The Mendenhall Wetland’s Acreage Issue

Thunder Mountain High School and Juneau-Douglas High School

Written by Grace Stauffer, Megan Sheufelt, McLeod Morehouse, Kelley Olson, and Connor Ulmer

Team Nuclear Narwhals

Thunder Mountain High School

Physical Address: 3101 Riverside Drive

(907) 780-1902

Mailing Address: 10014 Crazy Horse Drive, Juneau AK 99801

Juneau-Douglas High School

Physical Address: 1639 Glacier Avenue

(907) 523-1501

Mailing Address: 10014 Crazy Horse Drive, Juneau AK 99801

Coach: Jake Jacoby (907) 209-9450 or jake_jacoby@jsd.k12.ak.us

Coach: Ben Carney (907) 957-9540 or (907) 463-2504 or carneyb@jsd.k12.ak.us

Primary Writer Contact: Grace Stauffer: (907) 790-1609 or (907) 209-7711 or septentrio.stella@gmail.com
The Mendenhall Wetland’s Acreage Issue

Abstract

The Mendenhall Wetlands is a unique estuary that is locally fought over for the precious acres of simple, buildable, and legal land it provides. The Juneau International Airport, Temsco helicopters, Egan Drive, and a landfill are several examples of what already occupies much of the wetlands, and are integral parts to Juneau’s economy. However, we suggest that the best use for the economy, environment, and ecology of this area is to preserve the land we have left and protect and monitor the health of the land we have already utilized. These actions will keep Juneau’s economy healthy and the remaining wetlands pristine.
Introduction

For our paper, we chose to examine the Mendenhall estuary (Fig 1) Lake Pontchartrain estuary (Fig 2), which is located in southeastern Louisiana. The Mendenhall Estuary is about ten miles north of downtown Juneau, Alaska. Its many ecological values include wetland habitat for migratory waterfowl such as ducks, and its creeks are used by various anadromous fish species. The land of the estuary is also valued for construction purposes. Due to Juneau’s geology, level ground is scarce. In addition, most upland areas are difficult and more expensive to build on for engineering reasons. The resource we will focus on is the acreage of the estuary, because this resource is the most contested, on both sides of the argument. The economical and environmental values of the estuary are in conflict with each other. How much of the land should be developed, and how much should be preserved? To answer this question, we developed a management plan for the Mendenhall Watershed. Our management plan differs from the Alaska Department of Fish and Game’s plan. Their management plan was written in 1990. The “plan has been identified as one that needs to be updated” according to Ryan Scott of the Alaska Department of Fish and Game. Our plan takes into account the most recent data and information, including the extension of the Juneau Airport’s runway zone and the creation of the Juneau Dump. Thus, some of our recommendations are different from Alaska Department of Fish and Game’s.

History of the Wetlands

The refuge existed in essentially a pristine state until after the founding of Juneau around 1890. There were no records of the area until European contact because the local Native people, the Tlingit, did not create written records. The first records of the Mendenhall Wetlands come from Captain Vancouver. His party charted Douglas Island and the Gastineau Channel in 1794.
He noted ice blocking passage of Gastineau Channel. However, the Auk tribe, the local Tlingits in the area, possessed guns and other items of European origin. It is likely that other Europeans such as the Russians had already been there. From 1799 to the 1860’s, European fur traders visited to trade with the Auks. In 1879, naturalist John Muir traveled through the wetlands or “flats”, as they were known. Joe Juneau, Richard Harris, and Chief Kowee discovered gold in Silverbow Basin, near present-day Juneau’s downtown area, in 1880. Over the next few decades, Juneau was founded, then grew into a mining camp, and finally into a full-fledged town. Juneau’s residents began to have an impact on the wetlands beginning in the 1910’s. In the late teens and early twenties, dairy farming was conducted on the wetlands at the present-day location of the Juneau International Airport. In 1922, the dairy farm was taken over by the Kendlers, who continued to operate it until 1965. (Kendler, 1983). In 1924 and 1925, marten, fox and mink were farmed on what is now refuge land. The next year, 1926, a bridge was built across the Mendenhall River. 1934 saw the first use of Joe Kendler’s fields as a runway. In 1938, part of the farm was sold to Pan American Airways for use as an airfield. An area of the wetlands was drained for agricultural purposes in 1940. The airfield was enlarged by the US army during 1940 and 1941.

