

*Grazing on National Forest Riparian Lands:  
Illegal Disruption of Water Flow?*

Marc Lowry

Author

June 1, 1999

---

## STUDENT WRITING CONTEST

---

### GRAZING ON NATIONAL FOREST RIPARIAN LANDS: ILLEGAL DISRUPTION OF WATER FLOW?

MARC LOWRY

---

#### I INTRODUCTION

The importance and value of riparian lands can hardly be overemphasized.<sup>1</sup> Riparian areas in the United States contain the most diverse flora and fauna of any of the nation's ecosystems, especially in the arid southwest.<sup>2</sup> Comprising approximately one per-cent of North America's landmass, riparian lands provide habitat to roughly eighty percent of vertebrates in the Southwest during some phase in their development.<sup>3</sup> For example, at least fifty percent of nesting bird species in the Southwest use riparian habitats for breeding.<sup>4</sup> In addition to its biological importance, riparian areas provide important hydrologic functions as well. Riparian areas not only store water for future use, but also dissipate and attenuate the energy of floodwaters, which reduces peak flows in streams and rivers.<sup>5</sup> Despite the significance of riparian ecosystems, however, they are rapidly disappearing.

---

<sup>1</sup> See David J. Krueper, *Effects of livestock management on Southwestern riparian ecosystems*, in DESIRED FUTURE CONDITIONS FOR THE SOUTHWEST RIPARIAN ECOSYSTEMS: BRINGING INTERESTS AND CONCERNS TOGETHER 281, 283 (U.S. Dep't of Agric. Forest Serv. Gen. Technical Report RM-GTR-272, 1996).

<sup>2</sup> See James A. Gore, *Riparian Revegetation as a Mitigating Process in Stream and River Restoration*, in THE RESTORATION OF RIVERS AND STREAMS: THEORIES AND EXPERIENCE 41 (James A. Gore ed., 1985).

<sup>3</sup> See Krueper, *supra* note 1, at 283-84.

<sup>4</sup> See R. R. Johnson, et al., *Endangered Species vs. Endangered Habitats: A Concept*, in Importance, Preservation and Management of Riparian Habitat: A Symposium 68, \_\_ (U.S. Dep't of Agric. Forest Serv. Gen. Technical Report RM-GTR-43, 1977).

<sup>5</sup> See U.S. GEN. ACCOUNTING OFFICE, RCED-88-105, PUBLIC RANGELANDS: SOME RIPARIAN AREAS RESTORED BUT WIDESPREAD IMPROVEMENT WILL BE SLOW 10 (1988) [hereinafter PUBLIC RANGELANDS]. See also Andrew Brookes, et al., *Foodplain Restoration and Riparian Zone Management*, in RIVER CHANNEL RESTORATION: GUIDING PRINCIPLES FOR SUSTAINABLE PROJECTS 201 (Andrew Brookes & F. Douglas Shields Jr. eds., 1996).

In the last sesquicentennial approximately ninety-five percent of the riparian areas in western North America have been “altered, degraded or destroyed.”<sup>6</sup> Some estimate that ninety percent of the riparian ecosystems in Arizona and New Mexico are gone.<sup>7</sup> While farming, water impoundment, urban development and recreation factor into the degradation of the riparian lands, domestic livestock grazing has had by far the greatest impact in the disappearance of riparian areas.<sup>8</sup>

Riparian areas naturally attract livestock, particularly cattle. Livestock’s affinity for riparian zones is easily understood; these areas and their accompanying streams and rivers are the most productive portions of western rangelands.<sup>9</sup> Livestock thrive on the relatively lush vegetation, drinking water, and shade found there.<sup>10</sup> Consequently, livestock tend to congregate in these fertile streamside corridors for a disproportionate amount of time.<sup>11</sup>

Unmanaged grazing in riparian areas strips the streambanks of their vegetation, which, in turn, affects water conditions. As vegetation is lost, the riparian zone loses its ability to absorb water.<sup>12</sup> The inability to absorb water lowers the water table, which “often changes the whole character of the streams from perennially flowing to intermittent water courses that dry up in the

---

<sup>6</sup> Krueper, *supra* note 1, at 284.

<sup>7</sup> See George Wuethner, *The Price is Wrong*, SIERRA, Sept/Oct. 1990, at 40 (quoting the Arizona State Parks department).

