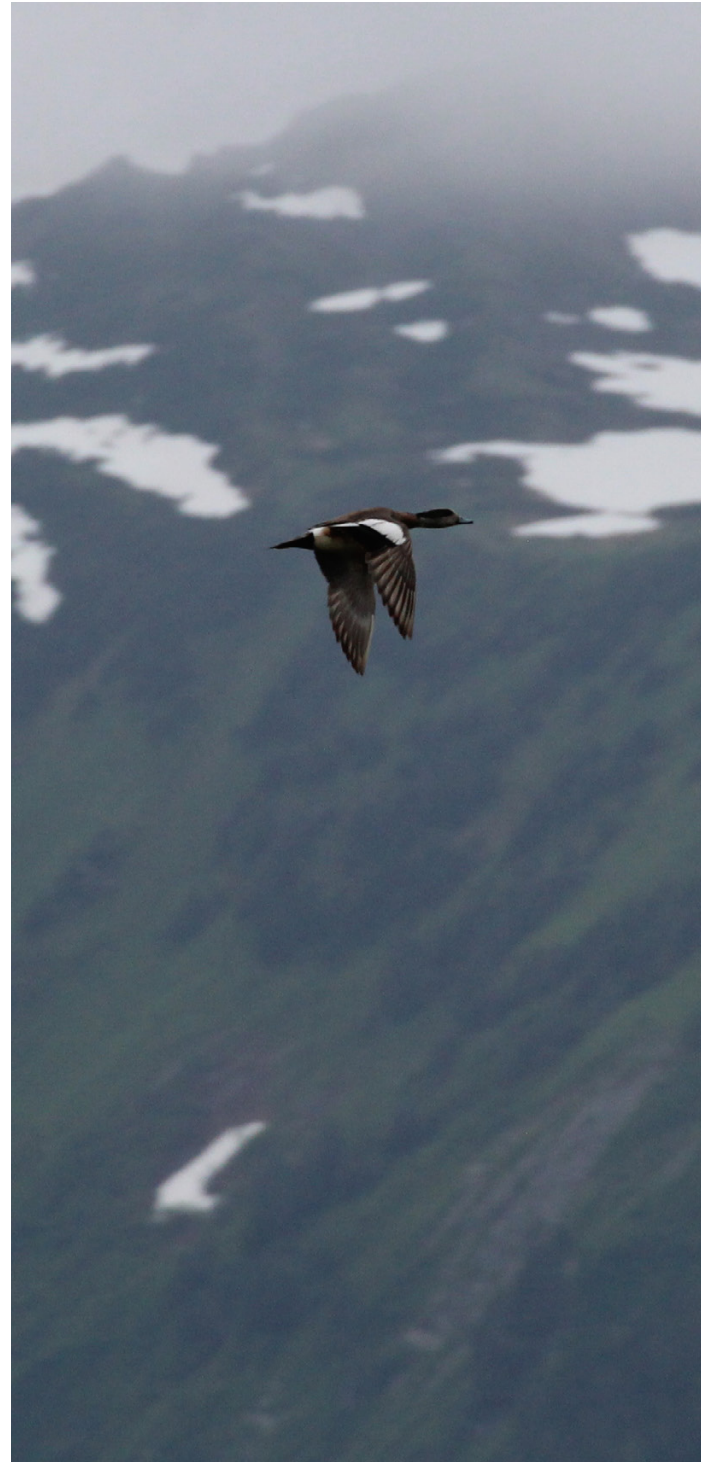
## Priority Habitat Selection

Because of the wide diversity of coastal wetland habitats across this region, Pacific Birds and the Coastal Wetlands Committee went through a process of selecting priority habitats to focus on over the next ten years. This involved consideration of conservation need, urgency, and partner engagement. Although all coastal wetlands are important, four ‘Tier 1’ habitats were selected as priorities for this ten-year phase to maximize the impact of limited resources.

### Tier 1 habitats include:

- ▶ Tidal wetlands, intertidal mudflats, and sandspits
- ▶ Eelgrass meadows
- ▶ Freshwater wetlands and lakes
- ▶ Bird-friendly working lands and waters

We also identified ‘Tier 2’ habitats which are of high value for birds and other wildlife, but do not rank as high based on our criteria and objectives for coastal bird conservation. Tier 2 habitats include: coastal forests; coastal dunes and beaches; and rocky intertidal habitats. Although these were not selected as priority habitats for this planning phase, we recognize their importance and value, will continue to engage in conservation of these habitats based on need and opportunity, and may focus on these areas in future planning phases.



American Wigeon (*Mareca americana*), Alaska. Monica Iglecia



## Threat Assessment

Assessing threats is a critical step in conservation planning and forms the foundation for identifying relevant conservation strategies and interventions. Pacific Birds staff conducted a review of available literature to identify priority threats and challenges for each Tier 1 priority habitat. This included consideration of threat magnitude (spatial scope and severity), urgency (conservation importance and timing), and reversibility (restoration potential and feasibility). A draft list of priority threats was then reviewed and refined with input from the Coastal Wetlands Committee and other regional experts. Selected threats are prevalent throughout coastal watersheds of the northern Pacific Flyway, and are shared across multiple (or all four) priority habitats.



Clark's Grebe  
(*Aechmophorus clarkii*).  
Ken Archer

## Conceptual Models and Strategy Development

To develop conceptual models and conservation strategies for each Tier 1 priority habitat, we used a modified approach to the Conservation Standards (formerly Open Standards) – a collaborative, step-by-step framework for designing, implementing, and adapting conservation initiatives. This framework can be streamlined using a process that requires fewer resources and less time.<sup>9</sup> We focused on the conceptualization and strategic planning steps of this process, applying clear logic to connect conservation targets (Tier 1 habitats) to threats, which are then directly tied to actionable strategies and interventions. The approach also links conservation targets to ecosystem services and human outcomes and demonstrates how strategies will achieve desired outcomes through a series of results chains (causal if-then sequences).

This preliminary work resulted in a set of conservation strategies and associated actions for each priority habitat. During virtual planning sessions, draft strategies and actions were shared, revised, and vetted by the Coastal Wetlands Committee and regional experts. We also conducted a series of scoping sessions with Indigenous partners from across the region, and with partners engaged in agricultural landscapes. Lastly, we compared strategies for all Tier 1 priority habitats to identify common strategic themes and actions, many of which were shared across habitats. Where possible, we synthesized habitat-specific actions into generalized actions that apply across all Tier 1 habitats.



Coastal delta on Kodiak Island, Alaska. S. Hillebrand/USFWS



# Situation Analysis

As a foundational part of the planning process described above, Pacific Birds staff gathered background information needed to understand the conservation situation. This process included a review of available literature and scoping sessions with partners and experts. Background information included the status of conservation targets (Tier 1 habitats), their importance for birds and other wildlife, key threats facing them, and factors contributing to those threats. This situation analysis formed the basis for conceptual models and conservation strategies for each Tier 1 habitat.

## Priority Habitats and Importance to Birds

Across the northern Pacific Flyway, coastal wetlands form a rich mosaic of habitats that support over 190 species of waterfowl, shorebirds, waterbirds, and wetland-associated landbirds (see Appendix B1 for a full list of species). The U.S. continental Pacific Birds region encompasses over 51.6 million acres of coastal wetlands: 1.6 million acres in Washington, Oregon, and northern California combined, and 50 million acres in coastal watersheds of Alaska (see Appendix C3-C6). Following is an overview of each Tier 1 priority habitat.







Billy Frank Jr. Nisqually National Wildlife Refuge USFWS, Washington Andrew LaValle/Creative Commons 3

## Tidal Wetlands, Intertidal Mudflats, and Sandspits

Estuarine ecosystems (where freshwater rivers meet saltwater) and associated tidal wetlands (where land meets sea) are highly dynamic and productive ecosystems. Tidal wetlands are flat, vegetated areas regularly inundated by tides, and include marshes (emergent tidal wetlands) and swamps (tidal scrub-shrub and forested wetlands). Tidal wetlands provide a variety of essential habitats for migratory birds across the Pacific Coast and are used by millions of birds during breeding, migration, and non-breeding. These areas are also highly valued by human communities for subsistence living, hunting, fishing, birding, and other cultural and recreational activities. Despite their many values, tidal wetlands are among the most altered habitats in the world. Tidal wetlands across the region have been cut off from tidal flow by structures (e.g., dikes, levees, tide gates) and converted for development and agriculture. Roughly 85% of vegetated tidal wetlands have been lost from this region since European colonization.<sup>10</sup>

Intertidal mudflats are a specific type of tidal flats that form in areas where sediment is deposited primarily by tides or rivers. These are areas that fall between high and low tides and can take the form of narrow bands or expansive flats, depending on topography and tides. Mudflats support a diversity of marine life including mollusks, crustaceans, worms, and microbes, which provide critical foraging habitat for breeding and migrating shorebirds. Biofilm, a dense layer of lipid-producing diatoms and microbial slime found on mudflats, is a key energy source for migratory shorebirds, accounting for up to 41% of the energy budget of Western Sandpipers (*Calidris mauri*) and Dunlin (*Calidris alpina*) during spring migration.<sup>11</sup> Dredging for navigational needs and pollution threaten mudflat habitats, and sea level rise is submerging substantial sections of mudflats.

Sandspits are narrow coastal land formations connected to the coast at one end. These areas lie above the tideline and are made up of sand, gravel, or mixed sediment. Sandspits provide important roosting habitat for shorebirds and waterfowl and nesting sites for birds like plovers. Sandspits also serve as important grit sites for species such as Brant (*Branta bernicla*); grit particles accumulate in the gizzard and aid in digestion. Sandspits often experience heavy human disturbance and may be affected by development. Protection or restoration of sandspits as roost, nest, and grit sites may increase the suitability of adjacent wetland habitats for many coastal birds.

### Key Threats:

*Land conversion (development, agriculture, aquaculture); Shoreline hardening/armoring; Sea level rise; Increased storms, flooding, erosion; Altered hydrology and sediment transfer; Invasive and problematic plants and animals; Anthropogenic pollution, eutrophication; Recreation and disturbance (sandspits).*



Western Sandpiper  
(*Calidris mauri*).

Peter Pearsall/USFWS

[Fraser River Delta & Estuary - Pacific Birds Habitat Joint Venture](#)





Eelgrass and Dungeness Crabs, Coos Bay, Oregon. *Monica Iglecia*

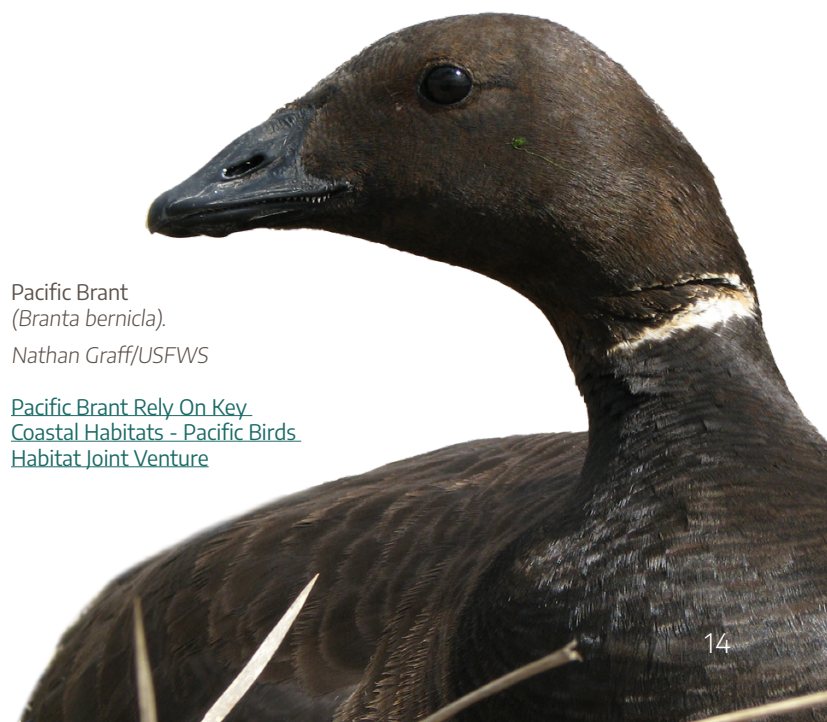
## Eelgrass Meadows

Eelgrass meadows are typically found in shallow subtidal to intertidal areas and contain a group of flowering seagrasses that are widespread throughout coastal and estuarine environments. Eelgrass (*Zostera spp.*) is the most common and widespread seagrass taxon in estuaries and embayments along the U.S. West Coast, occurring in soft-bottom habitats from Alaska to Baja California. These areas provide critical foraging habitat for waterfowl species that graze directly on eelgrass, like Brant, American Wigeon (*Mareca americana*), and Northern Pintail (*Anas acuta*), as well as species that forage for fish, herring roe, and invertebrates within eelgrass, like the Surf Scoter (*Melanitta perspicillata*), Steller's Eider (*Polysticta stelleri*), and Great Blue Heron (*Ardea herodias*). Dead eelgrass also provides important habitat as wrack (dead plant material that washes up on beaches). Shorebirds and other species forage in eelgrass wrack for invertebrates, and raptors such as Osprey (*Pandion haliaetus*) use wrack to line their nests.

Eelgrass also provides a variety of important ecological functions and ecosystem services including shoreline stabilization, water filtration, carbon sequestration, increased resilience to ocean acidification, and shelter for juvenile fish. Eelgrass strengthens coastal economies by supporting fish and shellfish which are integral to commercial and recreational fishing industries. Indeed, eelgrass forms the foundation of a diverse and dynamic marine food web. Increased water temperatures in the southern Pacific Flyway and increased water depths due to sea level rise in the northern extent may drastically shrink the range of eelgrass on the Pacific Coast, leaving mid-latitude estuaries as possible critical refugia for eelgrass and associated species.

### Key Threats:

*Land conversion (especially over-water structures that block sunlight, aquaculture); Damage from dredging, moorage, and anchoring; Shoreline hardening; Sea level rise and erosion of barrier islands; Altered hydrology and increased sedimentation; Rising sea temperatures; Invasive and problematic plants and animals (e.g., invasive aquatic plants, European green crab, burrowing shrimp); Disease, especially eelgrass wasting disease; Anthropogenic stressors (e.g., contaminants and pollution, eutrophication, propeller wash/boat wake); In some areas, trampling from increasing pedestrian traffic and human recreation on beaches.*



Pacific Brant  
(*Branta bernicla*).  
*Nathan Graff/USFWS*

[Pacific Brant Rely On Key Coastal Habitats - Pacific Birds Habitat Joint Venture](#)





Wetlands surrounding Tutakoke Bird Camp, a research station in Yukon Delta National Wildlife Refuge, Alaska. USFWS

## Freshwater Wetlands and Lakes

Here, freshwater wetlands and lakes (palustrine and lacustrine) include all non-tidal wetlands located within coastal watersheds in the continental Pacific Birds region. Freshwater wetlands adjacent to tidal areas form a particularly productive and biodiverse mosaic of habitats for coastal birds. Freshwater wetlands provide important roosting and foraging habitat for many waterfowl, shorebirds, waterbirds, and wetland-associated landbirds. Freshwater wetlands have experienced large-scale declines and degradation as a result of various land-use activities. Existing regulatory programs have slowed but not stopped the loss of freshwater wetlands across the Pacific Flyway, and recent regulatory uncertainty for federal protection may exacerbate losses. As drought worsens across the Western U.S., freshwater systems are increasingly important for birds, wildlife, and people.

### Key Threats:

*Land conversion; Sea level rise; Increased coastal erosion and severity of storm surges resulting in salinization of freshwater wetlands; Increased ecological drought; Anthropogenic pollution, eutrophication; Altered hydrology (increased runoff) and sedimentation; Invasive and problematic plants and animals; Loss of natural processes that create and sustain freshwater wetlands (landslides, beavers, logjams, flood, fire); in Alaska, permafrost melt resulting in drainage of freshwater wetlands.*

Greater Scaup  
(*Aythya marila*).  
Peter Pearsall/USFWS

[The Great Scaup Mystery | Ducks Unlimited](#)



Greater Yellowlegs  
(*Tringa melanoleuca*).  
Jake Bonello/USFWS





Shorebirds at Bay Farm, Humboldt Bay, California. *Monica Iglecia*

## Bird-friendly Working Lands and Waters

In coastal watersheds within the Pacific Birds region, agricultural lands are concentrated along valley bottoms and on floodplains. Many of the most productive agricultural lands in the region are former tidal wetlands that have been diked and drained. Commercial shellfish and kelp farms are typically found in intertidal habitats within well-sheltered estuaries and bays or close to shore.

Bird-friendly working lands and waters include agricultural and aquacultural landscapes that are managed in ways that provide suitable habitat and promote the conservation of birds. These areas include croplands, dairies, grazing lands, hayfields, shellfish and kelp farms that play an important role in commercial food production while also providing habitat for birds and other wildlife. Many working lands serve as surrogate habitats that provide important wetland functions. In particular, working lands that contain a mix of different crops, hedgerows, woodlots, wetlands, streams, and irrigation ditches provide a beneficial mosaic of habitats that support high species diversity.

The concept of bird-friendly working lands and waters aims to balance the needs of both humans and wildlife, recognizing that sustainable management practices can support both productive agriculture/aquaculture and healthy and diverse bird populations. Due to land conversion and widespread loss of natural seasonal freshwater wetlands in these areas, migratory waterfowl have adapted to rely on remnant grains, seeds, vegetables, grasses, and insects on pastures and hayfields. In particular, non-breeding waterfowl often use agricultural fields adjacent to estuaries in the fall and winter when estuarine productivity declines. Waterfowl use of agricultural lands can result in economic impacts to farmers and ranchers, and this tension has been a focus of management attention for species like the Aleutian Cackling Goose (*Branta hutchinsii leucopareia*). Much of this farmland is also being converted to residential and industrial uses, or to types of agriculture that do not support as many birds (e.g., berries, nuts, tree nurseries, greenhouses).

