

WASHINGTON'S ESTUARIES: WHERE FRESHWATER MEETS SALTWATER AND PROTECTION  
SCHEMES COLLIDE

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I. INTRODUCTION

Along the coasts of Washington, in sheltered bays, inlets, and lagoons, freshwater rivers meet with saltwater and create a transition zone between the land and ocean called estuaries.<sup>2</sup> Estuaries are vital ecosystems that are defined by a mix of fresh and saltwater, constant change, productivity, and a plethora of unique habitats, plants, and animals. Estuaries offer a variety of ecosystem services making them vital to humans, including increased coastal resiliency. Estuary protection has been addressed by both Washington and the federal government. This article will focus on the protection of the water in estuaries, and in particular, how Washington protects the balance of fresh and saltwater in estuaries.

Washington has the potential to protect the balance of fresh and saltwater through both statutory regulation and the public trust doctrine, though the public trust doctrine has not necessarily been applied in Washington this way before. The Washington Marine Waters Planning and Mangement Act and the Washington Shoreline Management Act both regulate development of structures in estuaries and can be used to ensure estuaries are getting enough saltwater. On the other hand, the Washington Water Code, Minimum Water Flows and Levels Act, and Water Resources Act all attempt to protect minimum flows in rivers and streams, thus ensuring estuaries are getting enough freshwater. Meanwhile the public trust doctrine has proven an effective tool in protecting other aspects of estuaries and can likely be used to ensure that estuaries are able to maintain the proper balance of fresh and saltwater. Ultimately, the waters of estuaries in Washington are not explicitly protected, but there is a good legal basis for their protection in the future.

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<sup>2</sup> *What are Estuaries?*, NAT'L ESTUARINE RESEARCH RESERVE SYS., <https://coast.noaa.gov/estuaries/estuary-resources/> (last visited May 23, 2018).

## II. ESTUARIES

Generally, estuaries are areas where rivers hit the ocean.<sup>3</sup> The National Oceanic and Atmospheric Administration (NOAA) defines estuaries as the zone where fresh water mixes with saltwater.<sup>4</sup> Estuaries can include just one river system or can be expanded to include a larger body of salt water and all the rivers that run into it.<sup>5</sup> This article will focus on estuaries on the smaller end of the scale, one river as it reaches salt water. This section will focus on what estuaries are, why they are important, and why the balance of saltwater and freshwater within an estuary is so vital.

In order to understand the regulatory schemes that impact estuaries, one must first understand the characteristics of an estuary. First, estuaries are ever changing ecosystems, affected by tidal, weather, seasonal, and climate changes.<sup>6</sup> Second, estuaries are some of the most productive ecosystems, home to a vast array of unique habitats, plants, and animals.<sup>7</sup> Finally, estuaries provide several important ecosystem services, acting as natural filters, nurseries, and living shorelines.<sup>8</sup> As living shorelines, estuaries increase coastal resiliency to change, particularly change caused by climate change.<sup>9</sup> Essentially, estuaries serve as the mixing point between fresh and saltwater. Plants and animals rely on this cycle and balance of fresh and saltwater in order for the species to both survive and thrive.

### A. Estuaries are Constantly Changing Ecosystems

Within an estuary, the tides, weather, seasons, and climate are creating constant change.<sup>10</sup> Many of these variations are interconnected and stack upon

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<sup>3</sup> *What is an Estuary?*, NAT'L OCEAN SERV., <http://oceanservice.noaa.gov/facts/estuary.html> (last visited May 22, 2018) [hereinafter NOS Estuary].

<sup>4</sup> *Id.*

<sup>5</sup> *Id.*

<sup>6</sup> *Estuarine Dynamics: The Constantly Changing Estuary*, NAT'L ESTUARINE RESEARCH RESERVE SYS., <http://web.archive.org/web/20130220231546/http://estuaries.noaa.gov/About/Default.aspx?ID=226> (last visited May 23, 2018) [hereinafter NERR].

<sup>7</sup> NOS Estuary, *supra* note 3.

<sup>8</sup> *Id.* See also *What is a living shoreline?*, NAT'L OCEAN SERV., <http://oceanservice.noaa.gov/facts/living-shoreline.html> (last visited May 23, 2018) [hereinafter NOS Living Shoreline].

<sup>9</sup> *Id.*

<sup>10</sup> NERR, *supra* note 6.

each other to create more drastic changes. Tides bring consistent change to estuarine systems.<sup>11</sup> As the tides ebb and flow they create a twice daily cycle in estuaries.<sup>12</sup> Plants and animals in estuaries are well adapted to both extremes of this cycle.<sup>13</sup> At high tide, they are ready to be inundated with saltwater, while at low tide they are ready to be either dry or under mostly freshwater.<sup>14</sup> Additionally, tides offer several services to estuaries.<sup>15</sup> First, tides help to clear debris out of the estuary by loosening debris and flushing it out.<sup>16</sup> In addition, the tides bring nutrients from the ocean into the estuary and carry other nutrients from the estuary out into the ocean.<sup>17</sup> Third, tides move sediment both in and out of the estuary, which can lead to the creation or destruction of things like sandbars and barrier islands.<sup>18</sup> All of these changes refresh the estuary, keeping it healthy and productive, making tides a crucial part of the dynamic ecosystem.<sup>19</sup>

Weather is another element of an estuary's dynamic ecosystem.<sup>20</sup> The largest weather influence is the wind, as wind impacts estuaries with waves and currents.<sup>21</sup> Wind-spurred waves carry energy and help tides to move nutrients and sediments around the estuary.<sup>22</sup> Waves can also pound logs and other debris into the shore and disturb sessile animals or create new habitats for them.<sup>23</sup> Wind also often creates currents.<sup>24</sup> Currents move sediments, nutrients, and floating organisms along the coast from one estuary to another.<sup>25</sup> Currents can also erode shorelines or replenish barrier islands and sandbars, which can connect or cut off

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<sup>11</sup> *Id.*

<sup>12</sup> *Tides Estuarine Dynamics: Create Cyclical Changes in Estuaries*, NAT'L ESTUARINE RESEARCH RESERVE SYS., <http://web.archive.org/web/20151024075542/http://estuaries.noaa.gov/About/Default.aspx?ID=227> (last visited May 23, 2018).