<sup>8</sup> Cattle grazing has a devastating impact on ecosystems including “changes in species composition, disruption of ecosystem functioning, and alteration of ecosystem structure. . . . Overall, . . . livestock production [] has had a much greater influence on the ecosystems of western North America than development.” Reed F. Noss, *Cows and Conservation Biology*, 8 CONSERVATION BIOLOGY 613, 614 (1994); See also Krueper, *supra* note 1, at 284. Krueper estimates that “[o]ver 70% of the western United States is currently being grazed by livestock in habitats ranging from sea level to alpine meadows.” Krueper, *supra* note 1, at 286. On public lands administered by the National Forest Service or Bureau of Land Management “livestock grazing is the most widespread economic use,” with 94% currently being grazed. *Id.*

<sup>9</sup> See William S. Platts, *Fish, Wildlife and Livestock: Protection of Riparian Areas*, WESTERN WILDLANDS, Summer 1990, at 16.

<sup>10</sup> See William S. Platts & Roger L. Nelson, *Characteristics of Riparian Plant Communities and Streambanks with Respect to Grazing in Northeastern Utah*, in PRACTICAL APPROACHES TO RIPARIAN RESOURCE MANAGEMENT: AN EDUCATIONAL WORKSHOP 73 (Robert E. Gresswell, et al., eds., U.S. Bureau of Land Management, BLM-MT-PT-89-001-4351, 1989).

<sup>11</sup> See *id.*

<sup>12</sup> See PUBLIC RANGELANDS, *supra* note 5, at 10.

summer months.”<sup>13</sup> Indeed, studies documenting the relationship of grazing to streamside plant cover demonstrate the importance of riparian vegetation to maintaining continuous water flows.<sup>14</sup>

Despite the detrimental impact that grazing has on riparian lands, legal efforts aimed at their preservation in National Forests usually rely on federal laws such as the Endangered Species Act or the Clean Water Act.<sup>15</sup> These statutes, however, do not consider the impact of grazing on streamside vegetation and this impact’s relationship to water flows. Consequently, riparian protection using these laws overlooks a potentially significant guardian of riparian zones, the Organic Act of 1897.<sup>16</sup>

The Organic Act of 1897 defined the vision and purpose of the nation’s forest reservations. The Act sought to improve and protect the forest “for the purpose of securing the favorable conditions of water flow, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States.”<sup>17</sup> At first glance, the language does not seem helpful in protecting riparian areas. Yet, mounting evidence suggests that grazing is directly responsible for the lack of year round water flow in many national forest streams. If so, then grazing undermines a core purpose of the national forest, which is to secure “favorable conditions of water flow.”

The following discussion analyzes the impacts of grazing on water flows to determine whether current grazing practices violate the Organic Act. This discussion first reviews the legislative history of the Organic Act. The discussion then focuses on the interpretation of the Organic Act and relevant property law by the federal courts. After this legal analysis, the latest scientific evidence is analyzed to determine

---

<sup>13</sup> PUBLIC RANGELANDS, *supra* note 5, at 11.

<sup>14</sup> See generally PUBLIC RANGELANDS, *supra* note 5. This report documents twenty-two riparian restoration projects on Forest Service and BLM lands. When managers excluded livestock from riparian areas, dramatic results occurred in the adjacent streams. Intermittent streams often developed into perennial ones, while others increased streamflow up to four hundred percent above pre-grazing rates.

<sup>15</sup> See Berton L. Lamb & Eric Lord, *Legal Mechanisms for Protecting Riparian Resource Values*, 28 WATER RESOURCES RESEARCH 965, 966-969 (1992).

<sup>16</sup> See Act of June 4, 1897, 30 Stat. 34 (1897).

<sup>17</sup> 16 U.S.C. § 475 (1998).

whether water flows are indeed compromised by grazing practices. The final part of the discussion juxtaposes the available science and law to establish whether or not the purpose of the Organic Act is violated by modern grazing in the national forest. The discussion concludes that cattle grazing in the national forest impacts riparian areas in a manner that undermines the purposes of the Organic Act.