### Key Threats:

*Coastal development; Conversion to crops that are not as bird-friendly; Sea level rise and saltwater intrusion; Increased ecological drought; Increased storms, flooding, erosion; Altered hydrology and sediment transfer; Anthropogenic pollution, eutrophication; Invasive and problematic plants and animals.*

Dusky Canada Goose  
(*Branta canadensis occidentalis*)  
*George Gentry/USFWS*

[Duskies on the Delta - Pacific Birds Habitat Joint Venture](#)



Dunlin  
(*Calidris alpina*).  
*Lisa Hupp/USFWS*

[Alaska-Japan Sister Site Relationship is for the Birds | U.S. Fish & Wildlife Service \(fws.gov\)](#)





## Priority Threats

Below is a summary table of priority threats to coastal wetlands in the northern Pacific Flyway. Most are shared across multiple Tier 1 habitats; half are driven by climate change (shaded).

Priority Threat	Priority Habitats Affected
Coastal development, land conversion	All
Altered hydrology and sediment transfer	All
Anthropogenic pollution, eutrophication	All
Invasive and problematic plants and animals	All
Sea level rise	All
Increased storm surge, flooding, erosion	All
Increased ecological drought	Freshwater Wetlands, Working Lands/Waters
Rising sea temperatures	Tidal Wetlands, Eelgrass Meadows

### Managing for Change: Resist, Accept, or Direct

As climate impacts interact with other threats such as land conversion, pollution, and invasive species, coastal systems are changing in rapid, novel ways that may limit the relevance of restoration measures based on historical ecological baselines. The conservation strategies and actions outlined in this plan are compatible with the Resist-Accept-Direct (RAD) framework for addressing climate impacts. The RAD framework is a simple and flexible approach to planning and decision-making in the face of climate change that supports strategic, forward-looking action.<sup>12</sup> In this framework, there are three potential options to manage climate-driven change: Resist (work to maintain/restore conditions based on historical or current conditions); Accept (allow ecosystem change without active intervention); or Direct (shape ecosystem change toward preferred new conditions).

Coastal partners employ a range of RAD solutions, for example, resisting change to protect coastal wetlands of high cultural or biological importance; directing change when one potential outcome is preferred over another; or accepting change when other options are not affordable or sustainable. It is often a priority to maintain or restore current conditions (resist) while monitoring systems and preparing to shift strategies (accept or direct) under future scenarios.

While we do not explicitly categorize the strategies and actions in this plan as 'resist, accept, or direct' - they encompass a suite of potential actions and outcomes compatible with the RAD framework, which partners may choose from and integrate into planning and decision-making.

William L Finley National Wildlife Refuge, Oregon. *George Gentry/USFWS Pigeon Butte*



# Human Communities

Human values, well-being, and perspectives are essential to consider in conservation planning. We assessed communities likely to be impacted by coastal conservation decisions, as well as groups with key perspectives and influence. Partners from across the region were consulted during this process, including social scientists who provided guidance on cultural, political, economic, and social dynamics underlying coastal conservation efforts. As a result, there were two focal groups we reached out to for a series of focused scoping sessions and in-person meetings.

## Indigenous Coastal Partners

Indigenous Peoples have effectively stewarded ecosystems for millennia and continue to manage over a quarter of the world's lands.<sup>13</sup> Tribes continue to have a significant role in Pacific Coastal conservation and often practice sustainable resource management practices that have been honed and passed down for thousands of years, since time immemorial.

There are over 300 federally recognized Tribes, Alaska Native entities, and First Nations in coastal areas of the continental Pacific Birds region. Through existing relationships and connections with Indigenous coastal partners, as well as outreach to the Native American Fish and Wildlife Society and regional coalitions of Indigenous partners on the Pacific Coast, we connected with citizens and staff of 20 Tribes and Indigenous groups from across the region. This included inland Tribal representatives with strong interests in the functioning of entire ecosystems, from headwaters to coasts. Our approach to building relationships with Indigenous partners is founded on upholding Tribal sovereignty and self-determination, respect for Indigenous Peoples and their cultural and historical connection to coastal lands and waters, and a commitment to prioritize and promote equity and environmental justice in coastal conservation actions.

During virtual scoping sessions and in-person meetings, we discussed Tribal coastal wetland priorities, values, opportunities, and challenges. In parallel to this engagement effort, Pacific Birds staff reviewed 14 Tribal Wetland Program Plans from coastal watersheds across the Pacific Coastal region.<sup>14</sup> Several broad priorities emerged from these discussions and wetland plan reviews.

- ▶ Support Tribal treaty rights and sovereignty over ancestral lands, waters, and resources
- ▶ Protect and restore coastal wetlands to sustain the many benefits and ecosystem services they provide, including:
  - ▷ traditional foods, plants, and animals integral to culture and subsistence
  - ▷ water quality, flood and erosion control, wildlife habitat
  - ▷ community health, mental and spiritual well-being
  - ▷ economic value (fisheries, recreation, native plant nurseries)
- ▶ Bolster Tribal capacity to plan for and adapt to coastal impacts of climate change
  - ▷ including coastal community relocation upslope from sea level rise and erosion
- ▶ Improve Tribal wetland inventories (both delineation and functional assessments), and increase Tribal staff capacity and training to carry out this work

Although these priorities are not comprehensive, they represent common themes expressed by Indigenous partners consulted and described in the Tribal Wetland Plans reviewed. Where possible, these priorities have been woven into this plan's conservation strategies and actions.



Buff-Breasted Sandpiper  
(*Calidris subruficollis*)

Jake Bonello/  
USFWS/Creative Commons



## Human Communities *(continued)*

### Conservation Partners in Working Lands

We conducted a series of scoping sessions with conservation partners working in agricultural landscapes across the region. We discussed coastal wetland priorities, values, opportunities and challenges, and again identified recurring themes. Partners conveyed that a combination of failing infrastructure (e.g., tide gates, levees), sea level rise and saltwater intrusion, increasing market competition for coastal lands, and generational turnover among farmers (often with no succession plan) are challenges to keeping agricultural lands in production.

While restoration of tidal influence to coastal lowlands is a high conservation priority in the Pacific Coastal region, bird-friendly working lands provide important forage and roosting habitat for many birds and other wildlife. They also often occur within landward migration zones, thus preserving opportunities for future adaptation to sea level rise.

Based on these considerations, our general recommendation is to support continued agricultural production, especially when it is bird-friendly and when continued production is viable. However, where working lands are at risk of imminent sea level rise and/or costs of replacing failing infrastructure (e.g., tide gates) are prohibitive, we recommend exploring alternative potential outcomes. In some cases, limited tidal restoration of working lands may increase productivity by restoring sediment transport and reducing inundation. In other cases, restoration of full tidal influence may be the most supportable option. Decisions may require consideration of trade-offs between restoration of tidal flow and negative impacts to food security and local economies. Where possible, these themes have been integrated in the conservation strategies and actions.








Viewing restored wetlands, Cypress Island, Washington. *Laura Farwell*



# Overarching Strategies

Below are the five overarching strategies and associated conservation actions identified to address key challenges facing coastal ecosystems, over the next ten years:

-  Protect and restore coastal wetlands and watershed function
-  Build habitat and community resilience to climate change
-  Strengthen monitoring, research, and knowledge transfer
-  Increase awareness and engagement
-  Increase funding and capacity

These conservation strategies represent key themes that emerged during planning meetings, scoping sessions, and literature reviews. Although the strategies have region-wide relevance, some associated actions are most relevant to particular habitats or geographies. We will work closely with partners to help determine the local or regional relevance of each action.



Black Brant (*Branta bernicla nigricans*), a Pacific Flyway subspecies of Brant, stopover at Izembek Lagoon, Alaska. Lisa Hupp/USFWS





## Strategy 1.

# Protect and Restore Coastal Wetlands and Watershed Function

### Actions:

1.1	Facilitate coordination among regional agencies, Tribes, research groups, and conservation partners to identify coastal wetland areas of highest importance for migratory birds in the northern Pacific Flyway, to inform focused conservation management and investments.
1.2	Prioritize the acquisition, restoration, and enhancement of coastal wetlands (both current and projected), including estuaries, associated river deltas, coastal inlets, and barrier embayments to maintain or recover ecosystem processes.
1.3	Ensure policies, regulations, and programs avoid impacts to existing coastal wetlands and support a goal of net gain of both wetland acreage and function
1.4	Improve interagency and transboundary coordination to protect coastal wetlands, including but not limited to local, state, provincial, and federal agencies, Tribes and First Nations. Work to connect groups focused on coastal wetland conservation for the benefit of different taxa (e.g., salmon, eelgrass, shellfish) who share common goals; work to coordinate and streamline parallel efforts.
1.5	Support, promote, and invest in coastal wetland conservation, protection, and/or restoration projects led by Indigenous partners, including projects returning ancestral lands to Indigenous sovereignty to help ensure long-term protection, restoration, and/or stewardship.
1.6	Promote and test incentives, easements, and innovative approaches focused on securing coastal wetland habitats and ecological processes on private shorelines - while acknowledging and supporting other land use needs where appropriate (e.g., bird-friendly agriculture/aquaculture). Explore options to incorporate Tribal subsistence hunting and harvests, co-management, and/or public access as part of easement development, which may benefit shared conservation priorities identified.
1.7	Where appropriate, remove barriers to tidal connectivity (i.e., roads/railways, culverts, tide gates, levees, dikes, and dams) to restore habitat forming processes such as tidal exchange, sediment transport, and hydrology - while acknowledging and supporting Indigenous access and other land use needs where appropriate.
1.8	Where appropriate, support implementation of innovative and nature-based solutions to address loss (restore/mimic) of natural processes (e.g., beaver dams, logjams, landslides, flood, fire) that create and sustain freshwater wetlands.

Strategy 1. Protect and Restore Coastal Wetlands and Watershed Function Actions continued

1.9	Improve agricultural, aquacultural, and forest management practices in coastal watersheds that are incompatible with healthy, watershed-level functions and ecological services. Synthesize and promote bird-friendly agricultural and aquacultural practices.
1.10	Support watershed-level hydrological functioning and ecological services, including land use management practices to limit and reduce development of impervious surfaces in upland areas, to prevent changes to wetland hydrology that alter ecological processes or functions.
1.11	Support effective management of aquatic invasive species, including practices to manage invasive seagrass, beachgrass, European green crabs, and in particular, invasive cord grasses of the genus <i>Spartina</i> . Expand state and federal funding, reinvigorate multi-state agreements of cooperation, and promote closer coordination with federal agencies to address invasive species control and removal. Support inclusion of criteria in conservation easements for ongoing control and removal of <i>Spartina</i> and other invasive species detrimental to the health of wetlands.
1.12	Support development, funding, and promotion of incentive and technical assistance programs to landowners to address sources of point and nonpoint pollution both within estuaries and from contributing watersheds - including runoff from residential, agricultural, and forest lands, failing septic systems, animal waste, energy development, and storm events. Facilitate coordination with local, state and federal agencies to identify and prioritize important bird areas where pollution or contamination has been identified.
1.13	Fund or incentivize the development of robust watershed management plans or similar landscape planning documents that identify priority conservation and restoration opportunities.
1.14	Promote implementation of existing and relevant aspects of Clean Water Act and other water laws and regulations in the U.S. and Canada, including monitoring and standardization of sustainable freshwater withdrawal indicators. In parallel, support the streamlining of regulatory processes and increased regulatory staff capacity.
1.15	Reduce and prevent shoreline hardening through collaboration with local, state, federal, and Tribal agencies, non-profit organizations, and community groups. This may include protecting unarmored feeder bluffs from shoreline armoring to enhance nearshore sediment delivery and reduce beach erosion, and/or exploring the use of incentives and community-based strategies focusing on the social science of armor removal on undeveloped properties or where erosion is not a significant concern.

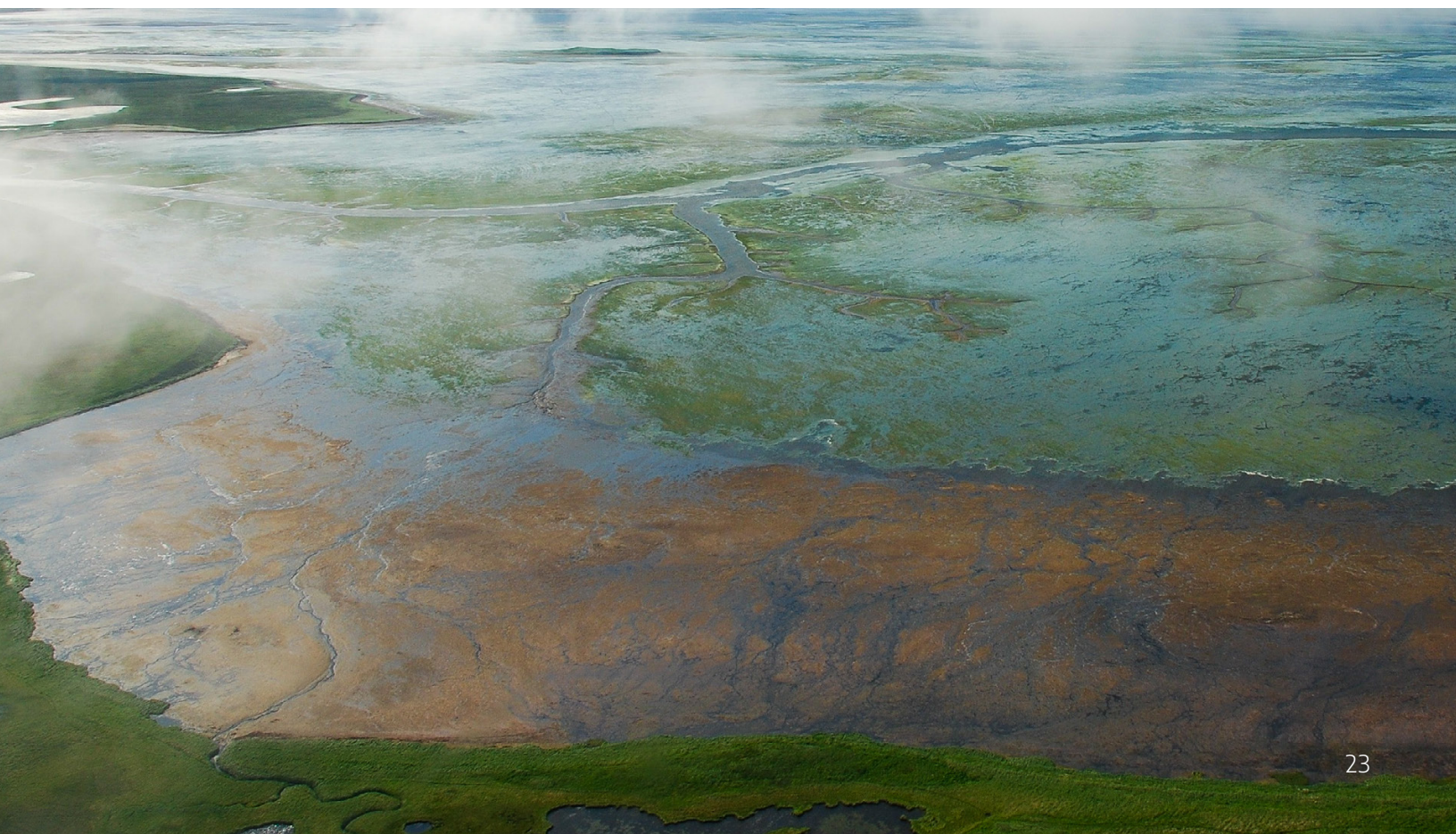


Strategy 1. Protect and Restore Coastal Wetlands and Watershed Function Actions continued

**Actions specific to Eelgrass habitats:**

<p><b>1.15</b></p>	<p>Avoid development within and/or immediately adjacent to eelgrass habitat where potential adverse impacts are identified, and incentivize and regulate overwater structure development by supporting policy development and implementation. This may require consideration of trade-offs or interactions with renewable energy development (e.g., off-shore wind, wave energy) and thoughtful siting of aquaculture.</p>
<p><b>1.16</b></p>	<p>Expand anchor-out zones at suitable eelgrass sites through a multi-layered approach that includes boater education, incentives, monitoring, and regulation.</p>
<p><b>1.17</b></p>	<p>Accelerate establishment and expansion of eelgrass at sites shown to possess suitable ecological conditions through conservation and active eelgrass restoration</p>
<p><b>1.18</b></p>	<p>Evaluate opportunities to leverage native shellfish restoration to enhance local water quality and advance regional eelgrass recovery efforts.</p>
<p><b>1.19</b></p>	<p>Promote and help facilitate the development of a West Coast-wide eelgrass mitigation policy, similar to the California Eelgrass Mitigation Policy and Implementing Guidelines (NOAA).</p>

Green eelgrass appears at low tide in the vast wetlands of Izembek Lagoon, at the edge of Izembek Refuge, Alaska. *Kristine Sowl/USFWS*





## Strategy 2.

### Build Habitat and Community Resilience to Climate Change

#### Actions:

2.1	Prioritize protection, conservation, community engagement, and adaptive working lands actions in landward migration zones (future tidal wetlands under sea level rise projections), to preserve opportunities for future adaptation.
2.2	Support restoration efforts that improve flow of freshwater inputs to support healthy tidal wetlands during drought years and increase riparian buffers in coastal forests.
2.3	Invest in coastal adaptation and restoration projects that bolster both habitat and community resilience to climate change, especially in Indigenous, low-income, and historically marginalized coastal communities. Support projects aligned with Tribal sovereignty and priorities that explicitly address environmental justice and social vulnerability, support the culture and subsistence of coastal communities, and that create local jobs and stimulate local economies, while improving ecosystem health.
2.4	Through technical assistance, funding, and other support, aid Tribal governments, local governments, and watershed councils in completing or updating coastal management plans to integrate sea level rise and other climate impacts, including social vulnerability assessments to identify coastal communities likely to be disproportionately impacted.
2.5	Fund and promote innovative, nature-based adaptation measures and projects of variable size and scale, including soft shore protection measures, beneficial reuse of sediment, and other adaptation strategies such as managed retreat.