<sup>13</sup> *Id.*

<sup>14</sup> *Id.*

<sup>15</sup> *Id.*

<sup>16</sup> NERR, *supra* note 6.

<sup>17</sup> *Id.*

<sup>18</sup> NOS Living Shoreline, *supra* note 8.

<sup>19</sup> NERR, *supra* note 6.

<sup>20</sup> *Estuarine Dynamics: Weather, Seasons and Climate Change*, NAT'L ESTUARINE RESEARCH RESERVE SYS., <http://web.archive.org/web/20151024191510/http://estuaries.noaa.gov/About/Default.aspx?ID=230> (last visited May 23, 2018).

<sup>21</sup> *Id.*

<sup>22</sup> *Id.*

<sup>23</sup> *Id.* Sessile animals include mussels, clams, and barnacles.

<sup>24</sup> *Id.* Floating organisms include phytoplankton and jellyfish.

<sup>25</sup> *Id.*

estuaries from other coastal systems.<sup>26</sup> Wind and other weather patterns create short term, less predictable change in estuaries.

Seasons, like tides, create more predictable change in estuaries. Varying amounts of rainfall, temperatures, and storms create seasonal cycles.<sup>27</sup> In Washington, winter and spring are often rainy, with spring also bringing snowmelt downriver from more mountainous areas away from the coast. The increase in freshwater flow during these seasons can flush debris and nutrients out of rivers into estuaries, and out of estuaries into the ocean.<sup>28</sup> During the winter, in parts of Washington's northern areas freezing temperatures can cause ice sheets to form, disrupting algae and invertebrate populations.<sup>29</sup> Often the summer heat and drier weather causes estuaries to become stagnate, resulting in lower oxygen content and higher water temperatures.<sup>30</sup> Additionally, late summer and autumn often bring more severe storms to estuaries on the open coast. Large storms can tear up shorelines, redistribute sediments and nutrients, and remove debris from estuaries.<sup>31</sup> Often these seasonal changes create a cycle for life in estuaries based on the availability of nutrients and the balance of fresh and saltwater.

However, climate change is creating change in estuaries that is less cyclical. Sea levels are rising due to glaciers and ice caps melting, as well as ocean waters warming and expanding.<sup>32</sup> Sea level rise threatens to flood estuaries and upset the balance of salt and freshwater that estuarine organisms depend on.<sup>33</sup> While estuaries are constantly changing due to tides, weather, and seasons, the changes caused by climate change are having a dramatic effect on the health and productivity of estuaries.

#### B. Estuaries are Some of the Most Productive Ecosystems on the Planet

Estuaries are unique ecosystems that are extremely productive.<sup>34</sup> NOAA defines productive ecosystems as “a biological system that efficiently converts

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<sup>26</sup> *Id.*

<sup>27</sup> *Id.*

<sup>28</sup> *Id.*

<sup>29</sup> *Id.*

<sup>30</sup> *Id.*

<sup>31</sup> *Id.*

<sup>32</sup> *Id.*

<sup>33</sup> *Id.*

<sup>34</sup> NOS Estuary, *supra* note 3.

energy into growth and production.”<sup>35</sup> Part of the reason estuaries are prolific ecosystems is they are home to a variety of habitats.<sup>36</sup>

Estuarine habitats are often defined by their biological make up.<sup>37</sup> Some of these habitats are defined by their lack of vegetation, such as uninterrupted water columns, rocky shores and bottoms, or soft shores and bottoms.<sup>38</sup> Other habitats such as kelp forests and microalgae beds are defined solely by their vegetation.<sup>39</sup> The majority of remaining habitats are defined by their unique mix of plants and animals, such as coastal (or salt) marshes, deep-water swamps, riverine forests, and mangroves.<sup>40</sup> Each of these habitats require a certain level of salinity in order to thrive; too much or too little saltwater may impact the plant and animals that can survive.<sup>41</sup>

Estuarine habitats are also defined by their tidal zone, which make estuarine habitats unique from all other habitats.<sup>42</sup> Estuarine habitats are divided into three tidal zones: (1) supratidal; (2) intertidal; and (3) subtidal.<sup>43</sup> Supratidal zones are the areas above the high tide mark.<sup>44</sup> They are home to terrestrial animals and plants that have adapted to the occasional exposure to salt or brackish water.<sup>45</sup> This often includes trees, shrubs, deer, fox, birds, and various reptiles.<sup>46</sup> Intertidal zones are the areas exposed to air at low tide and submerged underwater

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<sup>35</sup> *Estuary Glossary*, NOAA ESTUARY EDUCATION, <https://coast.noaa.gov/estuaries/estuary-resources/glossary.html> (last visited May 23, 2018).

<sup>36</sup> *Life in an Estuary: What Types of Plants and Animals Live in Estuaries?*, NAT’L ESTUARINE RESEARCH RESERVE SYS., <http://web.archive.org/web/20161115113525/http://estuaries.noaa.gov/about/default.aspx?ID=231> (last visited May 23, 2018).

<sup>37</sup> *Id.*

<sup>38</sup> *Life in an Estuary: Estuarine Habitats*, NAT’L ESTUARINE RESEARCH RESERVE SYS., <http://web.archive.org/web/20151022182606/http://estuaries.noaa.gov/About/Default.aspx?ID=233> (last visited May 23, 2018) [hereinafter NERR Habitats].

<sup>39</sup> *Id.*

<sup>40</sup> *Id.*

<sup>41</sup> *Estuaries: Adaptations to Life in the Estuary*, NOAA OCEAN SERV. EDUC., [http://oceanservice.noaa.gov/education/kits/estuaries/estuaries07\\_adaptations.html](http://oceanservice.noaa.gov/education/kits/estuaries/estuaries07_adaptations.html) (last visited May 22, 2018).