## II *LEGISLATIVE HISTORY OF THE ORGANIC ACT*

At the beginning of the 1890's land owned by the United States was available for purchase and development to any settler or corporation. In January of 1890 President Benjamin Harrison sent a message to the United States Congress requesting legislation for the preservation of forest areas. The message asked for legislation so "the rapid and needless destruction of our great forest areas may be prevented."<sup>18</sup> Attached to the letter was a report from the American Association for the Advancement of Science in Behalf of a Proper Forest Policy. This report contained a simple resolution. The resolution stated that the government should manage the nation's forests for "the purpose of insuring the perpetuity of the forest cover on the western mountain ranges, preserving thereby the dependent favorable hydrologic conditions."<sup>19</sup>

The report considered the existing administration of the forest to be unwise because it valued timber resources far above water.<sup>20</sup> Emphasizing the importance of water to the development of the western states, the report acknowledged the relationship between the forest cover and the distribution of water.<sup>21</sup> The report stated that the destruction of the forest cover had an unfavorable impact on the annual distribution of water.<sup>22</sup> Urging a change of forest management policy to reflect water's real value, the report conceded that land managers "cannot compass the

---

<sup>18</sup> Senate Ex. Doc. No. 51-36, at 1 (1st Session, 1890).

<sup>19</sup> *Id.*, at 2.

<sup>20</sup> *See Id.*

<sup>21</sup> *See id.* at 3.

<sup>22</sup> *See id.*

water question without at the same time giving attention and proper regard to the forestry question.”<sup>23</sup> Thus began the long road to the passage of the Organic Act of 1897.

The President’s message to Congress signaled the beginning of a policy shift in federal land use. The following year, Congress passed the Creative Act of March 3, 1891.<sup>24</sup> Although that legislation gave the President the authority to set aside forest reservations for the public benefit, it failed to end detrimental timber harvests on public land.<sup>25</sup> The Act merely proscribed settlement in the reserved areas.<sup>26</sup>

Responding to the paucity of protection for public lands, the Fifty-second Congress introduced legislation to protect the Creative Act Act’s forest reserves in 1892. The Senate Committee on Agriculture and Forestry outlined the problems associated with deforestation and called for a comprehensive management system to protect the forest reserves.<sup>27</sup>

The Committee was concerned about the water supply provided by the western forests.<sup>28</sup> It found that the forest cover was responsible for the “regularity of waterflow in springs, brooks, and rivers, as well as the state of the ground water level.”<sup>29</sup> The Committee observed that the principle advantage of forest vegetation was to act as a “mechanical impediment” that opposed surface flow,

---

<sup>23</sup> *Id.* at 3.

<sup>24</sup> The Creative Act of Mar. 3, 1891. § 24, 26 Stat. 1103, as amended, 16 U.S.C. § 471 (repealed 1976).

<sup>25</sup> See Robert Bassman, *The 1897 Organic Act: A Historical Perspective*, 7 NATURAL RESOURCES LAWYER 503, 503-504 (1974) [hereinafter Bassman]. The Committee on Agriculture and Forestry described the timber protection offered by the General Revisions Act of 1891 as “meaningless.” S. REP. NO. 52-1002, at 2 (1st Session, 1892). The Committee characterized the Secretary of Interior’s regulatory policy as “near as deserving the name of management as the pillaging of a city by a band of soldiers in war deserves the name of municipal administration.” *Id.* The Dep’t of Interior proclaimed that under this Act the “[f]orest reservations have been made which are such only in name. For lack of means they are no more protected by reason of reservation than any other public land.” Letter from Edward A. Bowers, Acting Commissioner, General Land Office to Hoke Smith, Secretary, Dep’t of Interior (Sept. 25, 1893), *reprinted in* H. REP. NO. 53-78, at 3 (1st Session, 1893).

<sup>26</sup> See H. REP. NO. 53-897, at 2 (2nd Session, 1894) (under the March 3, 1894 Act the President was “empowered to reserve public lands from sale and disposal, and to set them aside for forestry purposes”). See also 25 CONG. REC. 274 (1893) (Rep. McRae states that the lands set aside under the General Revisions Act of 1891 “can not be sold” to settlers.)

<sup>27</sup> See S. REP. NO. 52-1002, at 10 (1st Session, 1892).

<sup>28</sup> See *id.*, at 3, 5-10.

<sup>29</sup> *Id.*, at 5.