Geese at Billy Frank Jr. Nisqually National Wildlife Refuge, Washington. *Andrew LaValle/USFWS/Creative Commons*







## Strategy 3. Strengthen Monitoring, Research, and Knowledge Transfer

### Actions:

3.1	Invest in coastal wetland research and monitoring efforts to inform conservation decision-making and prioritization, and to address key knowledge gaps (see Appendix A, ‘Research Needs’).
3.2	Increase funding and capacity to monitor effectiveness of coastal wetland restoration projects, identify ecological associations between various habitat types, inform culturally appropriate education and outreach messaging, and support future habitat conservation and recovery.
3.3	Collaborate to advance bird species recovery and monitoring efforts in coastal landscape conservation initiatives and partnerships.
3.4	Explore modeling approaches that integrate existing bird survey and monitoring data with eBird and other community science data (e.g., Breeding Bird Survey, Christmas Bird Count). Evaluate the use of eBird data for monitoring rarely observed species (e.g., secretive marsh birds, some sea duck and seabird species) by comparing eBird estimates with existing survey and monitoring data.
3.5	Facilitate the collaborative development and dissemination of standard monitoring protocols and metrics to assess the health of coastal wetland complexes across the Pacific Coast, including extent, water quality, and sampling for biological indicators (e.g., bird use, bird response to management, local abundance) and invasive species. Recommend that monitoring efforts connect iteratively with planning and implementation, with a focus on responsive actions and key takeaways.
3.6	Support and collaborate with existing research and monitoring structures (e.g., National Wildlife Refuges, National Estuarine Research Reserves) to advance coast-wide wetland conservation.
3.7	Prioritize funding for local monitoring of invasive species in coastal wetlands using an Early Detection Rapid Response framework, including increased support for monitoring by Tribes and local communities.
3.8	Support and collaborate with research and monitoring partners to share scientific information, new tools and methods with conservation practitioners engaged in on-the-ground coastal wetland restoration.



## Strategy 4. Increase Awareness and Engagement

### Actions:

4.1	Improve information sharing and communication regarding ecological and cultural ecosystem services (e.g., Indigenous rights, subsistence hunting and eggling, recreational hunting, birdwatching) provided by healthy functioning coastal wetlands, and the economic value of healthy coastal wetland habitats and species. Emphasize the importance and interconnectedness of coastal habitats for wetland-dependent migratory birds.
4.2	Develop culturally appropriate and sensitive, community co-created messaging specific to birds and tidal wetlands and promote this messaging across organizations and programs delivering coastal outreach programs and materials. Identify common goals and values among diverse cultures and consumptive uses of coastal wetland resources. Consider tailored and translated messaging for specific audiences.
4.3	Work with state, federal, and Tribal partners, transportation and natural resource planning departments to incorporate and share resources, practices, and messaging, while promoting governance practice that creates a sense of transparency, equitable representation, and access to information and decision-making processes.
4.4	Target outreach and relationship-building to address political and social resistance to coastal wetland protection and restoration (e.g., from the public, agricultural producers, and industry), especially regarding landward migration of tidal wetlands under sea level rise.
4.5	Target public outreach and education to foster community stewardship, individual responsibility, and collective action to benefit coastal wetland conservation and recovery in close collaboration with local Indigenous Peoples and communities.
4.6	Promote successful shoreline homeowner and user outreach and incentive programs, resources and tools. Share programs and resources across local, state, and international jurisdictions to relevant audiences.



Red Knot  
(*Calidris canutus*).  
Ken Archer



Harlequin Duck  
(*Histrionicus histrionicus*).  
Laura Wolf/Creative Commons 2





## Strategy 5. Increase Funding and Capacity

### Actions:

5.1	Broaden and strengthen partnerships among Tribes, state and federal agencies, land trusts, local watershed councils, conservation districts, NGOs, local businesses, private landowners, and funders to develop shared and measurable definitions of success and a shared agenda for achieving it.
5.2	Invest in building human resource, infrastructure, information delivery, and technical capacities of organizations and programs involved in coastal wetland conservation and restoration.
5.3	Promote and invest in partnerships with Indigenous partners to ensure conservation planning and priorities are informed by Indigenous and local knowledge, that Indigenous partners benefit from implementation, and that data sovereignty is acknowledged and appropriately addressed.
5.4	Invest in partnerships and planning efforts that include marginalized and historically excluded communities, especially communities segregated into high risk, low elevation areas that may be disproportionately impacted by climate change.
5.5	Work with funding agencies and grant programs to streamline complex proposal timelines and processes, improve communications, increase flexibility regarding public access requirements, and ensure that grant criteria align with identified conservation priorities.
5.6	Identify opportunities to better leverage existing grant programs to support coastal wetland acquisition and restoration projects, and to expand or create new grant programs or incentives to support conservation projects.

Potter Marsh with partners, Alaska. *Laura Farwell*





# Bird Population & Habitat Objectives

In parallel to the strategic planning process, Pacific Birds staff identified coastal wetland priority species and established qualitative population and habitat objectives. We will continue to work towards developing more explicitly quantified objectives, in the near future.

## Coastal Wetland Birds

Coastal wetland birds are defined here as all waterfowl, shorebirds, waterbirds, and wetland-associated landbirds that regularly occur in coastal watersheds within the continental portion of the Pacific Birds region, during all or part of their annual life cycle. To identify birds that regularly occur within this geography, we referenced detailed species accounts<sup>15,16</sup> and spatially-explicit, seasonal relative abundance and range estimates from eBird.<sup>17</sup> We excluded species that occur in the region incidentally, non-native species, and predominantly oceanic species. See Appendix B1 for a full list.

Pacific Birds continental geography overlaps five Bird Conservation Regions (BCRs) – ecologically distinct regions in North America with similar bird communities, habitats, and resource management issues.<sup>18</sup> For each coastal wetland bird included in this plan, we assessed whether the species occurs primarily within BCR (5) Northern Pacific Rainforest, and/or BCRs 1-4, which only occur in Alaska within our service region: (1) Aleutian/Bering Sea Islands, (2) Western Alaska, (3) Arctic Plains and Mountains, (4) Northwestern Interior Forest. See Appendix C2 for a map of BCRs.



Lesser Yellowlegs (*Tringa flavipes*) and Greater Yellowlegs (*Tringa melanoleuca*). Courtney Celley/USFWS



# Priority Species

We reviewed the status of each coastal wetland bird species occurring within the Pacific Birds continental region, and established a list of priority species for conservation action (Appendix B1). Priority species were selected according to their status under three main categories of information:

## Stewardship Status

If a high proportion of the global population of a species occurs within Pacific Birds continental geography during all or part of their annual life cycle, this region may play an elevated stewardship role in the maintenance or recovery of the species. We derived seasonal estimates of the proportion of the modeled global population of each species within the Pacific Birds continental region, based on eBird relative abundance data<sup>16</sup>. Seasons are species-specific and defined by seasonal patterns of movement in eBird observations, and include: non-breeding (Winter), pre-breeding (Spring), breeding (Breed), and post-breeding (Fall). We evaluated seasonal proportion of population metrics within five percentage categories, ranging from <1% to 100% of global populations (Appendix B2).

## Imperiled Status

Three main sources of information were used to determine the imperiled status of each coastal wetland species.

1. Federally threatened and endangered (T&E) species listed in the US<sup>19</sup> or Canada<sup>20</sup>, and/or state<sup>21-23</sup> and provincial<sup>25</sup> T&E species.
2. Birds of Conservation Concern (BCC) identified by the U.S. Fish and Wildlife Service within the five BCRs (1-5) overlapping Pacific Birds continental geography.<sup>26</sup> See Appendix C1 for a map.
3. Tipping Point Species identified by the Road to Recovery (R2R) team.<sup>27</sup> These are species that require immediate, focused action to pinpoint causes of declines and develop strategies for recovery. R2R species alert categories (red, orange, yellow) were also noted, and correspond to the Avian Conservation Assessment Database (ACAD) Watch List categories.<sup>28</sup>

## Planning Status

Previous conservation planning efforts have assessed the status and priority of bird species across large scales (national and continental plans), and at state and provincial scales. To incorporate existing planning priorities, we identified priority species (and species priority levels) in national or continental bird conservation plans for the four major bird groups: waterfowl<sup>29</sup>, shorebirds<sup>4</sup>, waterbirds<sup>5</sup>, and landbirds<sup>30</sup>. We also identified Species of Greatest Conservation Need (SGCNs) in State Wildlife Action Plans (SWAP) for Alaska<sup>31</sup>, Washington<sup>32</sup>, Oregon<sup>33</sup>, and California<sup>34</sup>. SWAPs are a requirement to receive funding through the federal State and Tribal Wildlife Grants Program, and are developed by state agencies in collaboration with Tribes, local and federal agencies, nongovernmental organizations, and research institutions. Last revised in 2015, these plans are undergoing updates to be completed by 2025. Pacific Birds will review SWAP updates as they become available, and revise the priority species list accordingly. In British Columbia (BC), we included priority coastal species listed in the Pacific Birds-BC 2020-2030 Implementation Plan.<sup>1</sup>

A rubric accounting for factors from all three categories (Stewardship, Imperiled, and Planning Status) was applied to identify priority species, and to determine conservation priority levels ranging from Tier 1-4 (Tier 1 = highest priority). See Appendix B2 for scoring criteria. Species that did not meet minimum criteria are not considered priority species at this time. However, we acknowledge these species may be priorities locally or in other regions, and Pacific Birds will support efforts to maintain or recover non-priority species, based on need and opportunity.

Priority species may help guide how and where to focus limited resources, inform regional planning and decision-making, and help ensure that invested funds strategically benefit coastal wetland birds and habitats within the Pacific Birds geography.

Black Oystercatchers  
(*Haematopus bachmani*)  
Ken Archer



## Coastal Wetland Priority Species (Pacific Birds Habitat Joint Venture)

Tier 1: Very high priority (35 species)	Tier 2: High priority (50 species)	Tier 3: Medium priority (35 species)	Tier 4: Priority (52 species)
American White Pelican	Aleutian Tern <sup>AK</sup>	American Avocet <sup>CA</sup>	Alder Flycatcher <sup>AK</sup>
Black Oystercatcher	American Golden-Plover <sup>AK</sup>	American Dipper	American Pipit
Black Scoter	Ancient Murrelet	American Wigeon	Arctic Loon <sup>AK</sup>
Black Swift	Bald Eagle	Arctic Tern	Baird's Sandpiper <sup>AK</sup>
Brant*	Bank Swallow	Black-crowned Night Heron	Belted Kingfisher
Bristle-thighed Curlew <sup>AK</sup>	Bar-tailed Godwit <sup>AK</sup>	Black-necked Stilt	Black Guillemot <sup>AK</sup>
Cassin's Auklet	Barn Swallow	Bonaparte's Gull	Black Tern
Clark's Grebe	Barrow's Goldeneye	Bufflehead	Blue-winged Teal
Common Murre	Black Turnstone	Cackling Goose*	Canvasback
Harlequin Duck	Black-bellied Plover	Cinnamon Teal	Caspian Tern
Horned Grebe	Black-legged Kittiwake <sup>AK</sup>	Dunlin	Common Eider <sup>AK</sup>
Horned Lark*	Brandt's Cormorant	Forster's Tern	Common Goldeneye
Ivory Gull <sup>AK</sup>	Brown Pelican*	Greater Scaup	Common Merganser
King Eider <sup>AK</sup>	Buff-breasted Sandpiper <sup>AK</sup>	Heermann's Gull	Common Tern
Kittlitz's Murrelet <sup>AK</sup>	California Gull	Least Auklet <sup>AK</sup>	Common Yellowthroat
Long-billed Dowitcher	Canada Goose*	Lesser Scaup	Crested Auklet <sup>AK</sup>
Long-tailed Duck	Common Loon	Mallard	Eared Grebe
Marbled Murrelet	Emperor Goose <sup>AK</sup>	Marbled Godwit	Elegant Tern
Olive-sided Flycatcher	Glaucous Gull	Pacific Golden-Plover	Franklin's Gull
Pectoral Sandpiper <sup>AK</sup>	Glaucous-winged Gull	Parasitic Jaeger <sup>AK</sup>	Gadwall
Pelagic Cormorant	Greater White-fronted Goose*	Pomarine Jaeger <sup>AK</sup>	Great Blue Heron
Red Knot*	Greater Yellowlegs	Purple Martin	Green Heron
Rock Sandpiper*	Horned Puffin <sup>AK</sup>	Red Phalarope <sup>AK</sup>	Green-winged Teal
Ross's Gull	Hudsonian Godwit <sup>AK</sup>	Red-breasted Merganser	Herring Gull
Sandhill Crane*	Least Sandpiper	Red-necked Phalarope	Hooded Merganser
Short-billed Gull	Lesser Yellowlegs	Rhinoceros Auklet	Iceland Gull
Snowy Plover*	Long-billed Curlew	Ross's Goose	Killdeer
Spectacled Eider <sup>AK</sup>	McKay's Bunting <sup>AK</sup>	Snowy Egret	Long-tailed Jaeger <sup>AK</sup>
Steller's Eider* <sup>AK</sup>	Northern Pintail	Solitary Sandpiper <sup>AK</sup>	Marsh Wren
Tricolored Blackbird <sup>CA</sup>	Pacific Loon	Tundra Swan	Merlin
Tufted Puffin	Peregrine Falcon	Western Flycatcher	Northern Harrier
Upland Sandpiper <sup>AK</sup>	Pigeon Guillemot	Whiskered Auklet <sup>AK</sup>	Northern Shoveler
Wandering Tattler	Red-faced Cormorant <sup>AK</sup>	Willow Flycatcher	Northern Waterthrush <sup>AK</sup>
White-winged Scoter	Red-legged Kittiwake <sup>AK</sup>	Wilson's Phalarope	Parakeet Auklet <sup>AK</sup>
Yellow-billed Loon	Red-necked Grebe	Wilson's Snipe	Red-throated Loon
	Ruddy Turnstone		Red-winged Blackbird
	Sanderling		Redhead
	Semipalmated Sandpiper		Ring-necked Duck
	Short-billed Dowitcher		Ruddy Duck
	Snowy Owl <sup>AK</sup>		Rusty Blackbird <sup>AK</sup>
	Stilt Sandpiper <sup>AK</sup>		Sabine's Gull
	Surf Scoter		Semipalmated Plover
	Surfbird		Snow Bunting
	Thick-billed Murre		Snow Goose
	Trumpeter Swan		Spotted Sandpiper
	Western Grebe		Tree Swallow
	Western Gull		Violet-green Swallow
	Western Sandpiper		Virginia Rail
	Whimbrel		White-faced Ibis
	White-rumped Sandpiper <sup>AK</sup>		Willet
			Wood Duck
			Yellow-headed Blackbird

\* subspecies or subpopulation of conservation concern

<sup>AK, CA</sup> occurs only in Alaska or California within continental JV



# Bird Population and Habitat Objectives

The ultimate goal of this planning process is to help ensure there are sufficient amounts of habitat at watershed levels to support the maintenance or recovery of bird populations at continental and hemispheric levels. Our overarching objective is net gain of both acreage and function of each Tier 1 coastal wetland habitat.

For coastal wetland birds identified in this plan, we have assigned qualitative, species-specific population and habitat objectives, based on ACAD (version 2023) continental population trends since 1970.<sup>28</sup> In the implementation of this plan, Pacific Birds staff will work with regional partners to develop more explicitly quantified objectives by habitat type and species likely to benefit. The following is a general description of our preliminary, qualitative objectives and example actions that could be taken to achieve them. The four objective categories are borrowed and modified from the Sonoran Joint Venture Bird Conservation Plan.<sup>35</sup>

## Maintain

For species whose continental population is stable or has increased since 1970, protect existing habitat for no net loss (accounting for successional changes, values of bird-friendly working lands and waters, and habitat shifts due to climate change). This objective does not imply a “hands off” approach; existing habitat often must be actively protected and/or managed.

## Maintain+

Similar to Maintain, but for species whose continental population has decreased by 0-15% since 1970, increase efforts towards proactive protection, restoration, and/or enhancement of existing habitats on natural and working lands and waters.

## Increase by 50%

For species whose continental population has decreased by 15-50% since 1970, protect existing habitat while increasing the amount of suitable habitat, and/or increase the carrying capacity of existing suitable habitat, such that the population of the target species increases by 50%. Activities may involve habitat restoration or enhancement to increase the carrying capacity of an area, and/or increasing habitat suitability by addressing limiting factors for target species.

## Double

For species whose continental population has decreased by >50% since 1970, protect existing habitat while increasing the amount of suitable habitat, and/or increase the carrying capacity of existing suitable habitat, such that the population of the target species increases by 100%. Activities might include habitat creation (e.g., managing for inland migration of tidal habitats as sea level rises), restoration (e.g., invasive species removal, reintroducing tidal influence to areas behind dikes, levees, or tide gates), and/or enhancement (e.g., recontouring and replanting, improvements to working lands and waters).



Marbled Godwit (*Limosa fedoa*), Grays Harbor, Washington. Monica Iglecia

Conservation strategies and actions identified in this plan describe additional, specific steps that can be taken to increase the amount and/or improve the condition of coastal wetland habitats to support the levels of birds suggested by these objectives. See “[Overarching Strategies](#)” to learn more.



## Measuring Progress and Next Steps

To measure progress towards qualitative objectives for coastal wetland birds and their habitats, we will continue to work with partners to monitor bird populations and habitats based on the best available information for the Pacific Birds continental region.

### Bird Population Monitoring

Multiple Migratory Bird Joint Ventures (JVs), including Pacific Birds, are working with researchers at Cornell Lab of Ornithology to leverage eBird Status and Trends data products to develop quantitative bird population and habitat objectives, and to monitor progress towards objectives over time. JV-level eBird data summaries will be provided annually, allowing JVs to monitor changes in regional population trends, and potentially species abundances, over time.

Pacific Birds will also continue to monitor changes in the Stewardship, Imperiled, and Planning Status of coastal wetland species as markers of progress towards regional objectives (e.g., removal from federal or state species-of-concern lists, or downlisting of T&E species).