<sup>42</sup> NERR Habitats, *supra* note 38.

<sup>43</sup> *Id.*

<sup>44</sup> *Life in an Estuary: Tidal Zones*, NAT’L ESTUARINE RESEARCH RESERVE SYS., <http://web.archive.org/web/20151022182309/http://estuaries.noaa.gov/About/Default.aspx?ID=236> (last visited May 23, 2018).

<sup>45</sup> *Id.*

<sup>46</sup> *Id.*

at high tide.<sup>47</sup> These zones can range from steep cliffs, to sandy beaches, or vast mudflats.<sup>48</sup> Organisms in this zone must be able to survive being submerged under either saltwater at high tide or freshwater during high runoff periods, as well as being able to be dry at low tide.<sup>49</sup> In this zone, organisms often include shore birds, snails, mussels, oysters, and burrowing worms.<sup>50</sup> Subtidal zones are the areas below the low tide mark that always have water, such as tide pools.<sup>51</sup> While these areas always have water, the salinity of the water varies based on tide and river inputs.<sup>52</sup> Organisms here, such as fish, starfish, crabs, and dolphins, cannot handle long exposure to sun or air.<sup>53</sup>

The variety of habitats and tidal zones mean that estuaries are extremely productive ecosystems. Since these zones rely on the correct balance of salt and fresh water, that balance is important for maintaining the high productivity of an estuary. In order for estuaries to provide the many natural services that both humans and other organisms rely upon, it is important that estuaries maintain this correct balance of fresh and saltwater.

### C. Estuaries Offer a Variety of Ecosystem Services

Often the importance of estuaries is boiled down to its ecosystem services, which are the “benefits people obtain from ecosystems.”<sup>54</sup> Ecosystem services can be categorized into four groups: (1) provisioning services; (2) regulating services; (3) supporting services; and (4) cultural services.<sup>55</sup>

First, provisioning services are those services which provide humans with a good, as estuaries provide humans with a number of important resources.<sup>56</sup> The largest provision that estuaries provide is food, as estuaries provide the habitat for more than 75% of the seafood caught in the United States.<sup>57</sup> As a result, estuaries

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<sup>47</sup> *Id.*

<sup>48</sup> *Id.*

<sup>49</sup> *Id.*

<sup>50</sup> *Id.*

<sup>51</sup> *Id.*

<sup>52</sup> *Id.*

<sup>53</sup> *Id.*

<sup>54</sup> *More About Ecosystem Services*, U.S. FOREST SERV., [http://www.fs.fed.us/ecosystemservices/About\\_ES/index.shtml](http://www.fs.fed.us/ecosystemservices/About_ES/index.shtml) (last visited May 22, 2018).

<sup>55</sup> *Id.*

<sup>56</sup> *Id.*

<sup>57</sup> *Estuaries & You: Commercial Economic Benefites*, NAT’L ESTUARINE RESEARCH RESERVE SYS.,

also provide a commercial benefit from a healthy seafood industry, including jobs and exports for the global market.<sup>58</sup> In addition to food and a seafood industry, estuaries also provide other goods, such as fertilizer.<sup>59</sup>

Second, regulating services are those services that regulate resources, climate, or disease.<sup>60</sup> Estuaries act as pollution filters and nutrient regulators. Estuaries act as filters for a small amount of pollutants that enter the ocean.<sup>61</sup> Vegetation in estuaries filters pollutants and traps it within the estuarine sediment.<sup>62</sup> Additionally, estuaries regulate the carbon cycle by acting as large carbon sinks.<sup>63</sup> Estuaries, especially marshes, sequester carbon dioxide out of the atmosphere helping to mitigate the effects of climate change.<sup>64</sup>

Third, supporting services are those services that support soil formation and nutrient cycling.<sup>65</sup> Support services from estuaries include acting as a living shoreline and cycling nutrients.<sup>66</sup> Living shorelines is a term used for natural infrastructure that increases coastal resiliency.<sup>67</sup> As sea levels rise living shorelines will offer further protection to coastlines by buffering waves and storms.<sup>68</sup> The living shorelines also help collect silt and sedimentation allowing shorelines to grow, further mitigating sea level rise.<sup>69</sup> Estuaries are a crucial part of a living shoreline because they can act as buffers for flooding, as well as

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<http://web.archive.org/web/20151024080320/http://estuaries.noaa.gov/About/Default.aspx?ID=245> (last visited May 23, 2018).

<sup>58</sup> *Id.*

<sup>59</sup> *Id.*

<sup>60</sup> U.S. FOREST SERV., *supra* note 54.

<sup>61</sup> *Life in an Estuary: Unwanted Visitors*, NAT'L ESTUARINE RESEARCH RESERVE SYS., <http://web.archive.org/web/20151023001529/http://estuaries.noaa.gov/About/Default.aspx?ID=238> (last visited May 23, 2018).

<sup>62</sup> *Id.*

<sup>63</sup> NOS Living Shoreline, *supra* note 8. A carbon sink is a natural system that stores carbon once it has been sequestered from the atmosphere. Andrea Thompson, *What is a Carbon Sink?*, LIVESCIENCE, <http://www.livescience.com/32354-what-is-a-carbon-sink.html> (last visited May 23, 2018).

<sup>64</sup> NOS Living Shoreline, *supra* note 8.

<sup>65</sup> U.S. FOREST SERV., *supra* note 54.

<sup>66</sup> *Estuaries & You: Estuaries are Vital to Humans*, NAT'L ESTUARINE RESEARCH RESERVE SYS., <http://web.archive.org/web/20151024064752/http://estuaries.noaa.gov/About/Default.aspx?ID=244> (last visited May 23, 2018) [hereinafter NERR, *Estuaries are Vital to Humans*].