1944 marked the first major adverse human impacts on the wetlands. Federal game wardens found approximately 20,000 dead waterfowl at the site of the Juneau Gun Club. It was determined that they had died of lead poisoning, and the area was closed. $70,000 was spent in public funds to rehabilitate. In 1959 and 1960, the Army Corps of Engineers dredged a navigational channel between the wetlands and Douglas Island to allow larger boats to pass. It connected Fritz Cove to the Gastineau Channel. By 1971, however, the channel was once again silted in, and was navigable only by small craft at high tide. (Collinsworth, 1990). The general
recognition of the importance of the Mendenhall Wetlands was made in 1965, and public concern grew through the 60’s. Egan Drive, which is routed across the wetlands, was constructed in the 1970’s. More dredging associated with the construction was conducted.

In 1976, Alaska Statutes 16.20.034 was passed. It states that “The purpose of this chapter is to protect and preserve the natural habitat and game population in certain designated areas of the state.” One of these designated areas is the Mendenhall Refuge. The statutes define the area of the refuge. They state that hunting and recreational activities are permitted. Management of the refuge is given to the Department of Natural Resources, but any actions that affect habitat must comply with a management plan from the Department of Fish and Game. (Collinsworth, 1990).

Biology (Sec I)

Lyngbye sedge, or Carex lyngbyei, is a keystone species in the ecology of the Mendenhall Wetlands. Birds rely on it for grazing, algae house in it, invertebrates eat the algae, fish eat the invertebrates, and it filters the water in the wetlands. And the sedge is disappearing fast from isostatic glacial rebound. What will happen to the species that depend on it?

The glacial rebound alters which areas are submerged, and the area that the sedge grows on is determined by how much submergence is received. (Carstensen, 2004). When this happens, the organization of the vegetation zones change. Currently, the wetlands is lifting .6 inches a year, which doesn’t sound like much of a vegetation loss. However, sedges are also being lost by habitat loss, and not just because of the loss of the acreage. The building of the Egan roadway, for example, not only took away available habitat, but changed the hydrology of the area so the sedge didn’t get the required submergence time. When there is a shift in sedge dominance and reorganization, the populations of birds also shifts because that resource is no
longer available to them. Interestingly, though, the grazing pattern of geese delay this type of succession in the wetlands. The abundant presence of the geese is most likely slowing down the effects that the glacial uplift will have upon the dependent bird species, which makes grazing birds in fact another important species and it highlights a mutualistic relationship between the geese and the grass. Interestingly enough, sediment inputs from Mendenhall River and Lemon Creek encourage the growth of sedges because the offered sediments are a substrate of growth for the sedges. The presence of the sedges slows the water speed down, which allows to the sediment to settle and form a favorable substrate. The patterns of sediment movement and the success of sedges are dependent to each other.

The Mendenhall Wetlands has the 3rd greatest acreage of wetlands in Southeast Alaska, and many birds depend on the protein, nitrogen, and carbohydrates that the sedges provide. Many bird populations visit the Mendenhall estuary as a critical stopover point in their lengthy migrations. The birds rely on the Lyngbye sedge most because of their high requirements of protein, nitrogen, and carbohydrates so they can endure migration. However, there are relatively few suitable stopover point in their migration paths (Figure 3). If there wasn’t enough Lyngbye sedge for the Vancouver Canada Geese, or Branta canadensis, for example, they might have to move on and take a chance that there might be sustainable amounts of Lyngbye sedge elsewhere. This is a dangerous move, because there will very likely none, which is why the Mendenhall Wetlands is such a critical area to protect (However, there are several more reasons). Smaller birds, however, have drawn a harder lot because it takes even more energy to fly in the pressing wind, and can’t afford to not rest, eat, or waste energy. The crucial habitat may also be unavailable because of degradation or unavailability from the tides. Though we don’t have control over the tides, preventing degradation of the habitat is also a crucial step in protecting the
overall health of the wetlands. This is in fact a major problem because dog walkers that frequent the Mendenhall Wetlands for recreational purposes often accidentally let their dogs harass the birds, which triggers their flight distance reflex, and choose to move until they feel once again safe. The managers of the refuge suggest enforcing a leash law, which would solve most of the problem. Though the Lyngbye sedge is a critical factor for migratory birds, there are also several other large populations of birds that aren’t directly dependent on it, although they may benefit from the sedge.

