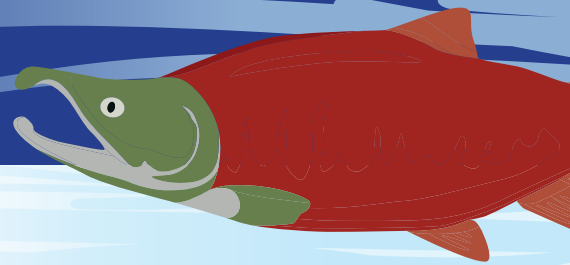


Wetlands Help Salmon & Communities Thrive



Healthy, functioning wetlands benefit everyone



Individuals rely on wetlands for fishing and recreation opportunities, and wetlands provide natural erosion and flood control that benefits landowners



Businesses and **local economies** benefit from flood control and rely on fisheries, hunting, tourism, and outdoor recreation opportunities that wetlands provide



The **Matanuska-Susitna Borough** benefits and saves money from wetlands that provide natural stormwater management, flood control, and filtration of pollutants to our watersheds and water supply

What are wetlands?

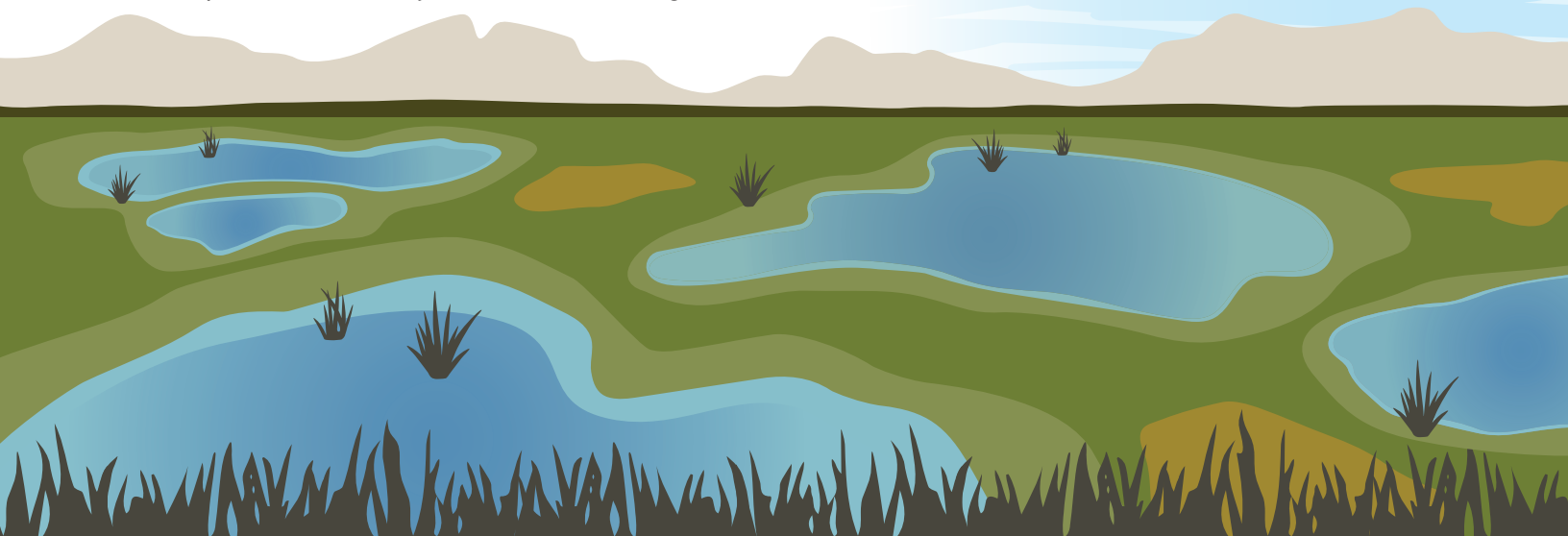
Wetlands are areas of land that are covered by or saturated with water, such as marshes or bogs. Surface water may be present seasonally or permanently. Wetlands are an important part of a watershed, connecting surface and subsurface waters of rivers, streams, lakes, and oceans.

Approximately 25% of the Matanuska-Susitna Borough's 25,258 square mile land mass is wetlands.¹ This vast amount of wetlands is one reason why the Mat-Su has such abundant salmon resources, as wetlands provide habitat for juvenile salmon rearing.