<sup>67</sup> NOS Living Shoreline, *supra* note 8. Living shorelines include estuaries as well as other natural shorelines, as opposed to developed shorelines. *Id.*

<sup>68</sup> *Id.*

<sup>69</sup> *Id.*

provide the coast with sedimentation from upstream areas.<sup>70</sup> The nutrient cycle is the recycling of nutrients and elements necessary for life; it includes the carbon, nitrogen, oxygen, and phosphorous cycles.<sup>71</sup> Nitrogen and phosphorous cycling are particularly important in estuaries.<sup>72</sup> Both of these elements often come down river as runoff from decomposing animals and plants, human and animal waste, and fertilizer.<sup>73</sup> While these nutrients are essential for many organisms, if there is an overabundance of these nutrients low oxygen conditions can develop injuring many other types of plants and animals. Estuaries play a key role in keeping these nutrients balanced to protect the nearby waters while also allowing organisms to grow.<sup>74</sup>

Finally, cultural services are those services that don't provide tangible resources but provide, among other things, educational, aesthetic, and recreational benefits.<sup>75</sup> Estuaries deliver a number of cultural services including a large number of recreational benefits.<sup>76</sup> Estuaries are often part of large city and trade centers.<sup>77</sup> Many Native American tribes have historic ties to estuaries for resources that are still used today by the tribes.<sup>78</sup> Additionally, recreational activities, such as fishing, boating, and hiking are popular in estuarine areas.<sup>79</sup> These activities bring various types of eco-tourism to local communities.<sup>80</sup> Estuaries also offer students and scientists the opportunity to learn about complex natural processes.<sup>81</sup>

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<sup>70</sup> *Why are Estuaries Important? Ecosystem Services*, NOAA OCEAN SERV. EDUC., [https://oceanservice.noaa.gov/education/tutorial\\_estuaries/est03\\_ecosystem.html](https://oceanservice.noaa.gov/education/tutorial_estuaries/est03_ecosystem.html) (last visited May 22, 2018).

<sup>71</sup> *Interactions: Estuaries' Role in the Nutrient Cycle*, ESTUARY EDUC.: NAT'L ESTUARINE RESEARCH RESERVE SYS., <http://web.archive.org/web/20151024075707/http://estuaries.noaa.gov/About/Default.aspx?ID=22> (last visited May 23, 2018).

<sup>72</sup> *Id.*

<sup>73</sup> *Id.*

<sup>74</sup> *Id.*

<sup>75</sup> U.S. FOREST SERV., *supra* note 54.

<sup>76</sup> NERR, *Estuaries are Vital to Humans*, *supra* note 66.

<sup>77</sup> *Estuaries & You: Cultural Importance*, NAT'L ESTUARINE RESEARCH RESERVE SYS., <http://web.archive.org/web/20130222163910/http://estuaries.noaa.gov/About/Default.aspx?ID=24> (last visited May 23, 2018).

<sup>78</sup> *Id.*

<sup>79</sup> *Estuaries & You: Recreational Benefits*, NAT'L ESTUARINE RESEARCH RESERVE SYS., <http://web.archive.org/web/20151024071618/http://estuaries.noaa.gov/About/Default.aspx?ID=24> (last visited May 23, 2018).

<sup>80</sup> *Id.*

<sup>81</sup> *Id.*



The large assortment of ecosystems services that estuaries deliver make estuaries vital to humans.<sup>82</sup> Estuaries are part of our economy, hobbies, and culture.<sup>83</sup> They help keep the coast healthy and strong. It is important that we protect estuaries and maintain the careful balance of fresh and saltwater so we can continue to benefit from these services.

#### D. The Importance of Maintaining Fresh and Saltwater in an Estuary

One of the essential components of estuarine health is the balance of salt and freshwater. Most plants and animals that live in estuaries are euryhaline, organisms that can tolerate changing salinity and life in brackish water.<sup>84</sup> The plants and animals that live in the supratidal and subtidal zones are often stenohaline, meaning they can only handle slight changes in salinity and need water to stay mostly fresh or mostly salt.<sup>85</sup> If either the saltwater or freshwater is blocked from reaching an estuary, the zones within the estuary with high salinity, changing salinity, and low salinity will shift. While many animals might be able to relocate to their preferred salinity, plants, which animals and the estuary rely on, cannot and will often die.<sup>86</sup> In order to protect estuary health we must protect the amount of freshwater and the amount of saltwater that reaches the estuary. While many legal schemes protect estuaries, the rest of this article will examine how well those schemes protect the balance of saltwater and freshwater within estuaries.

### III. LEGAL PROTECTION

There are many aspects to consider when protecting estuaries. In order to keep the plants, animals, and ecosystem services described above, both the land and water components of estuaries must be protected. In order to protect the balance of salt and freshwater, estuaries must have sufficient access to both types of water. This section will briefly discuss the federal protection of estuaries before moving on to focus on protections provided by the state of Washington. However,

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<sup>82</sup> NERR, Estuaries are Vital to Humans, *supra* note 66.

<sup>83</sup> *Id.*

<sup>84</sup> *Adaptations to Life in the Estuary*, NOAA OCEAN SERV. EDUC., [http://oceanservice.noaa.gov/education/kits/estuaries/estuaries07\\_adaptations.html](http://oceanservice.noaa.gov/education/kits/estuaries/estuaries07_adaptations.html) (last visited May 22, 2018).

<sup>85</sup> *Id.*

<sup>86</sup> *Id.*

each of the federal and state protection schemes differ greatly, potentially leaving estuaries at risk.

### A. Federal Estuary Protection

The federal government has several protection schemes for estuaries. While an in-depth discussion of these schemes falls outside of the scope of this article, they warrant a brief mention. The National Estuarine Research Reserve System (NERRS),<sup>87</sup> National Estuary Program (NEP),<sup>88</sup> the Agricultural Conservation Easement Program – Wetland Reserve Easements (ACEP-WRE),<sup>89</sup> the Estuary Restoration Act of 2000,<sup>90</sup> and Chapter 26 of Title 16 of the U.S. Code, entitled Estuarine Health,<sup>91</sup> all aim to protect estuary health. However, each of these protection schemes has flaws, meaning that if the state of Washington wants to fully protect its estuaries, it needs to fill these gaps.