At local scales, existing and expanding monitoring frameworks led by partners will inform management actions and recommended habitat improvements.

### Habitat Monitoring

A key next step for implementation of this strategic plan is to work with international, national, and regional partners to identify and prioritize key conservation areas, with the goal of maintaining or increasing habitat in support of bird population objectives. The best available data will be used to monitor the extent of coastal wetlands within the Pacific Birds continental geography – including the National Wetlands Inventory<sup>36</sup> (NWI) and NOAA's Coastal Change Analysis Program<sup>37</sup> (C-CAP). C-CAP data are updated every 5-10 years, enabling tracking of coastal change and progress towards habitat objectives in Washington, Oregon, and California. NWI is incomplete in Alaska; we will continue to explore best available sources of coastal mapping data for Alaska and BC.

We will also continue work with partners to refine estimates of Pacific Coastal wetland loss by habitat type, to inform which priority habitats have experienced the steepest losses, and where. Existing modeled projections of sea level rise will inform which habitats are at highest risk of future loss. Assessments of past, present, and future coastal wetlands, in combination with bird population data, will further focus objectives on the most imperiled and/or important habitats for coastal wetland species in the Pacific Birds region. We will coordinate with partners to determine the most useful and effective way to deliver this information (e.g., reports, maps, online tools).

Dusky Canada Goose goslings (*Branta canadensis occidentalis*), Chugach National Forest, Alaska. Elliot Deins/USDA





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Trumpeter Swan (*Cygnus buccinator*). Tom Koerner/USFWS



# Appendix A. Research Needs

Key knowledge gaps and applied research needs that emerged during this planning process are listed, below. While the list is by no means comprehensive, it captures common themes and information needs expressed by coastal conservation practitioners across the northern Pacific Flyway. Some information needs are more relevant to specific habitats or geographies, and we will work with partners to help determine the local or regional relevance of each action.

## Research Needs: Birds & Habitats

R.1	Support research and monitoring of Pacific coastal wetland bird species, guilds, and populations to address knowledge gaps and inform regionwide conservation decision-making and prioritization.
R.2	Invest in research and standardized monitoring of avian response to coastal restoration and enhancement, improving our understanding of fine-scale habitat associations of coastal wetland-associated bird species and guilds to inform restoration design and conservation. This includes increased support for pre-restoration baseline surveys and monitoring data.
R.3	Support, promote, and invest in Indigenous Knowledge and research on: coastal habitats and culturally significant birds, Indigenous stewardship and management practices, and the integration of Indigenous Knowledge and conventional science - with respect for data sovereignty and a commitment to knowledge exchange rather than extraction.
R.4	Improve understanding of the magnitude and type of constraints <i>Spartina</i> -invaded tidal wetlands place on different bird groups (limitations to roosting and foraging for waterfowl or shorebirds). Also, for the purposes of improving the efficacy of restoration and long term <i>Spartina</i> control programs, identify the density or percent cover thresholds at which <i>Spartina</i> -invaded marshes lose productivity and habitat value for birds.
R.5	Improve understanding of the availability and distribution of biofilm (especially high-lipid biofilm) in intertidal areas across the Pacific Coast, and implications for mudflat protection and conservation.
R.6	Establish a monitoring baseline for mudflat health and investigate mudflat habitat quality and shorebird use across Pacific Coast estuaries, to establish current baselines for future comparison.
R.7	Improve understanding of how sedimentation and hydrological processes affect landforms in coastal and estuarine areas (e.g., studies of sites across sediment regimes and/or levels of human impact to look at recovery rates and quality), and how these processes affect tidal habitats and invertebrate food resources. This may include studies of invertebrate regeneration in sediment to understand how long it takes created habitats to become viable for birds; downstream impacts of dams on sediment transfer; and upstream impacts of coastal change on biological communities.



## Research Needs: Climate Change

R.8	Synthesize existing data and research to understand how climate models and predictions impact Tier 1 habitats at state, regional, and international scales to inform adaptive climate change strategies.
R.9	Synthesize existing data and research on landward migration zones and potential for future tidal habitats under sea level rise projections at state, regional, and international scales.
R.10	Synthesize existing data and research to determine how much carbon is stored in tidal wetlands, to better understand their value for mitigating anticipated impacts of climate change and the viability of carbon market funding for tidal wetland conservation.
R.11	Invest in research and pilot projects to improve our understanding of current and future impacts to tidal wetland ecosystems, species, communities, cultural resources, and economies with a particular focus on climate impacts (e.g., sea level rise, increasing storms and drought, ocean warming and acidification), social resilience, social vulnerability, Indigenous rights, and equitable allocation of restoration resources.
R.12	Improve understanding of the distribution of eelgrass meadows and their habitat (since their extent changes within and between years) as well as how climate change will potentially impact available habitat for eelgrass. Collaborate to advance existing spatial tools for projecting potential future eelgrass habitats to inform eelgrass conservation planning and action.

## Research Needs: Spatial Planning and Mapping

R.13	Conduct spatial analysis and prioritization to determine where conservation investments across the Pacific Coast could have the highest conservation impact, based on existing data, plans, values, and tools, with input and feedback from diverse conservation groups, agencies, coastal communities, and interested parties.
R.14	Build upon existing spatial resources to extend maps of current extent of coastal wetlands to include Alaska and British Columbia. Support and fund efforts to complete and improve National Wetlands Inventory mapping in Alaska.
R.15	Improve understanding of the historical extent of tidal wetlands and the loss of tidal wetlands by habitat type, to inform contemporary coastal habitat targets with a focus on recovery of wetland functions. Extend work to include Alaska and British Columbia.
R.16	Synthesize existing spatial resources to map current tidal wetlands and track tidal wetland change at regional scales, including the National Wetlands Inventory (NWI), NOAA Coastal Change Analysis Program (C-CAP) and Pacific Marine and Estuarine Fish Habitat Partnership (PMEP) data.
R.17	Identify areas where oil spills and other sources of pollution would have the most impact on birds and their habitats, improving on existing maps (e.g., NOAA). Identify gaps between planning and field preparedness to handle potential spills, with a focus on priority bird areas. Develop and test potential mitigation measures so they are available after oil and other hazardous substance spills.

## Research Needs: Human Dimensions

R.13	Support studies of social and economic patterns and trends as they relate to nearshore resources, human use of the resources, and effects of resource management actions on individuals, user groups, and communities.
R.14	Evaluate landowner incentive programs that contribute to coastal wetland health and conservation practices directly (emphasis on Tier 1 habitats).
R.15	Support studies of social and economic patterns and trends as they relate to nearshore resources, human use of the resources, and the equity and effects of resource management actions on individuals, user groups, and communities.



## Appendix B. Coastal Wetland Bird Species

**Appendix B1. Coastal wetland bird species** that regularly occur in coastal watersheds of the Pacific Birds continental region, during all or part of their life cycle (193 species). Population estimates (eBird) are not available for all species or seasons (indicated by '-'), particularly for marine birds that are not easily observed; we highlight the need for more information to better understand the status of these species.

Appendix B1 terms and abbreviations (see "Bird Population and Habitat Objectives" for more information):

<b>JV</b>	Joint Venture (Pacific Birds Habitat Joint Venture)
<b>State, Province Codes</b>	Alaska (AK); British Columbia (BC); California (CA); Oregon (OR); Washington (WA)
<b>BCR</b>	Bird Conservation Region <sup>17</sup> (see Appendix C2 for map) <ul style="list-style-type: none"> <li>- BCR (5) Northern Pacific Rainforest (coastal areas of Southcentral and Southeastern AK, BC, WA, OR, and Northern CA)</li> <li>- BCR 1-4: (1) Aleutian/Bering Sea Islands; (2) Western AK; (3) Arctic Plains and Mountains; (4) Northwestern Interior Forest</li> </ul>
<b>Stewardship Status</b>	Seasonal proportion of modeled global population (%Pop) within continental JV, based on eBird relative abundance data <sup>17</sup> <ul style="list-style-type: none"> <li>- Seasons: Winter (non-breeding); Spring (pre-breeding); Breed (breeding); Fall (post-breeding)</li> <li>- Dash "-" indicates no available/sufficient eBird estimate for species and/or season</li> </ul>
<b>Imperiled Status</b>	<ul style="list-style-type: none"> <li>- Federal (US, Canada), State and/or Provincial listing as threatened or endangered species (Fed/State T&amp;E)</li> <li>- U.S. Fish and Wildlife Service Bird of Conservation Concern by BCR (BCC in BCR 1-5)<sup>26</sup></li> <li>- Road to Recovery partnership Tipping Point Species (R2R Tipping Point)<sup>27</sup></li> </ul>
<b>Planning Status</b>	<ul style="list-style-type: none"> <li>- Designation as priority species in national or continental plans for waterfowl<sup>3</sup>, shorebirds<sup>4</sup>, waterbirds<sup>5</sup>, and landbirds<sup>30</sup></li> <li>- Designation as species of conservation need in State or Provincial conservation plans (AK<sup>31</sup>, BC<sup>1</sup>, WA<sup>32</sup>, OR<sup>33</sup>, CA<sup>34</sup>)</li> </ul>
<b>JV Priority Tier + Objective</b>	<p>JV priority tier (1-4) based on combined Stewardship, Imperiled, and Planning Status of each species</p> <ul style="list-style-type: none"> <li>- 1 (very high priority); 2 (high priority); 3 (moderate-high priority); 4 (priority) – see Table B2 for scoring rubric</li> <li>- n/a indicates species not identified as a priority within continental JV region, but may be a conservation priority locally or in other regions. We will support efforts to maintain or recover non-priority species, based on need and opportunity.</li> </ul> <p>Qualitative JV bird population and habitat objective, based on ACAD continental population trend<sup>28</sup></p> <ul style="list-style-type: none"> <li>- MAINTAIN if continental population stable or increasing since 1970</li> <li>- MAINTAIN+ if continental population declined by 0-15% since 1970</li> <li>- INCREASE 50% if continental population declined by 15-50% since 1970</li> <li>- DOUBLE if continental population declined by &gt;50% since 1970</li> </ul>

Common Name <i>Scientific Name</i>  *subspecies or subpopulation of conservation concern  AK, CA: occurs only in Alaska or California within continental JV	Occurrence within continental JV region		Stewardship Status (% of global pop within continental JV)				Imperiled Status			Planning Status		JV Priority Tier 1-4  1=highest + (OBJECTIVE)
	BCR 5 N. Pacific Rainforest (coasts of S.AK, BC, WA, OR, N.CA)	BCR 1-4 Alaska areas (1-Islands, 2-West, 3-Arctic, 4-Interior)	Winter %Pop	Spring %Pop	Breed %Pop	Fall %Pop	T&E Fed or State/Prov	BCC in BCR 1-5	R2R Tipping Point	National or Continental Plan	State or Provincial Plans	
<b>WATERFOWL</b>												
American Wigeon <i>Mareca americana</i>	full annual cycle	breeding, migration	22%	16%	28%	21%				med	BC	3 (MAINTAIN+)
Barrow's Goldeneye <i>Bucephala islandica</i>	full annual cycle	full annual cycle	61%	71%	28%	65%				med	WA, CA	2 (MAINTAIN+)
Black Scoter <i>Melanitta americana</i>	full annual cycle	full annual cycle	41%	31%	-	-			yellow alert	med	AK, BC, WA	1 (DOUBLE)
Blue-winged Teal <i>Spatula discors</i>	full annual cycle	breeding, migration	<1%	<1%	<1%	<1%				med		4 (MAINTAIN)
Brant* <i>Branta bernicla</i>	wintering, migration	full annual cycle	6%	14%	9%	92%				med	AK, BC, WA OR, CA	1 (MAINTAIN)
Bufflehead <i>Bucephala albeola</i>	wintering, migration	full annual cycle	43%	21%	5%	18%				med	BC	3 (MAINTAIN)
Cackling Goose* <i>Branta hutchinsii</i>	wintering, migration	breeding, migration	33%	13%	12%	32%				med	AK, BC	3 (MAINTAIN)
Canada Goose* <i>Branta canadensis</i>	full annual cycle	breeding, migration	2%	1%	1%	<1%	BC listed			high	AK, BC, WA, OR	2 (MAINTAIN)
Canvasback <i>Aythya valisineria</i>	wintering, migration	breeding, migration	2%	2%	<1%	<1%				med		4 (MAINTAIN)
Cinnamon Teal <i>Spatula cyanoptera</i>	full annual cycle	n/a	<1%	<1%	<1%	<1%				high	WA	3 (INCREASE 50%)
Common Eider <sup>AK</sup> <i>Somateria mollissima</i>	n/a	full annual cycle	<1%	4%	1%	6%				med	AK	4 (MAINTAIN+)
Common Goldeneye <i>Bucephala clangula</i>	wintering, migration	full annual cycle	10%	5%	<1%	4%				med		4 (MAINTAIN)
Common Merganser <i>Mergus merganser</i>	full annual cycle	full annual cycle	8%	5%	7%	10%				med		4 (MAINTAIN+)
Emperor Goose <sup>AK</sup> <i>Anser canagicus</i>	n/a	full annual cycle	99%	99%	83%	99%				high	AK	2 (MAINTAIN)



Common Name <i>Scientific Name</i> *subspecies or subpopulation of conservation concern AK, CA: occurs only in Alaska or California within continental JV	Occurrence within continental JV region		Stewardship Status (% of global pop within continental JV)				Imperiled Status			Planning Status		JV Priority Tier 1-4 1=highest + (OBJECTIVE)
	BCR 5 N. Pacific Rainforest (coasts of S.AK, BC, WA, OR, N.CA)	BCR 1-4 Alaska areas (1-Islands, 2-West, 3-Arctic, 4-Interior)	Winter %Pop	Spring %Pop	Breed %Pop	Fall %Pop	T&E Fed or State/Prov	BCC in BCR 1-5	R2R Tipping Point	National or Continental Plan	State or Provincial Plans	
Gadwall <i>Mareca strepera</i>	full annual cycle	wintering, migration	<1%	<1%	<1%	<1%				med		4 (MAINTAIN)
Greater Scaup <i>Aythya marila</i>	wintering, migration	full annual cycle	27%	17%	27%	18%				med	BC	3 (MAINTAIN)
Greater White-fronted Goose* <i>Anser albifrons</i>	wintering, migration	breeding, migration	<1%	2%	28%	2%				high	AK, OR, CA	2 (MAINTAIN)
Green-winged Teal <i>Anas crecca</i>	wintering, migration	breeding, migration	<1%	2%	7%	<1%				med		4 (MAINTAIN)
Harlequin Duck <i>Histrionicus histrionicus</i>	full annual cycle	full annual cycle	65%	84%	23%	56%				low	BC, WA, OR, CA	1 (MAINTAIN)
Hooded Merganser <i>Lophodytes cucullatus</i>	full annual cycle	n/a	7%	3%	<1%	3%				low	BC	4 (MAINTAIN)
King Eider (AK) <i>Somateria spectabilis</i>	n/a	full annual cycle	<1%	58%	3%	6%			orange alert	high	AK	1 (DOUBLE)
Lesser Scaup <i>Aythya affinis</i>	wintering, migration	breeding, migration	3%	3%	6%	1%				high	AK, BC	3 (MAINTAIN)
Long-tailed Duck <i>Clangula hyemalis</i>	wintering, migration	breeding, migration	32%	13%	11%	12%			orange alert	high	AK, BC, WA	1 (DOUBLE)
Mallard <i>Anas platyrhynchos</i>	full annual cycle	full annual cycle	2%	3%	1%	2%				high	BC	3 (MAINTAIN)
Northern Pintail <i>Anas acuta</i>	wintering, migration	breeding, migration	2%	12%	16%	6%			yellow alert	high	BC	2 (DOUBLE)
Northern Shoveler <i>Spatula clypeata</i>	wintering, migration	breeding, migration	<1%	<1%	6%	<1%				low		4 (MAINTAIN)
Red-breasted Merganser <i>Mergus serrator</i>	full annual cycle	full annual cycle	15%	15%	7%	12%				med		3 (MAINTAIN)
Redhead <i>Aythya americana</i>	wintering, migration	breeding, migration	<1%	<1%	<1%	<1%				low	CA	4 (MAINTAIN)
Ring-necked Duck <i>Aythya collaris</i>	full annual cycle	breeding, migration	6%	5%	5%	5%				low		4 (MAINTAIN)
Ross's Goose <i>Anser rossii</i>	wintering, migration	n/a	<1%	<1%	0%	<1%				high		3 (MAINTAIN)