Gulls and Scoters form two of some of the largest bird populations on the wetlands. They rely on the invertebrates in the mussel, barnacle, and rockweed habitat. Alternatively, surfbirds and the Bonaparte Gull feed in the algal mats at a lower elevation, and flip aside algae to access the tasty invertebrates underneath. Though these areas are generally away from areas of Lyngbye sedge because of the difference in depth, the sedges are important in the water quality of the wetlands, which could alternately affect the health of the invertebrates upon which they feed.

The third source of food that is utilized by waterfowl, however, isn’t generally encouraged. This source, ditchgrass, grows almost exclusively in man-made ponds, which are abundant around the Juneau International Airport which is located on the wetlands. The entire ditchgrass plant is consumed by waterfowl. The ditchgrass ponds are also inviting to stickleback and crustaceans, which further attract predatory birds, herons, and mergansers. Though this is ecologically healthy, it is dangerous for both humans and birds, due to the proximity of airplanes, and so the birds must be frequently scattered. Duck hunting, an integral part of Juneau hunting culture, serves both waterfowl and humans because it limit the number of ducks in that area, which lowers the chance of a bird strike. Management plans have contemplated the artificial
construction of ditchgrass ponds elsewhere in the wetlands. However, the construction hasn’t happened because there are too many unknown factors that determine the success of a ditchgrass pond. Research on this subject would be extremely helpful in maintaining the biodiversity in the wetlands, and is highly encouraged by the Juneau Audubon Society (Armstrong, Carstensen, Willson, 2004).

Waterfowl, an integral part of the ecology of the wetlands, however, are not alone in their importance. There are 28 species of anadromous fish, most of which are salmonids that at one point in their lifetimes use the wetlands for feeding, rearing, and traveling through in order to get back to one of the 12 streams that flow into the wetlands in order to spawn. The health of the salmon is directly linked to the health of its spawning streams, addressed in the chemical and pollution chapters, and the health of the estuary. Salmon is also a large food source for Bald Eagles (Haliaeetus leucocephalus). There is a bounty of Pacific Sand Lance (Ammodytes hexapterus Pallas), upon which upwards of 40 species rely on, such as marbled murrelets, and kittiwakes. Eulachon (Thaleichthys pacificus), are prized by birds because of their high lipid content. Many of the recently mentioned organisms eat the invertebrates that feed on the algae trapped in the Lyngbye sedge. By the rule of 10% loss of energy between trophic levels, we know that this must be a substantial amount, given the amount of salmon and invertebrates in the wetlands. (Armstrong, Carstensen, and Willson, 2003)

Though the Lyngbye sedge is very beneficial to most organisms living in the wetlands, there are also many abiotic factors that are benefited by the presence of sedges and other riparian vegetations housed in the wetlands and other estuaries. The vegetation traps carbon dioxide from the atmosphere, and helps reverse the effects of climate change. Riparian vegetation also purifies the water that comes through it in such an efficient way that it would benefit an economy
more to preserve wetlands because the cost to manually purify the water would be much more and much less efficient than if the wetlands were preserved.

Chemistry (Sec I)

The Mendenhall Wetlands inherits many types of chemical issues from Duck Creek, Jordan Creek, Lemon Creek, and the nearby landfill. The problems with the water quality in these creeks is are the lack of dissolved oxygen, the abundance of iron, (United States Environmental Protection Agency.. 2001) and the reception of chemicals from the landfill. All of these factors alter the chemical makeup and health of the wetlands. Turbidity, debris, and sediment abundance also affect the organisms in the creek, and affect to a degree the success of those organisms in the wetlands.