The NERRS and NEP only protect the particular estuaries designated by Congress.<sup>92</sup> The ACEP-WRE focuses only on restoring wetland or marsh estuaries to lands that had been converted to agriculture and can be cost-effectively restored.<sup>93</sup> The Estuary Restoration Act covers only those estuaries chosen by the Secretary of the Interior and is limited by the funds allotted by Congress.<sup>94</sup> Additionally, both the ACEP-WRE and the Estuary Restoration Act are reactionary, protecting estuaries only after damage has occurred to the estuary rather than proactively protecting the resource.<sup>95</sup> Title 16, Chapter 26 lays out

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<sup>87</sup> *About National Estuarine Research Reserves*, NAT'L ESTUARINE RESEARCH RESERVE SYS., <https://coast.noaa.gov/nerrs/about/> (last visited May 22, 2018) [hereinafter NERR, About NERRs].

<sup>88</sup> *Overview of the National Estuary Program*, NAT'L ESTUARY PROGRAM, <https://www.epa.gov/nep/overview-national-estuary-program> (last visited May 22, 2018) [hereinafter NEP].

<sup>89</sup> *Agricultural Conservation Easement Program*, NATURAL RES. CONSERVATION SERV. WASHINGTON, <https://www.nrcs.usda.gov/wps/portal/nrcs/main/wa/programs/easements/acep/> (last visited May 23, 2018) [hereinafter NRCS].

<sup>90</sup> Estuary Restoration Act of 2000, Pub. L. No 106-457, 114 Stat. 1958 (2000).

<sup>91</sup> 16 U.S.C. §1221.

<sup>92</sup> NERR, About NERRs, *supra* note 87. The NERR system was established by the Coastal Zone Management Act. The NEP was established by the Clean Water Act. Together they cover 56 major estuaries nationwide. NEP, *supra* note 88. In Washington, the NERRs protect Padilla Bay and the NEP protects Puget Sound.

<sup>93</sup> NRCS, *supra* note 89. Within this program, the Natural Resource Conservation Service funds estuary restoration and protection in Washington, but the program is limited to when funds become available.

<sup>94</sup> Estuary Restoration Act, *supra* note 90.

<sup>95</sup> *See generally*, NRCS, *supra* note 89; Estuary Restoration Act, *supra* note 90.

Congress's intention to protect estuaries<sup>96</sup> and requires the Secretary of the Interior to consider impacts to estuaries when making recommendations about coastal commercial projects,<sup>97</sup> but it does not inhibit federal power to build in estuaries.<sup>98</sup> Ultimately each of these protection schemes are valuable for protecting estuaries, but they do not eliminate the need for Washington to also regulate to protect estuaries.

B. Washington's Statutory Scheme Protecting Estuaries' Saltwater.

As described above, saltwater is a vital component to estuarine health. As climate change causes ocean levels to rise, it is unlikely that a lack of salt water will occur in Washington's estuaries. However, dikes, jetties, seawalls, and other hard-shoreline structures can keep saltwater from reaching estuaries and are the main threat to maintaining the required amount of saltwater in the estuary, especially if they are used to try and create a resilient shoreline.<sup>99</sup> As briefly mentioned above, estuaries do a much better job than these structures in creating a resilient shoreline.<sup>100</sup>

Washington has two statutory schemes that regulate development that might impact an estuaries' saltwater. The Marine Waters Planning and Management Act (MWPMA)<sup>101</sup> and the Shoreline Management Act of 1971 (SMA)<sup>102</sup> both regulate marine development. The MWPMA and SMA both address the threat hard-shoreline structures pose to estuaries, but do not explicitly protect the saltwater flowing into the estuaries.

The purpose of the MWPMA is to establish policies to build upon existing efforts to create marine spatial plans<sup>103</sup> and "guide state agencies and local governments when exercising jurisdiction over proposed uses and activities" in marine waters. Under the MWPMA, a marine interagency team must create a

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<sup>96</sup> 16 U.S.C. §1221.

<sup>97</sup> *Id.* §1224.

<sup>98</sup> *Id.* §1226.

<sup>99</sup> NOS Living Shoreline, *supra* note 8.

<sup>100</sup> *Id.*

<sup>101</sup> WASH. REV. CODE § 43.372.

<sup>102</sup> *Id.* § 90.58.

<sup>103</sup> *Id.* § 43.372.005.

comprehensive management plan.<sup>104</sup> When creating the plan, the state must protect estuarine life and habitats,<sup>105</sup> and as shown above, estuary health relies on the correct amount saltwater. Therefore, when creating the plan, the state should consider protecting the flow of saltwater into the estuary by not allowing development to occur within the estuary.

The development of the management plan must also promote the “protection and restoration of ecosystem processes to a level that will enable long-term sustainable production of ecosystem goods and services.”<sup>106</sup> Estuaries are key ecosystems for production, thus the plan must promote the protection and restoration of estuary processes. The majority of these processes require a certain amount of saltwater. Therefore, when creating the management plan the marine interagency team should consider strategies to promote the continual flow of saltwater into estuarine systems.

The plan must also address impacts of climate change and sea level rise.<sup>107</sup> Estuaries protect against sea level rise by acting as a living shoreline, and they manage the increasing saltwater better than a sea wall or dike. This should only add to the marine interagency team’s willingness to include guidance to prevent structures that would impede saltwater from reaching estuarine systems, thus destroying the estuary.

While the management plan requirements laid out by the MWPMA seem to adequately compel the marine interagency team to consider the influx of saltwater into estuaries, there is a flaw with this regulatory scheme. The MWPMA only comes into effect when funding becomes available.<sup>108</sup> In fact, the marine interagency team is barred from creating the comprehensive marine management plan without federal, private, or other types of funding.<sup>109</sup> In the absence of funding, the management plan for certain estuarine areas will not be created or later updated, and without an updated plan, estuaries might be at risk of getting cut off from their saltwater source due to development.