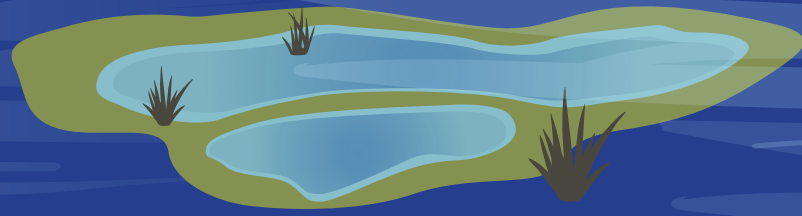
Thriving salmon and healthy habitats make vibrant communities in the Mat-Su

The Mat-Su is a special place where vibrant communities and resilient wild salmon are closely linked. Generally, salmon numbers remain strong here; however, human use and development may be impacting habitat quality and causing localized declines in salmon numbers.

Other parts of the world have already seen the decline or extinction of salmon populations. We have a unique opportunity in the Mat-Su to safely develop our economy while ensuring the survival of wild salmon, an important natural and cultural resource that supports our communities and economies.



What Services Do Wetlands Provide?



Wetlands provide important economic, ecological and cultural services to the Mat-Su. Key services wetlands provide include:

Fish and wildlife habitat

- Provide important feeding and sheltered rearing habitat for salmon and other fish species
- Provide safe and healthy waterways important to spawning salmon
- Provide an ideal environment for the development of organisms that attract and feed many species, including salmon
- Support salmon-bearing waters by storing and releasing cooler water that helps regulate water temperature, stream flows and lake levels
- Support biodiversity by providing food, water and shelter for mammals and birds

Erosion and flood control

- Stabilize shorelines and reduce erosion by distributing the flow of stream or river currents and holding soil together with plant roots
- Reduce flood water levels and flood-related damages to homes and businesses by acting like giant sponges
 - » Wetlands absorb, store and slowly release surface water, rain, snowmelt, and flood waters over time
 - » Vegetation slows the movement of water over floodplains, helping reduce erosion on adjacent lands

Water quality improvement and management

- Protect and improve water quality by acting as giant environmental filters
 - » Wetlands slowly filter fertilizer, sediments, heavy metals, and pollutants before water seeps into rivers, streams, and underground aquifers
- Provide wellhead protection by replenishing and purifying groundwater/drinking water
- Manage stormwater and increased amounts of surface water runoff due to paved surfaces, which helps reduce the impacts of runoff, such as increased sedimentation and water pollution that disrupt water flow and affect fish habitat and egg development

Economic benefits

All of these services provide economic benefits. For example, when wetlands purify groundwater and manage stormwater, our communities avoid the costs associated with the construction and continuous management of water and stormwater treatment facilities, saving millions of dollars.²

For example, in Minnesota, “the cost of replacing the natural flood control function of 5,000 acres of drained wetlands was found to be \$1.5 million annually.”³

National and local protections for wetlands

“The lack of state regulations combined with the broad scope of federal regulations make the need for local conservation and protection efforts all the more important.”

-Matanuska-Susitna Borough Wetlands Management Plan

Clean Water Act Section 404

Federal law requires a permit be obtained from the U.S. Army Corps of Engineers (USACE) before a wetland can be developed, filled or dredged. The USACE only has jurisdiction over wetlands if they are connected to navigable waters.

- Other agencies involved in or overseeing the permit review process: the Environmental Protection Agency (EPA), the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), Alaska Department of Environmental Conservation (ADEC), Alaska Department of Fish & Game’s Division of Habitat, and the Matanuska-Susitna Borough (MSB)
- USACE has decreased required mitigation plans for developments in recent years, reducing protections for wetlands

State of Alaska:*

- No regulations that apply to the Mat-Su

Mat-Su Borough:

- An ordinance regulating development along waterbodies and in floodplains requires a 75-foot setback for built structures from shorelines
- An ordinance regulating floodplain development requires all structures to conform to the minimum standards of development and obtain Flood Hazard Insurance
- The Su-Knik Wetlands Mitigation Bank is comprised of undeveloped, borough-owned wetlands. Landowners and developers can mitigate development of private wetlands by paying to protect banked wetlands.
- MSB Wetlands Management Plan provides guidance for developers and landowners¹