One of the most profligate issues in all three creeks is the lack of dissolved oxygen. The health of these water bodies are compromised because the lack of the dissolved oxygen inhibits the development, growth, and distribution of shell fish, invertebrates, and anadromous fishes. The presence of iron in the groundwater at Duck Creek also decreases the available amount of dissolved oxygen because iron tends to react with oxygen in any chemical process. Coho salmon are present in Duck Creek, but their numbers have dipped to only 4% of the original population size from the 1960s to 1998 because the lack of dissolved oxygen raises the Coho alevin death rate and produces feeble fry. (United States Environmental Protection Agency, 2001) Decay of organic debris is also considered a source of natural pollution for Duck creek because the processes that convert ammonia and nitrite also decrease the amount of dissolved oxygen present in the water. Furthermore, the chemistry and health of the streams in the way of dissolved oxygen affect the potential for the wetlands to support anadromous fishes.
The amount of iron, apart from its ability to affect the amount of dissolved oxygen in the water, can have other negative effects in the streams that carry water to the wetlands. Duck Creek, because of its richness in iron is choked with iron flocculate. This occurs when the iron in the stream oxidizes and forms ferric particulates that clump in the water and sink to the bottom of the creek in a thick coat. This coat clogs the interstitial area between gravel and inhibits the aeration of the creek, which has adverse effects on aquatic life, further affecting the biological welfare of the wetlands.

Another group of harmful substances making their way into the wetland are polybrominated diphenyl ethers, anthropogenic flame retardants more commonly referred to as PBDEs. They are found in our wetlands due to the proximity to the landfill. Formerly, all waste was incinerated, but in 2004 incineration was halted and waste is now placed in a landfill. (WIH Resource Group, 2008). The PBDEs have even reached to the Lemon Creek watershed and are found in its sediments. PBDEs are most harmful to upper trophic level organisms, due to the fact that PBDEs are accumulated in tissues and tend to biomagnify up the trophic food chain. There is also ample concern about the spreading of PBDEs from the site and Lemon Creek due to seasonal glacial flooding, which would directly bring the chemicals and harmful ions directly into the wetlands and even more directly affect the flora and fauna. It would be beneficial to Juneau’s economy to manage PBDEs because commercially collected invertebrates sequester the toxin in the tissue, further devaluing the quality of the product. Managing the landfill and PBDEs would also encourage health of upper trophic levels and the function of the estuary on an ecological level, due to the chemicals’ neurotoxic effects on invertebrates (affects thyroid function) and therefore many organisms in the estuary. This is perhaps one of the chemical influences in the wetlands we could most effectively manage. If disposal of electronics in the
landfill is monitored very closely, and further maintenance protocol was heeded to compensate for the lack of landfill lining, there would be a good chance to limit the abundance of PBDEs and their adverse effects on the wetlands. (Hoferkamp and Tamone, 2006)

Pollution Input and Outputs

There are several pollution inputs into the Mendenhall Wetlands, mainly from the creeks that run through residential areas and empty into the wetlands (Creeks Jordan, Lemon, and Duck).

Jordan Creek inputs sediment loads from winter road sanding, the dumping of snow, and bank erosion, as well as urban runoff and runoff from roads and All Terrain Vehicles. There is also substantial pollution from natural sources stimulated by outside factors, such as the clogging with iron flocculate. The lack of dissolved oxygen is an issue, especially since the estuary receives this water, but it’s not regarded as a pollutant. However, some of the excess sediments mentioned above are able to move out from the creek system because of the transportation of sediments, though it means they just move closer to the wetlands. In the Jordan Creek area there are also substantial inputs through three pipes that cause such water interactions that cause downwelling and the settling of sediments. Though data has not been collected since 2008 in regards to measuring pollution, there is substantial evidence that the amount of dissolved oxygen has decreased and the amount of pollution has increased. This is likely due to the addition of iron or other elements that deprive the water of dissolved oxygen (also discussed in the chemical chapter). There is significant pollution from the landfill, though the chemicals that are leached and the leaching patterns are more thoroughly discussed in the chemical section. Though the pollutants can move out from the streams, the pollutants still must travel to the Mendenhall wetlands, which must cope from its effects after the pollutants are moved out into the ocean,
further affecting the residents thereof that might come back to visit the wetlands in a later stage of life, such like salmonids.

Hydrology (Sec I)

The main creeks that flow into the Mendenhall Wetlands are Duck, Jordan, Upper, Sawmill, Lemon, and Nugget creeks. Duck Creek flows at 39.1 cubic feet per second, peaking July through September. Jordan Creek flows at 87.4 cubic feet per second, while peaking September through February. Lemon Creek discharges water into the estuary at 24.3 cubic feet per second. Nugget Creek peaks in August, at 93 cubic feet per second.