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<sup>104</sup> *Id.* § 43.372.040. The marine interagency team is created by the office of the governor and includes a representative from each agency in the governor’s natural resources cabinet as well as a representative from a federal agency in charge of marine spatial planning. *Id.* § 43.372.020.

<sup>105</sup> *Id.* § 43.372.005.

<sup>106</sup> *Id.* § 43.372.040.

<sup>107</sup> *Id.*

<sup>108</sup> *Id.*

<sup>109</sup> *Id.* § 43.372.020.

Unlike the MWPMA, funding does not limit the SMA. The SMA recognizes that shorelines are fragile, often overused resources that need coordinated management and protection.<sup>110</sup> Further, the Washington State Supreme Court has recognized that the SMA was enacted, in part, to protect to the environment.<sup>111</sup> Shorelines are defined as all water areas of the state and are differentiated from “shorelines of statewide significance.”<sup>112</sup> “Shorelines of statewide significance” include the entirety of the state’s marine shorelines.<sup>113</sup> The SMA requires that the “interest of all of the people shall be paramount in the management of shorelines of statewide significance.”<sup>114</sup>

There are three divisions of shorelines of statewide significance relevant to this paper.<sup>115</sup>

- (1) The area between the ordinary high tide mark and the western edge of the state along the Pacific coast;<sup>116</sup>
- (2) The estuarine areas of Puget Sound designated by statute, the Nisqually Delta, Birch Bay, Hood Canal, Skagit Bay, and Padilla Bay, between the ordinary high tide mark and the extreme low tide mark,<sup>117</sup> and
- (3) All other areas of the Puget Sound and Strait of Juan de Fuca laying waterward of the extreme low tide line.<sup>118</sup>

The first and second categories also include the associated shorelands, while the third category does not.<sup>119</sup> This distinction is important because the SMA could

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<sup>110</sup> *Id.* § 90.58.020.

<sup>111</sup> *Orion Corp. v. State* 109 Wn.2d 621, 660-61 (Wash. 1987) (citing *Dep’t of Ecology v. Pacesetter Constr. Co.* 89 Wn.2d 203, 214 (Wash. 1977)).

<sup>112</sup> WASH. REV. CODE § 90.58.030. The definition of shorelines includes reservoirs, lakes, and streams, with some restriction based on size. *Id.* This paper focuses on marine shorelines rather than the freshwater shorelines also included in the SMA.

<sup>113</sup> *Shorelines of Statewide Significance*, DEP’T OF ECOLOGY, STATE OF WASHINGTON, <https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Shoreline-coastal-planning/Shoreline-Management-Act-SMA/Shoreline-Management-Act-jurisdiction/Shorelines-of-statewide-significance> (last visited May 23, 2018).

<sup>114</sup> WASH. REV. CODE § 90.58.020 (1971).

<sup>115</sup> There are two additional divisions of “shorelines of statewide significance” which focus on non-marine waters including rivers and lakes. *Id.* § 90.58.030.

<sup>116</sup> *Id.*

<sup>117</sup> *Id.*

<sup>118</sup> *Id.*

limit development on some shorelands but not others. Since the development of shorelands could promote the further development of tidelands or estuaries, where shoreland development is limited estuaries are further protected from development that would isolate them from their saltwater source.

Local governments are required to work with the Washington Department of Ecology to create shoreline management plans (SMPs).<sup>120</sup> When creating these SMPs for shorelines of statewide significance, they must give different land uses preference as designated by statute.<sup>121</sup> In order, these uses consist of those which:

- (1) Recognize and protect the statewide interest over local interest;
- (2) Preserve the natural character of the shoreline;
- (3) Result in long term over short term benefit;
- (4) Protect the resources and ecology of the shoreline;
- (5) Increase public access to publicly owned areas of the shorelines;
- (6) Increase recreational opportunities for the public in the shoreline; and
- (7) Provide for any other element as defined in RCW 90.58.100 deemed appropriate or necessary.<sup>122</sup>

While none of these uses specifically address estuaries, uses (2) and (4) address the ecologic value of estuaries, while use (6) addresses their recreational benefits. When appropriate, the plans must also include a conservation element for the preservation of resources including estuarine areas for fisheries and wildlife protection.<sup>123</sup> Therefore, the SMP should address estuary health, which includes saltwater's ability to flow into the estuary.

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<sup>119</sup> *Id.* Shorelands are defined as all land extending landward 200 feet in all directions from the ordinary high tide mark. *Id.*

<sup>120</sup> *Id.* § 90.58.050. The SMA includes a time frame for each county to create their new SMP as well as a timeframe for amending the SMP in the future. *Id.* §90.58.080.

<sup>121</sup> *Id.* § 90.58.020.

<sup>122</sup> *Id.*

<sup>123</sup> *Id.* § 90.58.100.

Outside of the SMPs, the SMA also protects estuaries by limiting development. Since the SMA requires permits for all development on the “shorelines of the state,”<sup>124</sup> it potentially limits development in these areas.<sup>125</sup> A permit may only be granted if it is consistent with the SMP for the area.<sup>126</sup> If the SMP aims to protect estuaries, all development permit applications will need to consider estuarine impacts. This means that the SMA, and a properly created SMP, should be able to limit hard shoreline structures. This is particularly true when protecting estuaries for the ecosystem services they offer, including the positive impacts on coastal resiliency.

It is likely that the MWPMA and SMA protect the requisite amount of saltwater to keep an estuary healthy and limit hard structures that hurt both estuaries and coastal resiliency. Thus, the connection to saltwater that is vital to estuary health is likely protectable under Washington statute. However, the freshwater component is likely in jeopardy.