Local governments:*

- No direct control over wetlands through regulation, mitigation, or enforcement

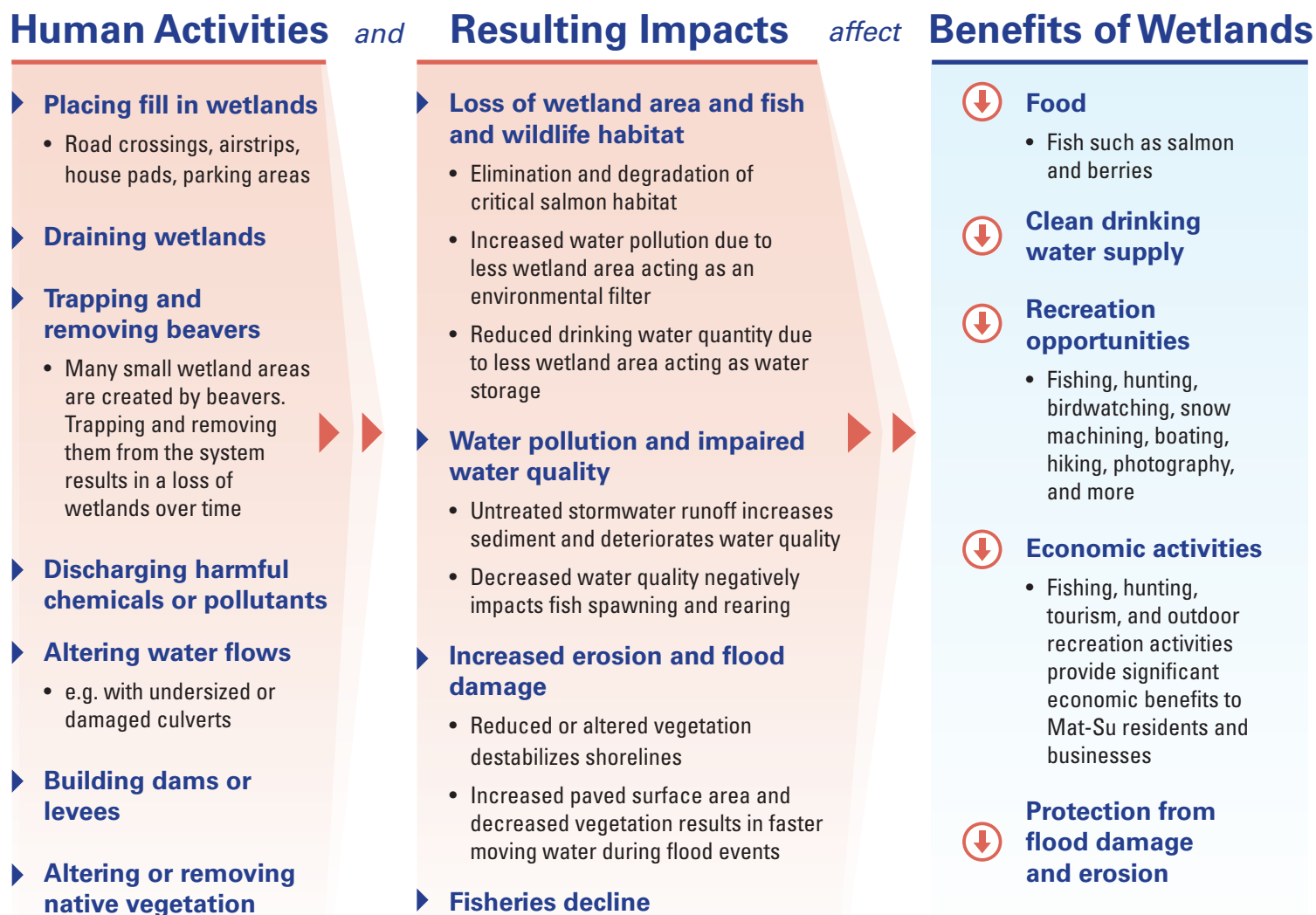
** = gap in regulation*

What Challenges Do Wetlands Face?

"As development continues, the demands for groundwater and surface water will increase. Undisturbed wetlands are critical to maintaining water supplies, balances, and quality."

-Matanuska-Susitna Borough Wetlands Management Plan

Human activities and climate change cause the majority of challenges that wetlands face. Predominant stressors to wetlands include biological, chemical, and physical alterations to habitat. In the Mat-Su Basin, loss of wetlands is most often caused by urban development, jeopardizing these natural assets that support the Mat-Su way of life. In particular, the loss and filling of wetlands can have a range of detrimental impacts on salmon populations.



Economic benefits of healthy salmon populations in the Mat-Su

Commercial and sportfishing support thousands of jobs and millions of dollars in earned wages in the Mat-Su.

Commercial: \$0.6-\$2.1 million annual earnings between 2004-2012 for Mat-Su resident permit holders only (*does not include supporting industries*)⁴

Sportfish: \$31-\$64 million annual earnings for Mat-Su residents (*includes supporting industries*)⁴

Residents also benefit economically from fishing by saving money at the grocery store.

Best Practices

The best approach is conservation!

“Avoiding negative impacts to wetlands through careful planning and management is vital to maintaining their functions and values,” and “maintaining current wetland functions will be less expensive than fixing a degraded system.”

- Matanuska-Susitna Borough Wetlands Management Plan

In many places in the Mat-Su Basin, salmon and their habitats are healthy so protective measures, like reservations of water, sustainable land management, voluntary land protection, and individual behaviors can prevent degradation. In other places, restoration is necessary to re-establish functioning wetlands and productive habitat.