Upper Creek runs along the western side of Thunder Mountain, which is mostly undeveloped, however, in its downstream regions it flows around buildings and through storm drains, and collects a deal of urban runoff. Lemon Creek, however, manages to house pink, chum, Dolly Varden, cutthroat, rainbow trout, steelhead, and coho, which were counted at 26,000 in a 2001 migration (Curran, 2006)

Lemon Creek, though with its abundance of fish, has less sediments currently because of gravel mining and bake hardening, which has destroyed the full alluvial fan that it once had. Dredging is also a substantial hydrology influence in Lemon Creek.

There has also been substantial flooding in many of these creeks. Lemon Creek reached a peak discharge in the February of 1983, with 4,510 cubic feet per second. Nugget Creek also floods mostly between July and September, due to glacial melt. (Neal and Holst, 1999) There was even a record flood in 1998 in October that resulted in a discharge of 12,400 cubic feet per second, an event that only happens once in a hundred years.
The Second Crossing

The second crossing is a causeway that is hotly in debate. The suggested routes have several suggested areas (Figure 4), most of which go through valuable areas of the wetlands environment (City and Borough of Juneau, 2007). The three main goals that are meant to be met in this construction are ease of access to West Douglas (where several construction projects are proposed), to relieve traffic on the main roads, and to quicken emergency responses. The three main suggested routes were Sunny Point and Vanderbilt Hill corridors. However, both of these suggestions were dismissed because they would not relieve traffic in that area. The third suggestion was near the airport at Yandukin Drive, however it would be an underground tunnel. This, too, was dismissed seeing as it would be more expensive, take longer to construct, and would ineffectively relieve traffic pressures. All of these three suggested routes would precipitate habitat loss, alterations in hydrology, additional pollution, and the imminent halt of duck hunting. Duck hunting is an integral part of ecological balance; it keeps the population of some waterfowl down, especially near the airport where it can be a safety hazard for bird strikes. The end of duck hunting would also be detrimental to Juneau culture. The Mendenhall wetlands has already undergone great loss and cannot tolerate any more anthropogenic loss if it will still function for all of the purposes stated in earlier paragraphs. The only alternative suggestion that would impact the wetlands the least is the suggested crossing at Spuhn island, which is far out the road. This crossing would not contribute to relieving traffic pressures or ease of access by emergency vehicles, because the areas it traverses are not very populated. It would also be an overwater construction. However, the City and Borough of Juneau suggested it in 1984, and it has long since been ruled out. Additionally, since the argument for a second crossing has been
sustained for such a long time, but has never progressed past a planning stage, it shows again that the people don’t want it, and can’t pay for it.

Management Plan (Sec II)

The most recent management plan that the Alaska Department of Fish and Game has produced is from 1990 (Collinsworth, 1990). The estuary is facing many more issues that weren’t addressed during the making of the management plan because they didn’t exist. Therefore, the management plan is outdated and ineffective at addressing many issues that are now facing the estuary. The management plan neglects to make any promise to protect riparian vegetation and the invertebrates that are dependent on the vegetation, though other stipulations they formulate wish to protect a resource but neglect in protecting the substance that resource is dependent upon. This is why we propose to protect foremost the lyngbye sedge and also the inflow of sediment that is their substrate. We propose, in order to protect water quality of the streams that flow into the wetlands and the wetlands itself, to limit and enforce by fines any pollution, especially iron pollution, that happens near the creeks that feed into the wetlands. We believe that research into alternate snow dumping sites would promote the health of the water. We also suggest the monitoring of trash into the landfill due to its proximity to the wetlands, as well as the lining of any future pits because leaching is a major issue. We also propose that a second crossing to Douglas Island not be made.

In regards to the biological management of the Mendenhall Wetlands, the most beneficial course of action would be to form protection of Lyngbye sedge, seeing as it is such a critical species for the wetlands. Though it is also being eliminated by the natural process of isostatic rebound, we need to research the effects of artificially changing the landscape to encourage the growth of the sedge, a measure that was suggested by the Juneau Audubon Society (2004).
However, since there is virtually no research or information about this, it is requisite that thorough and detailed research go into it seeing as it would be a major environmental change. A further measure to protect the biological resources of the Mendenhall wetlands would be to guard the flow of sediment from the Mendenhall River and Lemon Creek areas, seeing as it gives Lyngbye sedge a substrate on which to grow. We should also seed sedges closer to these areas, seeing that, do to isostatic rebound, the total amount of Lyngbye sedge is decreasing.