Common Name <i>Scientific Name</i> *subspecies or subpopulation of conservation concern AK, CA: occurs only in Alaska or California within continental JV	Occurrence within continental JV region		Stewardship Status (% of global pop within continental JV)				Imperiled Status			Planning Status		JV Priority Tier 1-4 1=highest + (OBJECTIVE)
	BCR 5 N. Pacific Rainforest (coasts of S.AK, BC, WA, OR, N.CA)	BCR 1-4 Alaska areas (1-Islands, 2-West, 3-Arctic, 4-Interior)	Winter %Pop	Spring %Pop	Breed %Pop	Fall %Pop	T&E Fed or State/Prov	BCC in BCR 1-5	R2R Tipping Point	National or Continental Plan	State or Provincial Plans	
Ruddy Duck <i>Oxyura jamaicensis</i>	wintering, migration	n/a	3%	1%	<1%	<1%				low		4 (MAINTAIN)
Snow Goose <i>Anser caerulescens</i>	wintering, migration	breeding, migration	<1%	<1%	<1%	<1%				med	BC	4 (MAINTAIN)
Spectacled Eider <sup>AK</sup> <i>Somateria fischeri</i>	n/a	breeding, migration	-	-	-	-	US listed		red alert	high	AK	1 (DOUBLE)
Steller's Eider <sup>*AK</sup> <i>Polysticta stelleri</i>	n/a	full annual cycle	-	-	-	-	US listed		red alert	high	AK	1 (DOUBLE)
Surf Scoter <i>Melanitta perspicillata</i>	full annual cycle	full annual cycle	40%	77%	66%	78%				med	BC, WA	2 (MAINTAIN)
Trumpeter Swan <i>Cygnus buccinator</i>	full annual cycle	breeding, migration	19%	17%	27%	31%				high	AK, BC, OR	2 (MAINTAIN)
Tundra Swan <i>Cygnus columbianus</i>	wintering	breeding, migration	2%	10%	29%	5%						3 (MAINTAIN)
White-winged Scoter <i>Melanitta deglandi</i>	wintering, migration	breeding, migration	-	51%	33%	67%				med	AK, BC, WA	1 (MAINTAIN+)
Wood Duck <i>Aix sponsa</i>	full annual cycle	n/a	<1%	<1%	<1%	<1%				low	BC	4 (MAINTAIN)
<b>SHOREBIRDS</b>												
American Avocet <sup>CA</sup> <i>Recurvirostra americana</i>	wintering, migration	n/a	<1%	11%	11%	10%				med		3 (MAINTAIN)
American Golden-Plover <sup>AK</sup> <i>Pluvialis dominica</i>	migration	breeding, migration	0%	10%	27%	14%		2,3,4	orange alert	high	AK	2 (DOUBLE)
Baird's Sandpiper <sup>AK</sup> <i>Calidris bairdii</i>	n/a	breeding, migration	0%	<1%	<1%	<1%				low		4 (MAINTAIN+)
Bar-tailed Godwit <sup>AK</sup> <i>Limosa lapponica</i>	n/a	breeding, migration	0%	2%	8%	<1%	WA listed	2,3	yellow alert	high	AK	2 (DOUBLE)
Black-necked Stilt <i>Himantopus mexicanus</i>	breeding, migration	n/a	0%	<1%	<1%	<1%	BC listed			low	OR	3 (MAINTAIN)
Black Oystercatcher <i>Haematopus bachmani</i>	full annual cycle	full annual cycle	97% resident							high	AK, OR, CA	1 (MAINTAIN)



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	BCR 5 N. Pacific Rainforest (coasts of S.AK, BC, WA, OR, N.CA)	BCR 1-4 Alaska areas (1-Islands, 2-West, 3-Arctic, 4-Interior)	Winter %Pop	Spring %Pop	Breed %Pop	Fall %Pop	T&E Fed or State/Prov	BCC in BCR 1-5	R2R Tipping Point	National or Continental Plan	State or Provincial Plans	
Black Turnstone <i>Arenaria melanocephala</i>	wintering, migration	breeding, migration	97%	98%	99%	98%		2		high	AK, CA	2 (MAINTAIN+)
Black-bellied Plover <i>Pluvialis squatarola</i>	wintering, migration	breeding, migration	1%	3%	12%	2%			orange alert	med	AK	2 (DOUBLE)
Bristle-thighed Curlew <sup>AK</sup> <i>Numenius tahitiensis</i>	n/a	breeding, migration	-	93%	92%	-		2,4	red alert	high	AK	1 (MAINTAIN+)
Buff-breasted Sandpiper <sup>AK</sup> <i>Calidris subruficollis</i>	n/a	breeding, migration	0%	8%	5%	<1%	Canada listed	3	orange alert	high	AK	2 (DOUBLE)
Common Ringed Plover <sup>AK</sup> <i>Charadrius hiaticula</i>	n/a	breeding, migration	0%	<1%	<1%	<1%						n/a (MAINTAIN+)
Dunlin <i>Calidris alpina</i>	wintering, migration	breeding, migration	9%	6%	24%	4%		2,3		med	AK	3 (DOUBLE)
Greater Yellowlegs <i>Tringa melanoleuca</i>	full annual cycle	breeding, migration	<1%	5%	6%	4%			orange alert	med		2 (DOUBLE)
Hudsonian Godwit <sup>AK</sup> <i>Limosa haemastica</i>	n/a	breeding, migration	0%	2%	20%	<1%	BC listed	2,4	red alert	high	AK	2 (DOUBLE)
Killdeer <i>Charadrius vociferus</i>	full annual cycle	n/a	1%	<1%	<1%	<1%				med	AK	4 (INCREASE 50%)
Least Sandpiper <i>Calidris minutilla</i>	wintering, migration	breeding, migration	1%	9%	11%	4%				very high		2 (INCREASE 50%)
Lesser Yellowlegs <i>Tringa flavipes</i>	migration	breeding, migration	<1%	6%	18%	3%		4,5	orange alert	med	AK, BC	2 (DOUBLE)
Long-billed Curlew <i>Numenius americanus</i>	wintering, migration	n/a	<1%	<1%	<1%	<1%				very high	OR	2 (MAINTAIN)
Long-billed Dowitcher <i>Limnodromus scolopaceus</i>	wintering, migration	breeding, migration	<1%	15%	91%	4%			orange alert	low	AK	1 (DOUBLE)
Marbled Godwit <i>Limosa fedoa</i>	wintering, migration	breeding, migration	1%	2%	<1%	1%		2,5		high	AK, WA	3 (INCREASE 50%)
Pacific Golden-Plover <i>Pluvialis fulva</i>	wintering, migration	breeding, migration	<1%	2%	9%	<1%				high	AK	3 (MAINTAIN)
Pectoral Sandpiper <sup>AK</sup> <i>Calidris melanotos</i>	n/a	breeding, migration	0%	19%	52%	5%		3	orange alert	low	AK	1 (DOUBLE)

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Red Knot* <i>Calidris canutus</i>	migration	breeding, migration	<1%	5%	10%	<1%	Canada listed	2,3,5	orange alert	high	AK, BC, WA, CA	1 (DOUBLE)
Red Phalarope <sup>AK</sup> <i>Phalaropus fulicarius</i>	n/a	breeding, migration	-	-	-	-				med	AK	3 (INCREASE 50%)
Red-necked Phalarope <i>Phalaropus lobatus</i>	breeding, migration	breeding, migration	-	1%	14%	5%				med	BC	3 (INCREASE 50%)
Rock Sandpiper* <i>Calidris ptilocnemis</i>	migration	full annual cycle	-	100%	99%	100%		1,2,4,5	yellow alert	med	AK, WA, OR	1 (INCREASE 50%)
Ruddy Turnstone <i>Arenaria interpres</i>	migration	breeding, migration	<1%	<1%	1%	2%			orange alert	high	CA	2 (DOUBLE)
Sanderling <i>Calidris alba</i>	wintering, migration	migration	3%	3%	<1%	3%			orange alert	high	AK, CA	2 (DOUBLE)
Semipalmated Plover <i>Charadrius semipalmatus</i>	wintering, migration	breeding, migration	<1%	11%	14%	4%				low		4 (INCREASE 50%)
Semipalmated Sandpiper <i>Calidris pusilla</i>	migration	breeding, migration	0%	8%	16%	1%			orange alert	med	AK	2 (DOUBLE)
Short-billed Dowitcher <i>Limnodromus griseus</i>	wintering, migration	breeding, migration	<1%	20%	<1%	<1%	BC listed	2,4,5	orange alert	high	AK, BC	2 (DOUBLE)
Snowy Plover* <i>Charadrius nivosus</i>	full annual cycle	n/a	3%	1%	<1%	2%	US listed		yellow alert	high	WA, OR, CA	1 (MAINTAIN+)
Solitary Sandpiper <sup>AK</sup> <i>Tringa solitaria</i>	n/a	breeding, migration	0%	3%	13%	2%				high	AK	3 (MAINTAIN)
Spotted Sandpiper <i>Actitis macularius</i>	full annual cycle	breeding, migration	<1%	8%	9%	8%				low	AK	4 (DOUBLE)
Stilt Sandpiper <sup>AK</sup> <i>Calidris himantopus</i>	n/a	breeding, migration	0%	<1%	13%	1%			orange alert	med		2 (DOUBLE)
Surfbird <i>Calidris virgata</i>	wintering, migration	breeding, migration	88%	79%	42%	87%				high	AK, CA	2 (INCREASE 50%)
Upland Sandpiper <sup>AK</sup> <i>Bartramia longicauda</i>	n/a	breeding, migration	0%	<1%	<1%	<1%	BC, WA listed			high	AK, WA, OR	1 (MAINTAIN)
Wandering Tattler <i>Tringa incana</i>	breeding, migration	breeding, migration	<1%	74%	72%	63%		2,3,4	yellow alert	med	AK, BC, CA	1 (MAINTAIN+)



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Western Sandpiper <i>Calidris mauri</i>	wintering, migration	breeding, migration	<1%	57%	63%	13%				high	AK	2 (INCREASE 50%)
Whimbrel <i>Numenius phaeopus</i>	migration	breeding, migration	<1%	9%	12%	2%	BC listed		orange alert	high	AK	2 (DOUBLE)
White-rumped Sandpiper <sup>AK</sup> <i>Calidris fuscicollis</i>	n/a	breeding, migration	0%	<1%	-	<1%			orange alert	low		2 (INCREASE 50%)
Willet <i>Tringa semipalmata</i>	wintering, migration	n/a	<1%	<1%	<1%	<1%		5		med		4 (INCREASE 50%)
Wilson's Phalarope <i>Phalaropus tricolor</i>	breeding, migration	n/a	0%	<1%	<1%	<1%				high		3 (MAINTAIN+)
Wilson's Snipe <i>Gallinago delicata</i>	full annual cycle	breeding, migration	2%	29%	17%	7%				med		3 (MAINTAIN)
<b>WATERBIRDS</b>												
Aleutian Tern <sup>AK</sup> <i>Onychoprion aleuticus</i>	n/a	breeding, migration	0%	2%	31%	<1%		1,2,4,5		high	AK	2 (MAINTAIN)
American Bittern <i>Botaurus lentiginosus</i>	full annual cycle	n/a	<1%	<1%	<1%	<1%						n/a (INCREASE 50%)
American Coot <i>Fulica americana</i>	full annual cycle	n/a	2%	<1%	<1%	1%						n/a (INCREASE 50%)
American White Pelican <i>Pelecanus erythrorhynchos</i>	full annual cycle	n/a	<1%	<1%	<1%	<1%	BC, WA listed			med	WA, OR, CA	1 (MAINTAIN)
Ancient Murrelet <i>Synthliboramphus antiquus</i>	wintering, migration	full annual cycle	-	-	-	-		1,5		high	AK, BC	2 (MAINTAIN+)
Arctic Loon (AK) <i>Gavia arctica</i>	n/a	breeding, migration	0%	<1%	<1%	<1%					AK	4 (MAINTAIN+)
Arctic Tern <i>Sterna paradisaea</i>	breeding, migration	breeding, migration	-	11%	7%	1%				high	AK	3 (INCREASE 50%)
Black Guillemot <sup>AK</sup> <i>Cephus grylle</i>	n/a	full annual cycle	-	-	-	-					AK	4 (MAINTAIN)
Black Tern <i>Chlidonias niger</i>	breeding, migration	n/a	0%	<1%	<1%	<1%				med	CA	4 (DOUBLE)

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Black-crowned Night Heron <i>Nycticorax nycticorax</i>	full annual cycle	n/a	<1%	<1%	<1%	<1%	BC listed			med		3 (MAINTAIN+)
Black-legged Kittiwake <sup>AK</sup> <i>Rissa tridactyla</i>	n/a	full annual cycle	-	-	-	-	BC listed				AK	2 (DOUBLE)
Bonaparte's Gull <i>Chroicocephalus philadelphia</i>	breeding, migration	full annual cycle	3%	20%	7%	29%				med		3 (MAINTAIN+)
Brandt's Cormorant <i>Urile penicillatus</i>	full annual cycle	n/a	9% resident				BC listed	5		high	CA	2 (MAINTAIN)
Brown Pelican* <i>Pelecanus occidentalis</i>	full annual cycle	n/a	<1%	<1%	<1%	3%	OR listed			med	WA, OR, CA	2 (MAINTAIN)
California Gull <i>Larus californicus</i>	full annual cycle	n/a	2%	4%	3%	27%	BC listed	5		med	BC	2 (INCREASE 50%)
Caspian Tern <i>Hydroprogne caspia</i>	breeding, migration	n/a	<1%	7%	8%	4%				low	OR	4 (MAINTAIN)
Cassin's Auklet <i>Ptychoramphus aleuticus</i>	full annual cycle	full annual cycle	-	-	-	-	BC listed	5		med	AK, BC, CA	1 (INCREASE 50%)
Clark's Grebe <i>Aechmophorus clarkii</i>	full annual cycle	n/a	2%	2%	2%	4%	BC listed	5	orange alert	low	AK, BC, WA	1 (MAINTAIN)
Common Loon <i>Gavia immer</i>	full annual cycle	full annual cycle	-	8%	4%	8%	WA listed				AK, WA, CA	2 (MAINTAIN)
Common Murre <i>Uria aalge</i>	full annual cycle	full annual cycle	-	-	-	-	BC listed			med	AK, BC, CA	1 (MAINTAIN)
Common Tern <i>Sterna hirundo</i>	breeding, migration	n/a	0%	<1%	<1%	<1%				low		4 (MAINTAIN+)
Crested Auklet <sup>AK</sup> <i>Aethia cristatella</i>	n/a	full annual cycle	-	-	-	-				med	AK	4 (MAINTAIN+)
Double-crested Cormorant <i>Nannopterum auritum</i>	full annual cycle	full annual cycle	2%	2%	2%	2%						n/a (MAINTAIN)
Eared Grebe <i>Podiceps nigricollis</i>	wintering, migration	n/a	<1%	<1%	<1%	<1%				med		4 (MAINTAIN)
Elegant Tern <i>Thalasseus elegans</i>	postbreeding	n/a	0%	0%	0%	<1%				med	CA	4 (MAINTAIN+)



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Forster's Tern <i>Sterna forsteri</i>	wintering, migration	n/a	<1%	<1%	<1%	<1%	BC listed			med		3 (INCREASE 50%)
Franklin's Gull <i>Sterna forsteri</i>	breeding, migration	n/a	0%	<1%	<1%	<1%				med	OR	4 (MAINTAIN)
Glaucous Gull <i>Larus hyperboreus</i>	wintering, migration	full annual cycle	<1%	26%	13%	43%			orange alert		AK	2 (DOUBLE)
Glaucous-winged Gull <i>Larus glaucescens</i>	full annual cycle	full annual cycle	99%	99%	95%	96%				low	AK	2 (INCREASE 50%)
Great Blue Heron <i>Ardea herodias</i>	full annual cycle	n/a	3%	2%	2%	3%					BC	4 (MAINTAIN)
Great Egret <i>Ardea alba</i>	full annual cycle	n/a	<1%	<1%	<1%	<1%						n/a (MAINTAIN)
Green Heron <i>Butorides virescens</i>	breeding, migration	n/a	<1%	<1%	<1%	<1%				low		4 (DOUBLE)
Heermann's Gull <i>Larus heermanni</i>	wintering, migration	n/a	27%	1%	<1%	29%				med		3 (MAINTAIN+)
Herring Gull <i>Larus argentatus</i>	full annual cycle	full annual cycle	<1%	3%	5%	4%				low	AK	4 (DOUBLE)
Horned Grebe <i>Podiceps auritus</i>	wintering, migration	full annual cycle	63%	21%	5%	46%			yellow alert		BC	1 (DOUBLE)
Horned Puffin <sup>AK</sup> <i>Fratercula corniculata</i>	full annual cycle	full annual cycle	-	-	-	-	BC listed			med	AK	2 (MAINTAIN+)
Iceland Gull <i>Larus glaucoides</i>	wintering, migration	migration	6%	4%	<1%	2%				low		4 (MAINTAIN+)
Kittlitz's Murrelet <sup>AK</sup> <i>Brachyramphus brevirostris</i>	full annual cycle	full annual cycle	-	-	-	-	US candidate	1,2,3,5	red alert	high	AK	1 (INCREASE 50%)
Least Auklet <sup>AK</sup> <i>Pagophila eburnea</i>	n/a	full annual cycle	-	-	-	-				med	AK	3 (MAINTAIN+)
Long-tailed Jaeger <sup>AK</sup> <i>Stercorarius longicaudus</i>	n/a	breeding	-	-	5%	-				low	AK	4 (MAINTAIN+)
Ivory Gull <sup>AK</sup> <i>Pagophila eburnea</i>	n/a	migration	-	<1%	<1%	62%	Canada listed		yellow alert	med		1 (INCREASE 50%)

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Marbled Murrelet <i>Brachyramphus marmoratus</i>	full annual cycle	full annual cycle	99% resident				US, Canada	1,2,4,5	yellow alert	high	AK, BC, WA, OR, CA	1 (DOUBLE)
Pacific Loon <i>Gavia pacifica</i>	wintering, migration	breeding, migration	85%	44%	22%	42%						2 (MAINTAIN)
Parakeet Auklet <sup>AK</sup> <i>Aethia psittacula</i>	breeding	full annual cycle	-	-	-	-			low	AK		4 (MAINTAIN+)
Parasitic Jaeger <sup>AK</sup> <i>Stercorarius parasiticus</i>	n/a	breeding, migration	<1%	15%	12%	7%	BC listed		low			3 (MAINTAIN+)
Pelagic Cormorant <i>Urile pelagicus</i>	full annual cycle	full annual cycle	53% resident							high	AK, BC, CA	1 (DOUBLE)
Pied-billed Grebe <i>Podilymbus podiceps</i>	full annual cycle	n/a	2%	1%	<1%	1%						n/a (MAINTAIN)
Pigeon Guillemot <i>Cephus columba</i>	full annual cycle	full annual cycle	72%	88%	90%	100%			med	AK, CA		2 (MAINTAIN)
Pomarine Jaeger <sup>AK</sup> <i>Stercorarius pomarinus</i>	n/a	full annual cycle	-	48%	40%	10%			low	AK		3 (MAINTAIN+)
Red-faced Cormorant <sup>AK</sup> <i>Urile urile</i>	n/a	full annual cycle	25% resident					1,2,5	red alert	high	AK	2 (DOUBLE)
Red-legged Kittiwake <sup>AK</sup> <i>Rissa brevirostris</i>	n/a	breeding, migration	-	-	-	-		1	high	AK		2 (INCREASE 50%)
Red-necked Grebe <i>Podiceps grisegena</i>	full annual cycle	full annual cycle	86%	18%	2%	25%					WA, OR	2 (MAINTAIN)
Ring-billed Gull <i>Larus delawarensis</i>	full annual cycle	n/a	<1%	<1%	<1%	<1%						n/a (MAINTAIN)
Ross's Gull <i>Rhodostethia rosea</i>	n/a	wintering, migration	-	-	-	89%	Canada listed		orange alert	high		1 (MAINTAIN+)
Sabine's Gull <i>Xema sabini</i>	breeding, migration	n/a	-	15%	5%	7%			low	AK		4 (MAINTAIN)
Sandhill Crane* <i>Antigone canadensis</i>	breeding, migration	breeding, migration	<1%	8%	10%	8%	WA, CA listed				AK, WA, OR, CA	1 (MAINTAIN)
Short-billed Gull <i>Larus brachyrhynchus</i>	full annual cycle	full annual cycle	99%	51%	71%	97%			orange alert		AK	1 (DOUBLE)