### C. The Regulatory Scheme Impacting the Freshwater in Washington’s Estuaries

Freshwater is just as vital as saltwater in ensuring estuarine health. By far the greatest threat to freshwater reaching the estuary is the river drying up before it reaches the saltwater. One tactic for protecting the balance of fresh and saltwater in an estuary would be to ensure that freshwater is reaching the estuary by requiring rivers to have a set minimum or base flow. This flow would be a water right for fish and other instream resources, including estuary health.<sup>127</sup> The Washington Department of Ecology is required to establish minimum flows by the Washington Water Code,<sup>128</sup> the Minimum Water Flows and Levels Act of 1967,<sup>129</sup> and the Water Resources Act of 1971 (WRA).<sup>130</sup>

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<sup>124</sup> “Shorelines of the state” include shorelines and shorelines of statewide significance. *Id.* § 90.58.030.

<sup>125</sup> *Id.* § 90.58.140.

<sup>126</sup> *Id.*

<sup>127</sup> *Protecting Stream Flows*, DEP’T OF ECOLOGY, STATE OF WASHINGTON, <https://ecology.wa.gov/Water-Shorelines/Water-supply/Protecting-stream-flows> (last visited May 23, 2018) [hereinafter DEP’T OF ECOLOGY].

<sup>128</sup> WASH. REV. CODE § 90.03.247.

<sup>129</sup> *Id.* § 90.22.010.

<sup>130</sup> *Id.* § 90.54.010; DEP’T OF ECOLOGY, *supra* note 127.

The Washington Water Code grants the Department of Ecology exclusive authority to establish minimum flows and levels.<sup>131</sup> When setting minimum flows, the Department of Ecology must consult and consider the recommendations of the Department of Fish and Wildlife, the Department of Commerce, the Department of Agriculture, and representatives of any affected Indian tribe.<sup>132</sup>

The Minimum Water Flows and Levels Act of 1967 dictates how the Department of Ecology may set minimum flows.<sup>133</sup> It states that the Department of Ecology may “establish minimum water flows or levels for streams, lakes or other public waters for the purposes of protecting fish, game, birds or other wildlife resources, or recreational or aesthetic values of said public waters whenever it appears to be in the public interest to establish the same.”<sup>134</sup> The flows needed to support estuaries would fall under the protection of the purposes of this act.

The WRA lays out Washington’s plan for water management at a watershed level to meet the needs of people, farms, and fish.<sup>135</sup> The intent of the legislature in creating the WRA was to ensure that the legislature, executive branch, Indian tribes, local governments, and interested parties work closely together to wisely manage the water resources of the state.<sup>136</sup> One of the fundamental goals of the WRA is protecting the natural environment, including retaining the base flows necessary to protect wildlife, fish, and other environmental values.<sup>137</sup> Withdrawals from these base flows are only permitted where clear, overreaching public interest exists, and the cases where this occurs is limited.<sup>138</sup>

Minimum or base flows can be vital in keeping water in streams for fish and other wildlife to use. The minimum flows required by the Water Code, the Minimum Water Flows and Levels Act, and the WRA could protect the amount of water entering estuaries; however, these flows are treated as a water right.<sup>139</sup> Washington is a prior appropriation state, meaning that water rights are “first in

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<sup>131</sup> *Id.* § 90.03.247.

<sup>132</sup> *Id.*

<sup>133</sup> *Id.* § 90.22.020.

<sup>134</sup> *Id.* § 90.22.010.

<sup>135</sup> *Id.* § 90.54.005.

<sup>136</sup> *Id.* § 90.54.005.

<sup>137</sup> *Id.* § 90.54.020.

<sup>138</sup> *Id.*

<sup>139</sup> DEP’T OF ECOLOGY, *supra* note 127.



time... first in right.”<sup>140</sup> Thus, in times of shortage water users with earlier priority dates retain access to their rights while junior users must give up their right to use the water. When the Department of Ecology creates a rule mandating a minimum flow, the priority date is thirty days after the date of rule adoption.<sup>141</sup> For estuaries, this means that if the Department of Ecology sets a minimum stream flow to protect the amount of freshwater entering an estuary, that minimum flow might still not exist in dry years due to senior water right holders withdrawing all the water before it reaches the estuary. Therefore, even the minimum flows required by the Department of Ecology may not fully protect the flow of freshwater into estuaries. Additionally, the Department of Ecology has been extremely hesitant to create instream flows, especially in basins where water scarcity is likely.

Another tactic that might be used to protect instream flows involves water quality. Under the federal Clean Water Act,<sup>142</sup> the state of Washington has created water quality standards. In *PUD No. 1 v. Wash. Dep’t of Ecology*, the U.S. Supreme Court ruled that these standards could include water quantity.<sup>143</sup> When setting water quality standards, a state may use an instream flow requirement to enforce designated uses within those standards.<sup>144</sup> What this means for Washington is that if instream flows are important for maintaining current or creating new water quality standards, there is another mechanism for enforcement of those instream flows through the Clean Water Act and the permits it requires. However, this is a pretty convoluted tactic and would have to start with rulemaking to create the standards. Then if non-compliance occurred, any water rights junior to the instream flow would need to be cut off in order to protect the flow. Both of these stages would likely include lengthy litigation.

The lack of freshwater in streams poses a direct threat to Washington’s estuaries despite the fact that the regulatory scheme appears to protect a certain amount of freshwater instream. There are several regulatory schemes that should protect instream flows, and thus protect the freshwater entering Washington’s

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<sup>140</sup> WASH. REV. CODE § 90.03.010. Water rights may only be acquired by “appropriation for beneficial use.” *Id.* The Water Code, the Minimum Water Flows and Levels Act, and the WRA have made it clear that instream use is a beneficial use if promoting wildlife, fish, and other environmental values.

<sup>141</sup> DEP’T OF ECOLOGY, *supra* note 127.

<sup>142</sup> 33 U.S.C. §§ 1251-1376.

<sup>143</sup> *PUD No. 1 v. Wash. Dep’t of Ecology*, 511 U.S. 700 (1994).

<sup>144</sup> *Id.* at 723.

estuaries. However, there is a lack of action within the schemes leaving Washington's instream flows and estuaries at risk.