Management in regards to the chemistry and water quality of the estuaries and the streams that feed into it, would be to try to limit the abundance of iron. Even though iron is naturally present and abundant in the soil, general care should be taken to prevent the addition of iron sources around those areas because iron demands oxygen, and many of the water sources for the wetlands are deficient in dissolved oxygen. The prohibition of unnecessary pollution inputs, too, would increase the quality of the water. An example is snow dumping; alternate sites away from the creeks and estuaries would perhaps be more ideal, seeing as the snow brings in sediment and atmospheric pollution. Investigation of the pipes in Jordan Creek that alter water behavior would be wise. The landfill is a major source of pollution. PBDEs are present, which detract from the health of the wetlands. Lining the pits would be the best general pollution inhibitor. Monitoring and generating a safer way to dispose of electronics, a source of PBDEs, would also be a good proposal for maintaining the chemical health of the wetlands.

The second crossing to Douglas Island is not a wise choice for a number of reasons. The environmental reasons being that it alter hydrology, precipitate habitat loss, fragment the environment, chase away waterfowl, provide unsuitable areas for waterfowl, and prohibit duck hunting. Duck hunting, an integral part of Juneau culture, is additionally a positive ecological factor as it keeps the duck populations from rising to unsustainable levels as well as keeping the
populations near the airport down, as birds can cause airplane strikes. There are also many economical factors. The only suggestion that wouldn’t destroy the wetlands does not serve as a convenience, and doesn’t relieve downtown traffic pressures. The crossing would be expensive, and cause traffic elsewhere. The project hasn’t surpassed the planning stage, and there are also concerns about the ability to pay for such a crossing. We already have one bridge to Douglas, and we don’t really need a second, it’s not that hard to drive a little longer to reach the western side. We propose to not build a second crossing, for all of these reasons.

Comparison Estuary (Sec III)

The Pontchartrain basin includes many areas of estuaries. The Basin is a watershed of 10,000 square miles, and is surrounded by expanding urban areas, encroaching on the estuary. It loses 24 square miles annually. The land is used in various ways, such as hunting, fishing, and general recreation. Parts of the estuary were ditched and dredged to allow boats, and those processes have been happening since the 1700s. A major causeway runs North and South through the basin to allow cars to cross the bay. Major modern construction projects include levees, spillways, and roads, which creates the lack of sediment, and also creates change in the natural hydrology of the estuary. The anthropogenic pressures being exerted on this estuarine area have resulted in 50% habitat loss since the 1900s. The estuary is still habitat for many endangered species, and since the increase in habitat loss and the decrease in habitat quality, the estuary has seen decline in populations of species. Construction has created fragmented habitats that have resulted in the construction of movement corridors. With the loss of valuable submerged aquatic vegetation, the integrity of the ecology is shaken. Without management and restriction, the estuarial areas of the lake Pontchartrain basin will degrade and disappear. The
Lake Ponchartrain Basin is in an ecological state that nobody wants the Mendenhall Refuge to experience (McInnis and Rogers, 2006)

We chose to compare the Mendenhall Refuge to the estuarial areas of the Lake Ponchartrain Basin because both are key watersheds in their respective areas. The Mendenhall Refuge is an area desired for construction, just as Lake Pontchartrain was highly convenient for its own residents to utilize because of its flat structure. Transportation convenience is a major consideration of construction projects; where a causeway through the Pontchartrain Basin stands, a second crossing through the Mendenhall Refuge is considered. Waste treatment plants flank both estuaries. They both suffer similar anthropogenic pressures for construction and the economic trade-offs between development and conservation. Both estuaries are hosts to migratory birds, and are both areas for hunting. Conservation is a key argument in both areas, and there is an ongoing battle in each area to prove the benefits and even the economic value of conservation in each.

After the formation of concrete management plans for the Lake Pontchartrain Basin estuaries, it is obvious that all of the issues could have been resolved if those in that area could have realized the importance of aquatic vegetation and water quality, and the effects of key species to the quality of the estuary., t is apparent in current management plans that they intend on protecting each of these different areas in hope of restoring the function of their estuary, because of the importance of each factor.