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Red-throated Loon <i>Gavia stellata</i>	full annual cycle	full annual cycle	12%	12%	6%	3%					AK	4 (MAINTAIN)
Rhinoceros Auklet <i>Cerorhinca monocerata</i>	full annual cycle	breeding, migration	-	-	-	-				low	BC, CA	3 (MAINTAIN+)
Slaty-backed Gull <sup>AK</sup> <i>Larus schistisagus</i>	n/a	full annual cycle	<1%	<1%	-	-						n/a (MAINTAIN+)
Snowy Egret <i>Egretta thula</i>	full annual cycle	n/a	<1%	<1%	<1%	<1%				high	OR, CA	3 (MAINTAIN)
Sora <i>Porzana carolina</i>	full annual cycle	n/a	<1%	<1%	<1%	<1%						n/a (MAINTAIN)
Thick-billed Murre <i>Uria lomvia</i>	wintering, migration	full annual cycle	-	-	-	-	BC listed			med	AK	2 (MAINTAIN)
Tufted Puffin <i>Fratercula cirrhata</i>	full annual cycle	full annual cycle	-	-	-	-	WA listed	5		low	AK, WA, OR, CA	1 (MAINTAIN)
Virginia Rail <i>Rallus limicola</i>	full annual cycle	n/a	15%	9%	2%	14%						4 (MAINTAIN)
Western Grebe <i>Aechmophorus occidentalis</i>	full annual cycle	n/a	50%	40%	3%	35%	BC listed	5		med	BC, WA	2 (INCREASE 50%)
Western Gull <i>Larus occidentalis</i>	full annual cycle	n/a	14% resident					5	orange alert	low	BC	2 (DOUBLE)
Whiskered Auklet <sup>AK</sup> <i>Larus occidentalis</i>	n/a	full annual cycle	-	-	-	-		1		med	AK	3 (MAINTAIN+)
White-faced Ibis <i>Plegadis chihi</i>	breeding, migration	n/a	0%	<1%	<1%	<1%				low		4 (MAINTAIN)
Yellow-billed Loon <i>Gavia adamsii</i>	wintering, migration	full annual cycle	93%	4%	12%	14%		1,2,3	red alert		AK	1 (DOUBLE)
<b>WETLAND-ASSOCIATED LANDBIRDS</b>												
Alder Flycatcher <sup>AK</sup> <i>Empidonax alnorum</i>	n/a	breeding, migration	0%	11%	11%	10%					AK	4 (MAINTAIN+)
American Dipper <i>Cinclus mexicanus</i>	full annual cycle	full annual cycle	47% resident									3 (MAINTAIN+)

Common Name <i>Scientific Name</i> *subspecies or subpopulation of conservation concern AK, CA: occurs only in Alaska or California within continental JV	Occurrence within continental JV region		Stewardship Status (% of global pop within continental JV)				Imperiled Status			Planning Status		JV Priority Tier 1-4 1=highest + (OBJECTIVE)
	BCR 5 N. Pacific Rainforest (coasts of S.AK, BC, WA, OR, N.CA)	BCR 1-4 Alaska areas (1-Islands, 2-West, 3-Arctic, 4-Interior)	Winter %Pop	Spring %Pop	Breed %Pop	Fall %Pop	T&E Fed or State/Prov	BCC in BCR 1-5	R2R Tipping Point	National or Continental Plan	State or Provincial Plans	
American Pipit <i>Anthus rubescens</i>	full annual cycle	breeding, migration	1%	20%	25%	9%					AK	4 (MAINTAIN+)
Ash-throated Flycatcher <i>Myiarchus cinerascens</i>	breeding, migration	n/a	0%	<1%	<1%	<1%						n/a (MAINTAIN)
Bald Eagle <i>Haliaeetus leucocephalus</i>	full annual cycle	full annual cycle	44%	39%	44%	31%	CA listed				AK, WA, CA	2 (MAINTAIN)
Bank Swallow <i>Riparia riparia</i>	breeding, migration	breeding, migration	0%	<1%	3%	<1%	Canada listed				AK, CA	2 (DOUBLE)
Barn Swallow <i>Hirundo rustica</i>	breeding, migration	n/a	<1%	<1%	<1%	<1%	Canada listed				AK	2 (INCREASE 50%)
Belted Kingfisher <i>Megaceryle alcyon</i>	full annual cycle	full annual cycle	6%	5%	6%	7%					AK, BC	4 (INCREASE 50%)
Black Phoebe <i>Sayornis nigricans</i>	full annual cycle	n/a	3%	-	2%	-						n/a (MAINTAIN)
Black Swift <i>Cypseloides niger</i>	breeding, migration	n/a	-	25%	46%	50%	Canada listed	5	orange alert	high, yellow (D)	AK, BC, OR, CA	1 (DOUBLE)
Cliff Swallow <i>Petrochelidon pyrrhonota</i>	breeding, migration	n/a	0%	2%	2%	2%						n/a (MAINTAIN)
Common Nighthawk <i>Chordeiles minor</i>	breeding, migration	n/a	0%	2%	3%	1%						n/a (DOUBLE)
Horned Lark* <i>Eremophila alpestris</i>	full annual cycle	breeding, migration	<1%	<1%	<1%	<1%	US listed				AK, WA, OR	1 (DOUBLE)
Marsh Wren <i>Cistothorus palustris</i>	full annual cycle	n/a	7%	5%	1%	2%					CA	4 (MAINTAIN)
McKay's Bunting <sup>AK</sup> <i>Plectrophenax hyperboreus</i>	n/a	full annual cycle	100%	100%	100%	100%		1		high, yellow (R)	AK	2 (MAINTAIN+)
Merlin <i>Falco columbarius</i>	full annual cycle	breeding, migration	2%	10%	13%	12%						4 (MAINTAIN)
Common Yellowthroat <i>Geothlypis trichas</i>	breeding, migration	n/a	<1%	2%	1%	1%					AK, CA	4 (INCREASE 50%)
Eastern Kingbird <i>Tyrannus tyrannus</i>	breeding, migration	n/a	0%	<1%	<1%	<1%						n/a (INCREASE 50%)

Common Name <i>Scientific Name</i> *subspecies or subpopulation of conservation concern AK, CA: occurs only in Alaska or California within continental JV	Occurrence within continental JV region		Stewardship Status (% of global pop within continental JV)				Imperiled Status			Planning Status		JV Priority Tier 1-4 1=highest + (OBJECTIVE)
	BCR 5 N. Pacific Rainforest (coasts of S.AK, BC, WA, OR, N.CA)	BCR 1-4 Alaska areas (1-Islands, 2-West, 3-Arctic, 4-Interior)	Winter %Pop	Spring %Pop	Breed %Pop	Fall %Pop	T&E Fed or State/Prov	BCC in BCR 1-5	R2R Tipping Point	National or Continental Plan	State or Provincial Plans	
Eastern Yellow Wagtail <sup>AK</sup> <i>Motacilla tschutschensis</i>	n/a	breeding, migration	0%	<1%	2%	<1%						n/a (MAINTAIN+)
Northern Harrier <i>Circus hudsonius</i>	full annual cycle	breeding, migration	<1%	15%	15%	12%					CA	4 (INCREASE 50%)
Northern Rough-winged Swallow <i>Stelgidopteryx serripennis</i>	breeding, migration	n/a	0%	<1%	<1%	<1%						n/a (MAINTAIN+)
Northern Waterthrush <sup>AK</sup> <i>Parkesia noveboracensis</i>	n/a	breeding, migration	0%	14%	10%	10%						4 (MAINTAIN)
Olive-sided Flycatcher <i>Contopus cooperi</i>	breeding, migration	breeding, migration	0%	22%	22%	13%	Canada listed	2,4,5	yellow alert	high, yellow (D)	AK, OR, CA	1 (DOUBLE)
Osprey <i>Pandion haliaetus</i>	breeding, migration	breeding, migration	<1%	2%	6%	3%						n/a (MAINTAIN)
Peregrine Falcon <i>Falco peregrinus</i>	full annual cycle	full annual cycle	<1%	1%	4%	2%	BC listed				AK, WA, OR	2 (MAINTAIN)
Purple Martin <i>Progne subis</i>	breeding, migration	n/a	0%	<1%	<1%	<1%					WA, OR, CA	3 (MAINTAIN+)
Red-winged Blackbird <i>Agelaius phoeniceus</i>	breeding, migration	full annual cycle	<1%	<1%	<1%	<1%					AK	4 (INCREASE 50%)
Rusty Blackbird <sup>AK</sup> <i>Euphagus carolinus</i>	breeding, migration	breeding, migration	<1%	6%	8%	6%					AK, BC	4 (DOUBLE)
Snow Bunting <i>Plectrophenax nivalis</i>	wintering, migration	full annual cycle	2%	6%	3%	<1%					AK	4 (DOUBLE)
Snowy Owl <sup>AK</sup> <i>Bubo scandiacus</i>	n/a	breeding, migration	<1%	9%	15%	7%		1,2,3		high, yellow (D)	AK	2 (MAINTAIN+)
Swamp Sparrow <i>Melospiza georgiana</i>	wintering, migration	n/a	<1%	<1%	0%	<1%						n/a (MAINTAIN)
Tree Swallow <i>Tachycineta bicolor</i>	breeding, migration	breeding, migration	<1%	8%	12%	<1%					AK	4 (INCREASE 50%)
Tricolored Blackbird <sup>CA</sup> <i>Agelaius tricolor</i>	full annual cycle	n/a	<1% resident				CA listed		red alert	very high, red	CA	1 (INCREASE 50%)
Violet-green Swallow <i>Tachycineta thalassina</i>	breeding, migration	breeding, migration	0%	14%	15%	18%						4 (INCREASE 50%)



Common Name <i>Scientific Name</i> *subspecies or subpopulation of conservation concern AK, CA: occurs only in Alaska or California within continental JV	Occurrence within continental JV region		Stewardship Status (% of global pop within continental JV)				Imperiled Status			Planning Status		JV Priority Tier 1-4 1=highest + (OBJECTIVE)
	BCR 5 N. Pacific Rainforest (coasts of S.AK, BC, WA, OR, N.CA)	BCR 1-4 Alaska areas (1-Islands, 2-West, 3-Arctic, 4-Interior)	Winter %Pop	Spring %Pop	Breed %Pop	Fall %Pop	T&E Fed or State/Prov	BCC in BCR 1-5	R2R Tipping Point	National or Continental Plan	State or Provincial Plans	
Warbling Vireo <i>Vireo gilvus</i>	breeding, migration	n/a	0%	10%	9%	4%						n/a (MAINTAIN)
Western Flycatcher <i>Empidonax difficilis</i>	breeding, migration	n/a	0%	33%	43%	14%					AK	3 (MAINTAIN)
White Wagtail <sup>AK</sup> <i>Motacilla alba</i>	n/a	breeding, migration	<1%	<1%	<1%	<1%						n/a (MAINTAIN+)
Willow Flycatcher <i>Empidonax traillii</i>	breeding, migration	n/a	0%	9%	17%	8%	CA listed				OR, CA	3 (INCREASE 50%)
Yellow-headed Blackbird <i>Xanthocephalus xanthocephalus</i>	full annual cycle	n/a	<1%	<1%	<1%	<1%					CA	4 (MAINTAIN)

**Appendix B2. Rubric to determine JV Priority Species and Tiers**, based on criteria in 3 categories: Stewardship Status, Imperiled Status, and Planning Status.

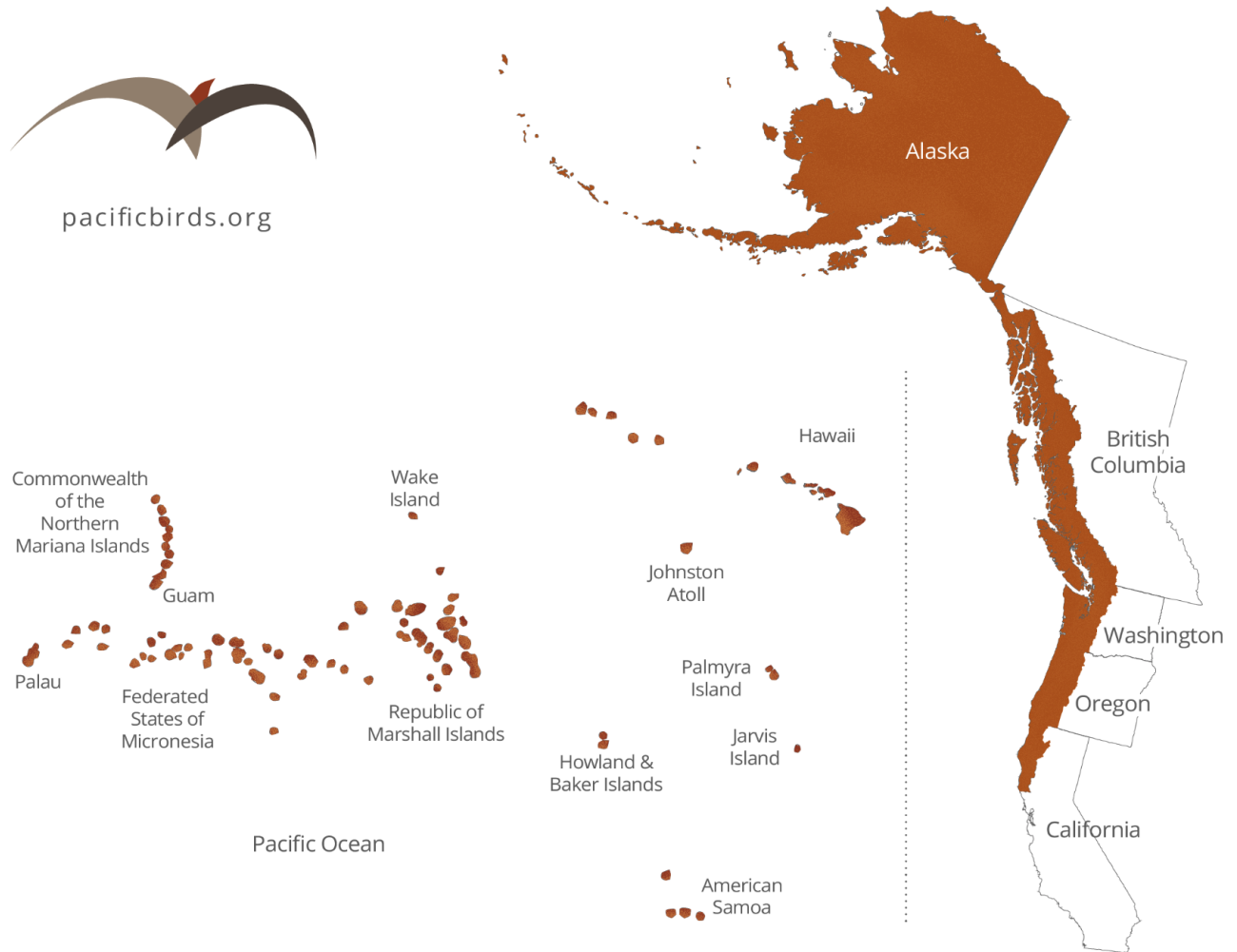
Stewardship Status* (%Pop)	Imperiled Status (T&E, BCC, R2R)	Planning Status (National/Continental Plans, State/BC Plans)	Rubric	JV Priority Tier
>50-100% any season	- T&E federal or in ≥2 States/BC - Tipping Point Species (R2R) - BCC in ≥4 BCRs	- Very high priority, nat'l/cont'l plan - Priority species in ≥3 state/BC plans	Meets ≥1 criteria in ≥2 status columns (only 1 column → Tier 2)	1 (very high priority)
>25-50% any season	- T&E in 1 State/BC - BCC in 3 BCRs	- High priority, nat'l/cont'l plan	Meets ≥1 criteria in ≥2 status columns (only 1 column → Tier 3)	2 (high priority)
>10-25% any season	- BCC in 2 BCRs	- Medium priority, nat'l/cont'l plan - Priority species in 2 state/BC plans	Meets ≥1 criteria in ≥2 status columns (only 1 column → Tier 4)	3 (medium priority)
1-10% any season	- BCC in 1 BCR	- Low priority, nat'l/cont'l plan - Priority species in 1 state/BC plan	Meets ≥1 criteria in ≥2 status columns (only 1 column → non-priority)	4 (priority)
<1% all seasons	- None	- None	Any 2 status columns	n/a (non-priority)

\* For species with no available eBird %Pop estimates, only required ≥1 criteria in ≥1 status columns to meet rubric for each tier

- %Pop: Seasonal proportion of modeled global population within continental JV area, based on eBird relative abundance data<sup>17</sup>
- T&E: Listed as a threatened or endangered species, federally (US<sup>19</sup>, Canada<sup>20</sup>) or at the state or provincial level (AK, WA, OR, CA, BC)<sup>21-25</sup>
- BCC: "Bird of Conservation Concern" identified by U.S. Fish & Wildlife Service<sup>26</sup>, within Bird Conservation Regions (BCRs) 1-5<sup>18</sup>
- R2R Alert: "Tipping Point" species alert status, determined by Road to Recovery (R2R) team<sup>27</sup>