“Today, the survival of Pacific salmon depends upon our ability to manage harvests and protect, maintain, and improve salmon ecosystems in harmony with human development.”

- ADF&G Alaska's Wild Salmon

GOAL: Conserve wetlands

Public and private land recommendations

<ul style="list-style-type: none">• Develop/follow protection mechanisms<ul style="list-style-type: none">» Tax incentives to protect wetland habitat» Development setbacks or buffers» Land swaps» Set minimum flow rates and stream and lake levels to maintain viable aquatic systems» Floodplain development• Encourage voluntary conservation easements and/or purchase wetlands from sellers	<ul style="list-style-type: none">• Enhance degraded wetlands• Mitigation options<ul style="list-style-type: none">» On-site mitigation» Mitigation banks: These banks “restore, enhance, or otherwise permanently preserve wetlands in perpetuity and generate credits which may be used to offset unavoidable wetland impacts”⁵ in another location» In-lieu fee programs: compensatory mitigation for impacts or unavoidable losses to wetlands due to development or other projects	<ul style="list-style-type: none">• Due to potential declines in water quality from already-filled wetlands, consider limited to no additional filling of wetlands, or provide compensatory mitigation, in the following heavily impacted watersheds:⁶<ul style="list-style-type: none">» Wasilla Creek Watershed» Cottonwood Creek Watershed» Lucile Creek Watershed» Meadow Creek Watershed• Avoid discharging warmed roadside ditch water directly into a stream; re-infiltrate ditch water on the downhill side of a road running parallel to a stream to reduce the risk of elevating stream temperatures⁷
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Are all wetland types created equal?

A variety of wetland types exist, and they all have different characteristics and functions depending on their location in the landscape. Individual wetlands contribute to the overall functioning of an entire watershed. Wetland development should be evaluated on both an individual basis and considering the collective health of a watershed.

How much filling of wetlands is too much?

“Substantial declines in water quality may be expected after more than five percent of wetlands in a boreal watershed have been filled,”¹ though additional research is needed to confirm this. In some Mat-Su watersheds, around 10% of wetlands have already been filled. Many of these waterbodies have been designated as having “impaired” water quality.

Are some wetlands more critical for salmon populations than others?

Some wetlands directly support salmon populations while others do not; however, some wetlands may indirectly support salmon by contributing to the overall health of a watershed. In Alaska, individual wetlands and their ecological roles regarding salmon need to be continually identified and assessed.

References:

1. *Wetlands Management Plan*. Matanuska-Susitna Borough. 2012. <https://www.matsugov.us/environment/wetlands>
2. matsu2050.org
3. *Wetland Functions and Values*. U.S. Environmental Protection Agency. <http://www.epa.gov/watertrain>
4. *The Economic Geography Of Salmon*. Cultural Research North. http://www.matsusalmon.org/dev/wp-content/uploads/2015/12/David_Holen-Mat-Su-Salmon-Symposium-2015.pdf
5. *A Comprehensive Inventory of Impaired Anadromous Fish Habitats in the Matanuska-Susitna Basin, with Recommendations for Restoration, 2013*. Alaska Department of Fish & Game. http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2013-2014/uci/anadromous_fish.pdf
6. Gracz, Mike. *Wetland Loss Assessment by Wetland Type and Watershed in an Expanded Core Area of the Matanuska-Susitna Borough*. <http://matsusalmon.org/wp-content/uploads/2018/08/MatSuWetlandLoss2018-7.pdf>
7. Haserodt, Megan. *Effects of Roads on Groundwater Flow Patterns in Peatlands and Implications for Nearby Salmon Streams on the Kenai Peninsula, AK*.

Additional information:

- <http://greatlandtrust.org/priorities/habitat-conservation/>
- *Appendix 5.3 Wetland Habitats: Featured Species-associated Wetland Habitats: Freshwater Grass Wetland, Freshwater Sedge Wetland, Bog, and Salt Marsh (Estuarine)*. https://www.adfg.alaska.gov/static/species/wildlife_action_plan/appendix5_wetland_habitats.pdf
- *Conserving Salmon Habitat in the Mat-Su Basin: The Strategic Action Plan of the Mat-Su Basin Salmon Habitat Partnership, 2013*. <http://matsusalmon.org/wp-content/uploads/2012/10/2013-Strategic-Action-Plan.pdf>
- <https://www.fisheries.noaa.gov/national/habitat-conservation/coastal-wetlands-too-valuable-lose>
- *Alaska's Wild Salmon*. Alaska Department of Fish & Game. https://www.adfg.alaska.gov/static/home/library/pdfs/ak_wild_salmon.pdf