The greatest harm to the Lake Pontchartrain estuaries was the loss of Submerged Aquatic Vegetation, or SAV (McInnis and Rogers, 2006). A very large portion of Lake Pontchartrain’s ecology, or any estuary’s, is the success of aquatic vegetation. The vegetation acts as a large nursery for many types of key species (Boesche and Turner, 1984). It provides shelter from
predation and allows the safe development for fish, crustaceans, shellfish, and other invertebrates and vertebrates. The thick cover of vegetation is strongly linked to the encouragement of the growth of prey species during vulnerable stages of their life. Seeing as the vegetation is a large contributor to the presence of prey species, the absence of vegetation would exponentially affect the presence of organisms in the upper trophic level. The vegetation also contributes to the abiotic factors in an estuary. Aquatic vegetation prevents erosion which is caused by wave energy and shock. SAV also aids in removing and recycling of nutrients throughout the estuaries. Since the SAV absorbs pollutants that could precipitate algal blooms, and the resulting hypoxia, the vegetation is greatly important not just for the wellbeing of the estuary but for the survival of many organisms in it, as well as supplying it with oxygen. Since the SAV has the ability to absorb nutrients and pollutants, those designing restoration efforts on the estuary consider seeding more vegetation as a means of bioremediation, which would simultaneously remove harmful pollutants while restoring an integral ecological species. Since 1954, 50% less SAV grows in Lake Pontchartrain because of extensive construction (McInnis and Rogers, 2006). The removal of such large amounts in Lake Pontchartrain stimulated a large macroalgal growth, which increased the turbidity of the estuary. The algal growth itself contributed to some of the decline of SAV because of the nutrient imbalances that the algae was incurring. Water quality was is perhaps the greatest change during the absence of SAV because of the lack of filtration in the estuary.

We can apply the lessons learned about the importance of vegetation in an estuary to the Mendenhall estuary. Since much habitat is being altered by the expansion of the Temsco area, the airport expansion, and even glacial isostatic rebound, our top priority in saving the wetlands should be the preserving the vegetation, seeing as it effects the ecology, water quality, and
physical aspects of the estuary, as it did Lake Pontchartrain. We do not want the Mendenhall Wetlands to digress into the water quality that Lake Pontchartrain had, seeing as it drove many species away from, and decreased the presence of a key species. If the Mendenhall Wetland’s vegetation is preserved, we can preserve a positive water quality which in turn fosters a healthy ecosystem.

If we try to learn from this estuarine predecessor, we can prevent ourselves from ever going down this road of environmental destruction. The free processes that the estuaries perform cannot be replicated by human efforts. If we initially decide to spend that acreage on preserving the Mendenhall Wetlands, we are gaining more as an ecosystem than we can provide for ourselves without the wetlands, as well as preserving a unique ecosystem for our future.

Conclusion

In conclusion, we highly suggest that the best use of the acreage of the Mendenhall wetlands would be preservation. Nothing that is made by man can possibly meet or exceed the enormous amount of environmental support that the preservation of simple habitat could provide. The wetlands are an essential stopover for migratory birds, and without the amount of habitat as resources for these birds, there could be a potential decline in population and diversity. Seeing as we could already utilize the airport before its expansion, we deem that Juneau could be better kept pristine and beautiful by preserving the wetlands, instead of making a functional airport even bigger. We discourage the construction of a second bridge, as the most popular and ‘convenient’ choices for construction could be extremely harmful to the wetlands. We also suggest that the landfill not expand past the land it already occupies, and that greater care should go into the containment of the many harmful chemicals that are housed within the pits, and that any future pits that will be dug shall be lined. We discourage the expansion of the Temsco pad,
seeing as they already receive a steady flow of tourists without expansion. Preservation is our only hope to maintain this natural and unique neighborhood that we are lucky to have in such a close proximity to where we live.

Figures

**Figure 1.** The Mendenhall Wetlands

**Figure 2.** The Pontchartrain Basin.

**Figure 3.** The Pacific Flyway

**Figure 4.** The proposed 2nd crossings of the Gastineau channel
References Cited