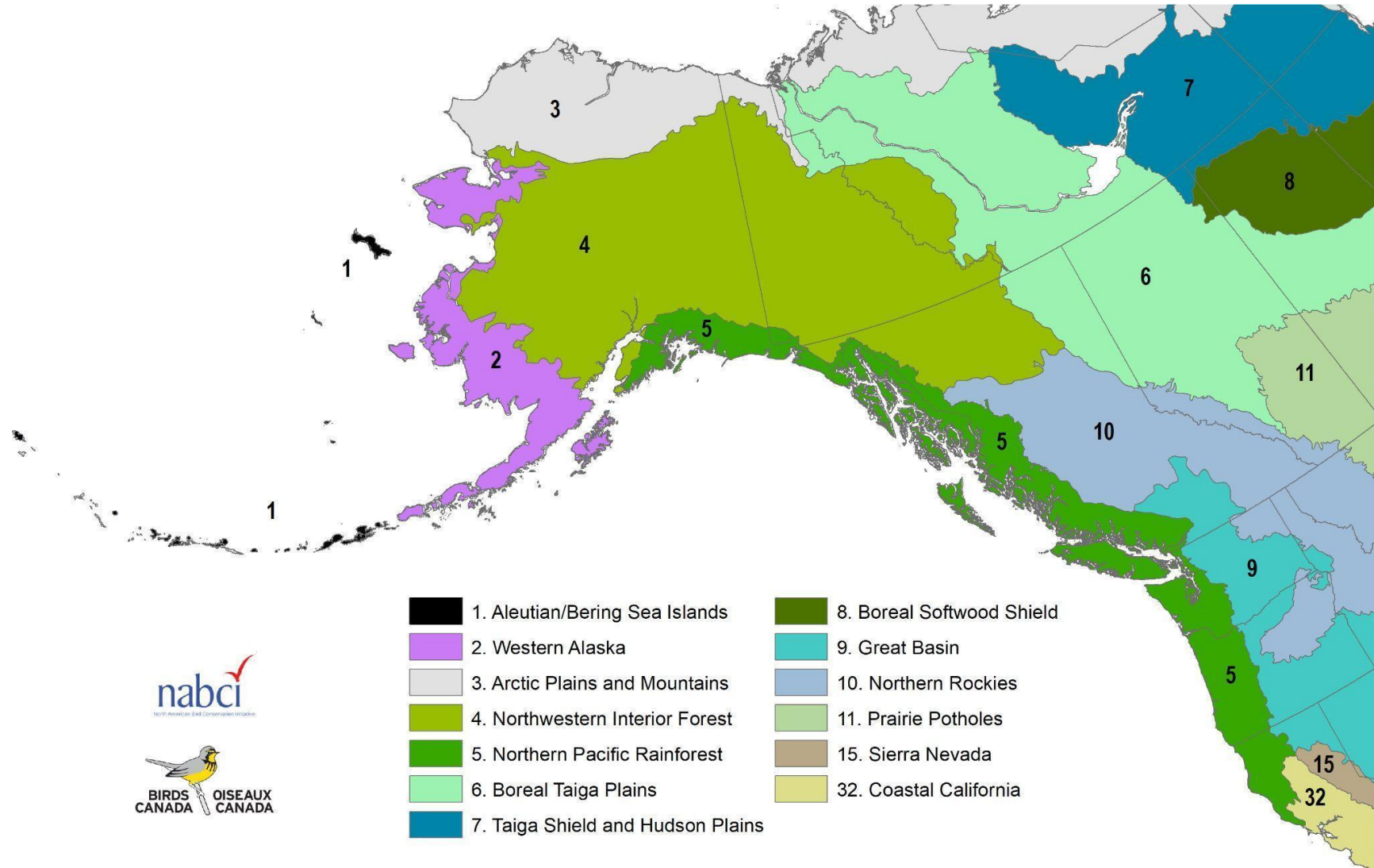
# Appendix C. Reference Maps

Appendix C1. Map of the Pacific Birds Habitat Joint Venture service region.

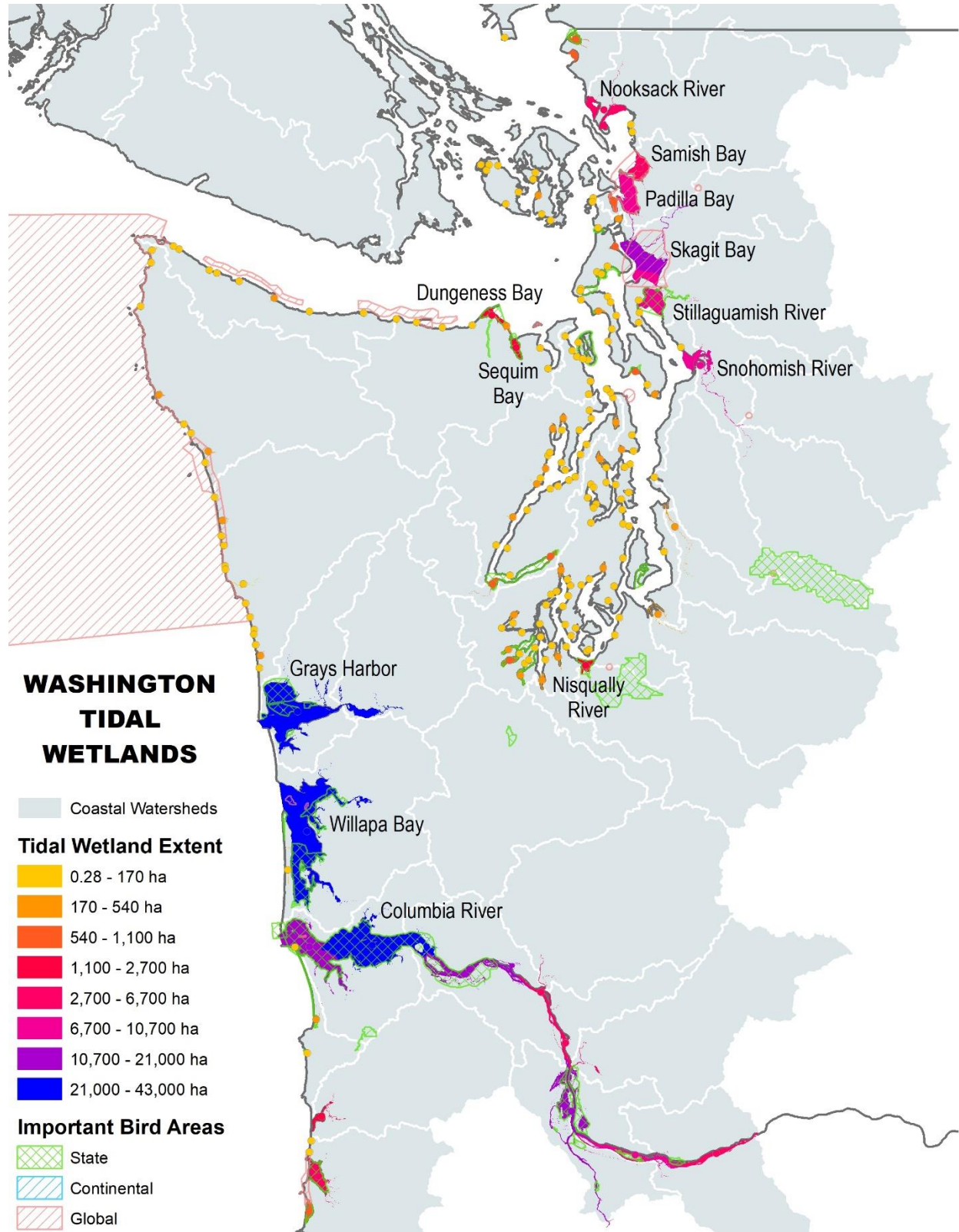




Appendix C2. Map of Bird Conservation Regions (BCRs) within the continental Pacific Birds region.<sup>18</sup>



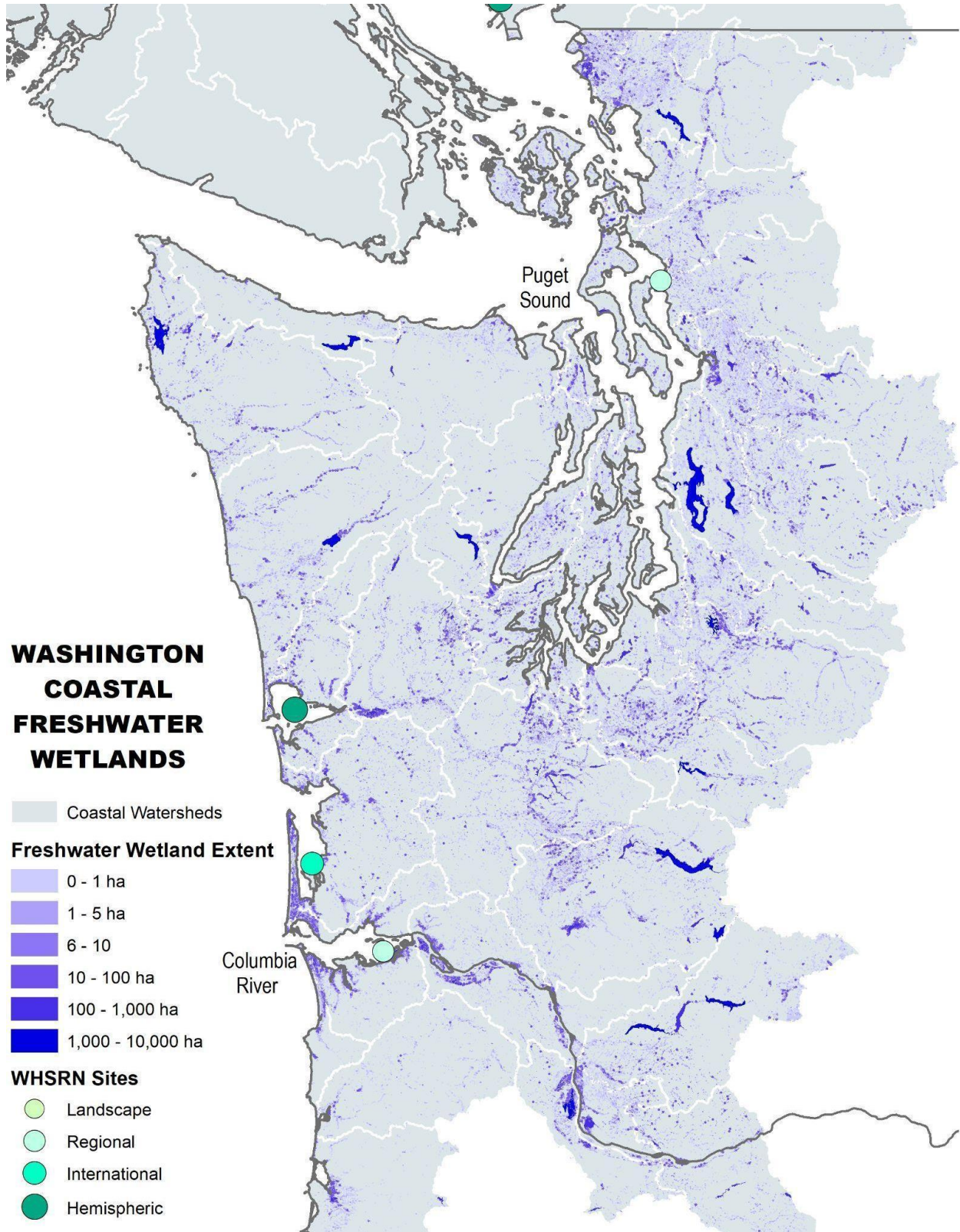
Appendix C3a. Tidal wetlands within coastal watersheds of Washington State, with coastal Important Bird Areas (IBAs) indicated by hatch shading.



Tidal wetland extents derived from Pacific Marine and Estuarine Fish Habitat Partnership (PMEP) data. ([www.pacificfishhabitat.org/data/estuary-extents](http://www.pacificfishhabitat.org/data/estuary-extents))



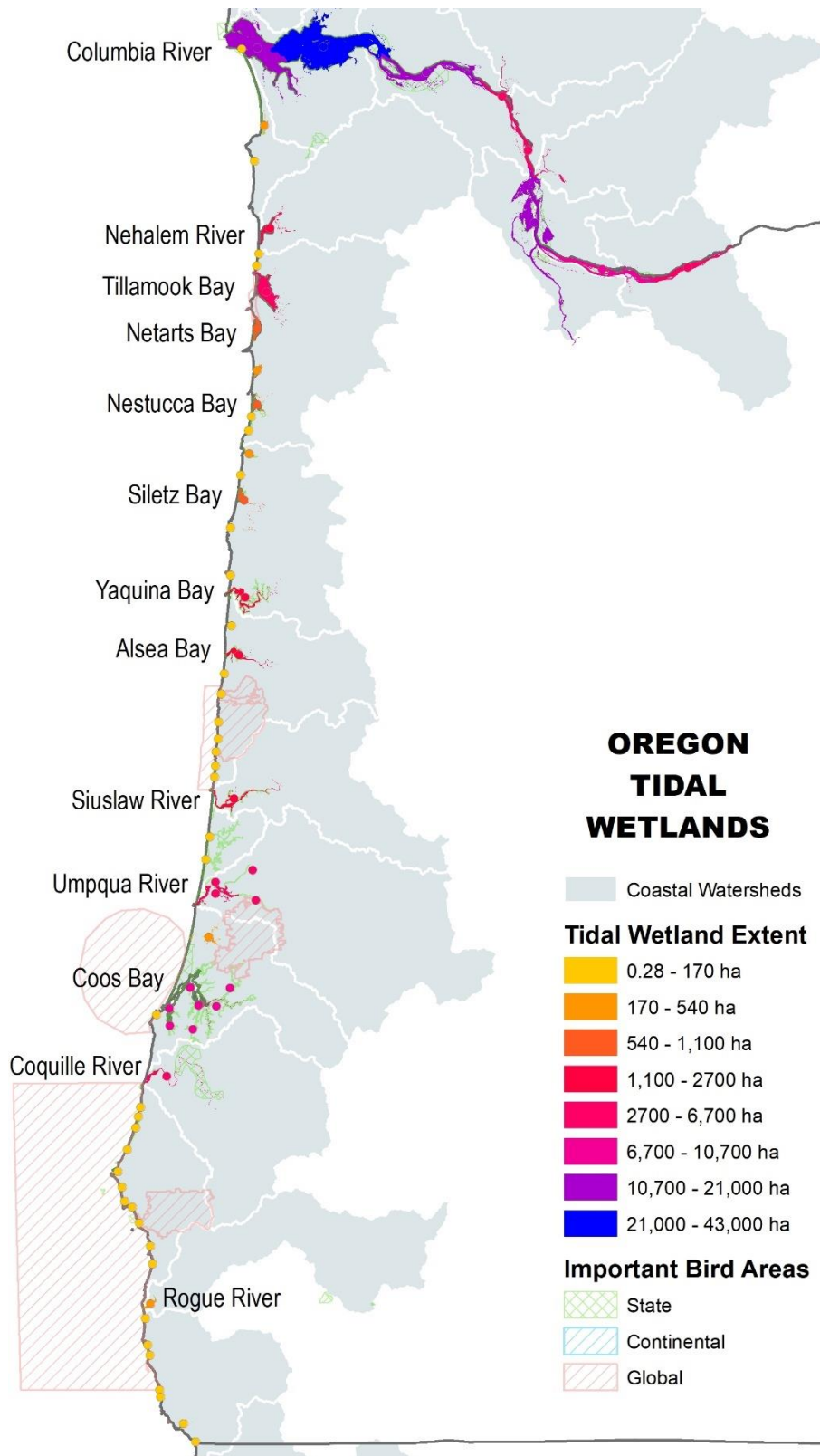
Appendix C3b. Freshwater wetlands coastal watersheds of Washington State, with Western Hemisphere Shorebird Reserve Network (WHSRN) sites indicated by circles.