#### D. The Public Trust Doctrine may Protect both the Salt and Freshwater Components of Washington's Estuaries

Washington's statutes may partially protect the balance of fresh and saltwater depending on the amount of freshwater available, but the public trust doctrine may protect the delicate water balance needed by estuaries. The Washington Supreme Court recognizes that the public trust doctrine has existed within the state from statehood.<sup>145</sup> In Washington, the doctrine has always protected a right of navigation and a right to fisheries.<sup>146</sup> More recently these interests have expanded to include boating, swimming, water skiing, and other related recreational activities that are connected to the use of public waters.<sup>147</sup>

The public trust doctrine has been used in Washington to prevent development on estuaries.<sup>148</sup> In *Orion Corporation v. State*, a private developer wished to fill parts of Padilla Bay, an estuary in the north part of the Puget Sound, to develop them into a Venetian-style community.<sup>149</sup> After being told that they could not build due to the SMA, the developer sued for takings damages.<sup>150</sup> On remand the lower court found that the bay was navigable for the purposes of public recreational navigation, and thus, was covered by the public trust doctrine.<sup>151</sup> Since the bay was protected by the public trust doctrine, the developer could not use the tideland in any way that impacted the public trust.<sup>152</sup> It was important that the public trust reinforced the SMA because it meant that the state

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<sup>145</sup> *Caminiti v. Boyle*, 107 Wn.2d 662, 669 (Wash. 1987).

<sup>146</sup> *Id.*

<sup>147</sup> *Id.* (quoting *Wibour v. Gallagher*, 77 Wn.2d 306, 316 (Wash. 1969)).

<sup>148</sup> *Orion Corp. v. State*, 109 Wn.2d 621 (Wash. 1987).

<sup>149</sup> *Id.* at 626. In 1980, Padilla Bay was selected to be part of NOAA's National Estuarine Research Reserve System. *About Padilla Bay*, DEP'T OF ECOLOGY, STATE OF WASHINGTON, <https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Padilla-Bay-reserve/About-Padilla-Bay> (last visited May 23, 2018). This designation was part of the court's reasoning in determining that the SMA prevented development of the estuary in *Orion Corp. v. State*, 103 Wn.2d 441, 444 (Wash. 1985).

<sup>150</sup> *Orion Corp.*, 109 Wn.2d at 624-625.

<sup>151</sup> *Id.* at 641.

<sup>152</sup> *Id.* Under the public trust doctrine, the state is merely exercising a right it already has rather than regulating private property; therefore, there can be no takings claims if the public trust is involved because there is no taking of private property. Ralph W. Johnson, Craighton Goeppele, David Jansen & Rachael Paschal, *The Public Trust Doctrine and Coastal Zone Management in Washington State*, 67 WASH. L. REV. 521, 525 (1992).

could fully protect Padilla Bay without fear of being liable for takings claims. This same tactic will likely prove just as effective at stopping development in other estuaries, including those developments that are designed to keep saltwater away from the estuaries, such as dikes.

Washington's public trust doctrine may also help to protect the freshwater flowing into estuaries. If the courts were to examine the need to have freshwater in estuaries to protect public trust resources, it is likely that they will rule that the state is required to have at least some instream flow. It is unlikely that such a case would be brought, but a plaintiff could attempt to show that upstream water use was impacting downstream public trust uses. For instance, an interested group could bring a case based on the effects of upstream water use on estuarine fisheries. However, given the strength of water rights protection in Washington,<sup>153</sup> it is unclear how the state would move forward from a court ruling and change water rights in order to protect estuaries without a major policy shift.

Washington's public trust doctrine has strong precedent and is a useful tool in protecting the state's estuaries, if people choose to use it in the courts. However, the doctrine offers the same complications as Washington's statutory schemes. While the public trust doctrine clearly protects the saltwater component of estuaries, it is less clear if it will adequately protect the freshwater component necessary to keep estuaries healthy and functioning. While it limits development that might block the flow of saltwater, it has never been tested as a method for combating upstream water rights to protect the flow of freshwater into an estuary.

#### IV. CONCLUSION

Estuaries are vital ecosystems found up and down the Washington coastline where freshwater reaches saltwater and life flourishes. Estuaries are important to people for many reasons, as they are ever changing areas that promote habitat and biodiversity. These habitats often offer people services such as pollution control and security against rising ocean levels. As climate change continues to impact our coastlines, the coastal resiliency that estuaries offer will become increasingly important. The vast biodiversity of estuaries offers people food, jobs, and unique recreational opportunities. It is important that we continue to protect the state's estuaries and the balance of saltwater and freshwater that keeps them healthy and productive.

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<sup>153</sup> Existing water rights have always been protected by new water resource legislation in the state. *See Caminiti v. Boyle*, 107 Wn.2d. 662 (Wash. 1987).

Washington's statutes attempt to protect the salt and freshwater that flows in and out of estuaries. The MWPMA and SMA both can prevent development that would cut estuaries off from the surrounding saltwater. An array of freshwater legislation attempts to protect instream flows, which would protect the freshwater that estuaries need. However, instream flows are still at risk in some basins depending on the priority date of the instream flow right and the Department of Ecology's willingness to set the instream flow. While Washington's statutes announce a state policy for protecting estuaries, they fail to fully live up to this goal by not completely protecting the balance of salt and freshwater in the state's estuaries.

Washington also has a strong public trust doctrine. The courts have ruled that the public trust has always existed in Washington and has always applied to fisheries, including estuaries. There have been cases that show this doctrine will stop development that takes estuarine land or cuts estuaries off from saltwater. It is unclear if the public trust doctrine would also be able to protect the freshwater that flows into estuaries given a conflict between state policy to protect public trust doctrine uses and state policy to protect existing water rights. While it is unclear if the public trust doctrine would fully protect the balance of fresh and saltwater, it is nevertheless a strong tool in Washington for protecting estuaries. Ultimately, in order to protect the water in Washington's estuaries we must focus on further protecting instream flows and other protections for the state's instream freshwater.