Freshwater wetland extents derived from the National Wetlands Inventory (NWI), including freshwater emergent wetlands, freshwater forested/shrub wetlands, ponds and lakes, but excluding rivers.<sup>36</sup>

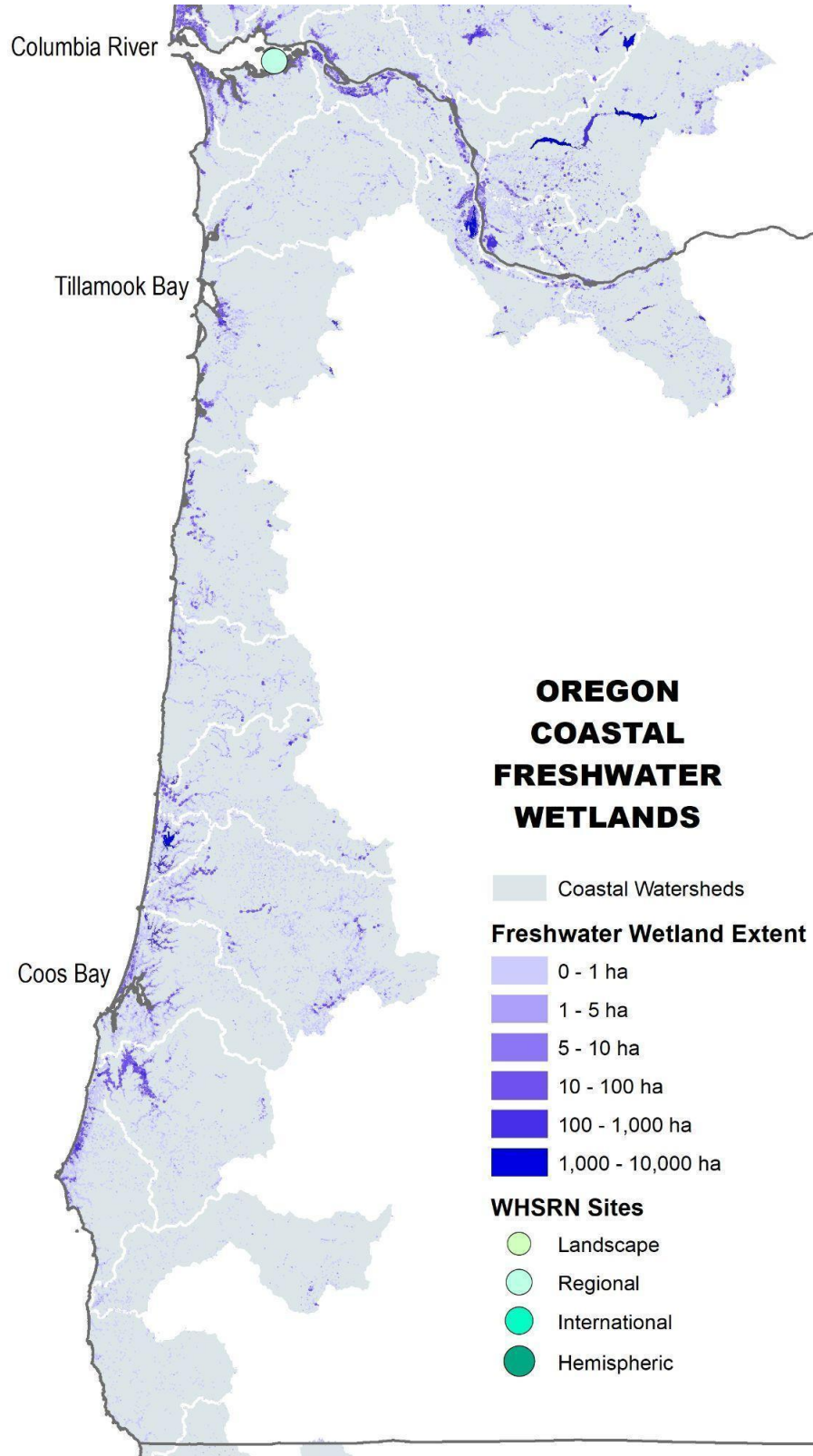


Appendix C4a. Tidal wetlands within coastal watersheds of Oregon State, with coastal Important Bird Areas (IBAs) indicated by hatch shading.



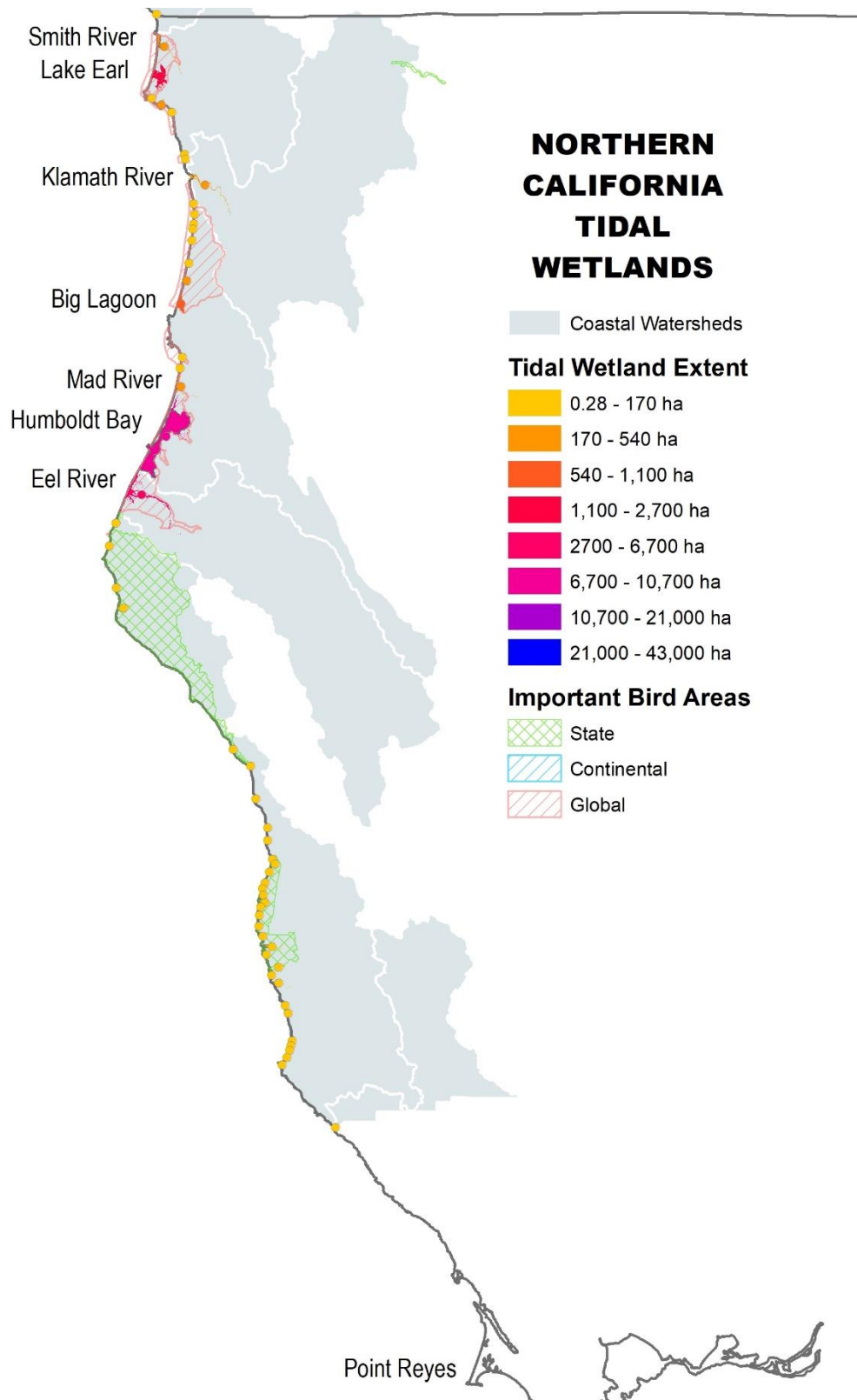
Tidal wetland extents derived from Pacific Marine and Estuarine Fish Habitat Partnership (PMEP) data. ([www.pacificfishhabitat.org/data/estuary-extents](http://www.pacificfishhabitat.org/data/estuary-extents))

Appendix C4b. Freshwater wetlands within coastal watersheds of Oregon State, with Western Hemisphere Shorebird Reserve Network (WHSRN) sites indicated by circles.



Freshwater wetland extents derived from the National Wetlands Inventory (NWI), including freshwater emergent wetlands, freshwater forested/shrub wetlands, ponds and lakes, but excluding rivers.<sup>36</sup>

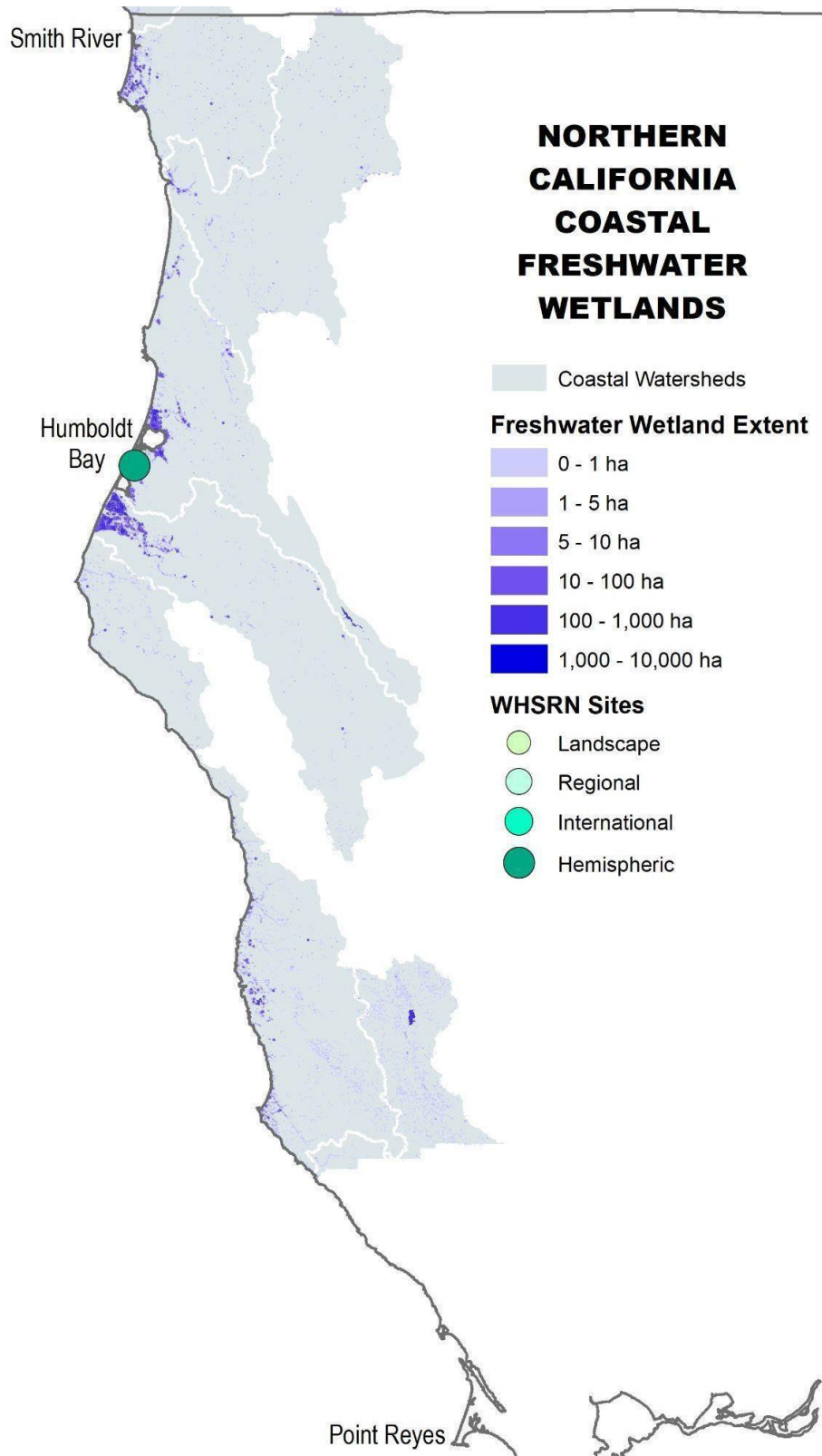
Appendix C5a. Tidal wetlands within coastal watersheds of Northern California, with coastal Important Bird Areas (IBAs) indicated by hatch shading.



Tidal wetland extents derived from Pacific Marine and Estuarine Fish Habitat Partnership (PMEP) data. ([www.pacificfishhabitat.org/data/estuary-extents](http://www.pacificfishhabitat.org/data/estuary-extents))

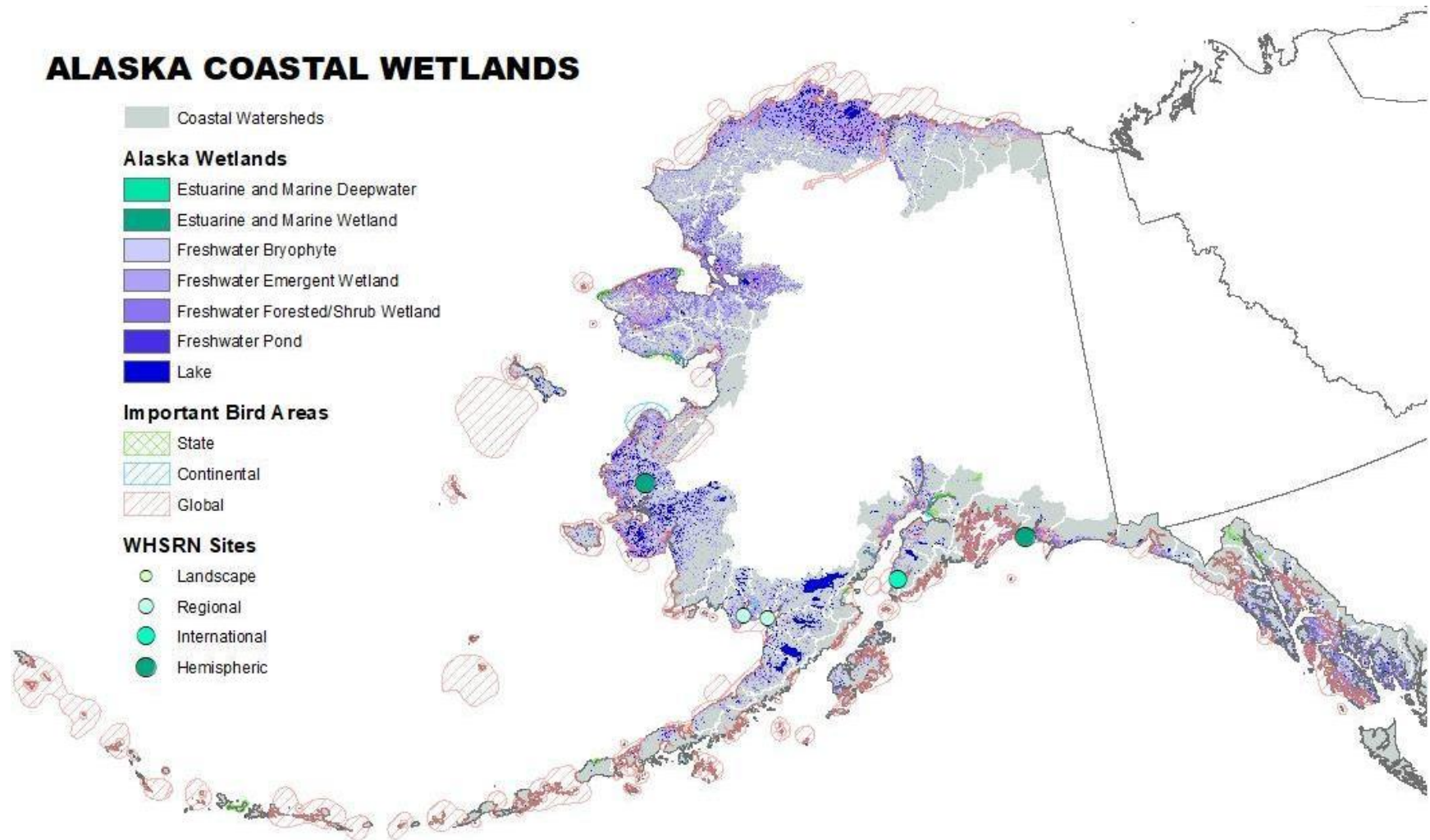


Appendix C5b. Freshwater wetlands within coastal watersheds of Northern California, with Western Hemisphere Shorebird Reserve Network (WHSRN) sites indicated by circles.



Freshwater wetland extents derived from the National Wetlands Inventory (NWI), including freshwater emergent wetlands, freshwater forested/shrub wetlands, ponds and lakes, but excluding rivers.<sup>36</sup>

Appendix C6. Tidal and freshwater wetlands within coastal watersheds of Alaska, with coastal Important Bird Areas (IBAs) indicated by hatch shading and Western Hemisphere Shorebird Reserve Network (WHSRN) sites indicated by circles.



Alaska estuarine and freshwater wetlands layer derived from the Alaska Vegetation and Wetland Composite (AKVWC), from Alaska Natural Heritage Program at Alaska Center for Conservation Science, University of Alaska Anchorage. (<https://accscatalog.uaa.alaska.edu/dataset/alaska-vegetation-and-wetland-composite>)

Appendix C7. Estimated extent of coastal wetlands within Pacific Birds continental U.S. region. National Wetlands Inventory<sup>35</sup> is incomplete in AK so an alternate dataset was used, not directly comparable to wetland extents for WA, OR, and N.CA. AK tidal areas are underestimated.

State or Region within JV	Wetland Type	Area in Hectares	Area in Acres	Data Source
Washington	Tidal	186,921 ha	461,891 ac	PMEP
Oregon	Tidal	128,001 ha	316,296 ac	PMEP
Northern California	Tidal	20,104 ha	49,678 ac	PMEP
Pacific Northwest Coast combined (WA, OR, N.CA)	Tidal	335,026 ha	827,865 ac	PMEP
Alaska	Tidal	557,312 ha	1,377,145 ac	AKNHP
Pacific Birds U.S. continental region (all combined)	Tidal	892,337 ha	2,205,010 ac	PMEP, AKNHP

Washington	Coastal Freshwater	215,433 ha	532,346 ac	NWI
Oregon	Coastal Freshwater	77,138 ha	190,612 ac	NWI
Northern California	Coastal Freshwater	25,113 ha	62,055 ac	NWI
Pacific Northwest Coast combined (WA, OR, N.CA)	Coastal Freshwater	317,684 ha	785,013 ac	NWI
Alaska	Coastal Freshwater	19,682,618 ha	48,636,732 ac	AKNHP
Pacific Birds U.S. continental region (all combined)	Coastal Freshwater	20,000,301 ha	49,421,745 ac	NWI, AKNHP

Pacific Northwest Coast combined (WA, OR, N.CA)	Tidal & Coastal Freshwater (combined)	652,710 ha	1,612,879 ac	PMEP, NWI
Alaska	Tidal & Coastal Freshwater (combined)	20,239,929 ha	50,013,877 ac	AKNHP
Pacific Birds U.S. continental region (all combined)	Tidal & Coastal Freshwater (combined)	20,892,639 ha	51,626,756 ac	PMEP, NWI, AKNHP

PMEP (Pacific Marine and Estuarine Fish Habitat Partnership). 2017. West Coast Current and Historical Estuary Extent.

<https://www.pacificfishhabitat.org/data/estuary-extents>

AKNHP (Alaska Natural Heritage Program). 2018. Alaska Vegetation and Wetland Composite. Alaska Center for Conservation Science, University of Alaska Anchorage. <https://accscatalog.uaa.alaska.edu/dataset/alaska-vegetation-and-wetland-composite>

USFWS (U.S. Fish and Wildlife Service). 2023. National Wetlands Inventory. 2023. <https://www.fws.gov/program/national-wetlands-inventory>