“promoting filtration to the soil and . . . lengthening the time during which the water is to run off.”<sup>30</sup> Recognizing the economic value of forest vegetation, the Committee proclaimed that “[n]o artificial reservoirs can supply the more easily and cheaply maintained natural reservoir of the forest floor.”<sup>31</sup> The committee concluded that the principle purpose of the forest reserves should be to “maintain desirable forest conditions with regard to waterflow,” and called for the development of a federal system of management to implement this policy.<sup>32</sup>

The House of Representatives also considered forest preservation legislation in the 52nd Congress. The House Committee on Public Lands lamented that the law providing for the reservation of forestlands did not effectively define the reasons for withdrawing them.<sup>33</sup> Without a statutorily defined purpose, the committee feared that the function of the reserves would be undermined. Therefore, the Public Lands Committee called for a clear definition of the purpose for the reservations. According to the Committee, a statutory purpose for the forest reservations was essential “to prescribe the manner and methods by which . . . the pasturage within the same shall be used, so as not to injure or destroy the primary objects for which these reservations have been made, namely, to secure forest conditions as are necessary to preserve an even water flow.”<sup>34</sup>

Although the legislative momentum for increased forest protections began to gather, there was simply not enough time for the 52nd Congress to consider fully the ramifications of this novel legislation.<sup>35</sup> However, Representative McRae, sponsor of the House bill and chairman of the Public Lands Committee, reintroduced the House bill at the beginning of the 53rd Congress.

---

<sup>30</sup> *Id.*, at 6.

<sup>31</sup> *Id.*, at 7.

<sup>32</sup> *Id.*, at 10.

<sup>33</sup> See H. REP. NO. 52-2437, at 2 (2nd Session, 1893).

<sup>34</sup> *Id.* The committee recognized that the reservations were set aside for economic uses. These uses, however, were to be consistent with the primary purpose of securing a water supply.

<sup>35</sup> See Letter from W.M. Stone, Commissioner, General Land Office, to Hoke Smith, Secretary of the Interior (Jan. 26, 1893)[hereinafter Letter], *reprinted in* H. REP. NO. 52-2437, at 3 (2nd Session, 1893).

The floor debate during the 53rd Congress highlighted what the bill sought to achieve. Representative McRae again told the Committee of the Whole that “[t]he main purpose of this bill . . . is to protect the forest growth against destruction and the preservation of forest conditions upon which the water flow is said to depend.”<sup>36</sup> After the House added amendments regulating the type and amount of timber that harvesters could remove from the reservations,<sup>37</sup> the bill passed the House on a vote of 150 to 53 on December 17, 1894.<sup>38</sup>

Unfortunately, the full Senate seemed uninterested in considering protective legislation for the nation’s forests at that time.<sup>39</sup> Concerned that protective legislation would impede western development, the Senate, with more western influence than the House, paid little attention to the legislation.<sup>40</sup> Until the Organic Act of 1897 passed in the 55th Congress, however, Representative McRae continued to introduce the bill in each successive Congress.<sup>41</sup>

During the interim, the House Public Lands Committee continually worked with the Department of Interior [hereinafter DOI] to refine the details of the legislation.<sup>42</sup> The majority of the discussion between them, however, centered upon the methodology of timber sales and the manner by which the reservation timber would be selected for harvest. Yet, it is clear that DOI respected the primary purpose of the reservations, securing a continuous water supply. The DOI

---

<sup>36</sup> 25 CONG. REC. 2374 (1893)

<sup>37</sup> See Bassman, *supra* note 25, at 506-509.

<sup>38</sup> See Report of the Secretary of the Interior (1895), *reprinted in* H. REP. NO. 54-1593, at 6 (1st Session, 1896).

<sup>39</sup> See Bassman, *supra* note 25, at 509.

<sup>40</sup> See *id.*, at 509-510.

<sup>41</sup> On the House floor, Rep. McRae stated that “for six years I have labored industriously to secure legislation for the use and the administration of the reservations. . . . The bill, introduced by me . . . passed the House in the Fifty-third and Fifty-fourth Congresses.” 30 CONG. REC. 966 (1897).

<sup>42</sup> See *generally* H. REP. NO. 54-1593 (1st Session, 1896) (reprinting the relevant correspondence between the Committee on Public Lands and the Dep’t of Interior on the legislation and documents Interior’s advice for amendments to the bill).



sought a “judicious” harvesting of timber that would “insure the preservation of public timber in localities where it is essential as a conservative of the water supply.”<sup>43</sup>

In his annual report of 1895, the Secretary of the DOI called for passage of the McRae bill.<sup>44</sup> The Secretary emphasized the need to protect the forest reserves from degradation to guarantee a water supply. The Secretary stated that “[t]he object of these reservations is to preserve the forests themselves for future use, and through the preservation of the forests to protect and reserve the supply of water so that it may be stored and utilized for irrigation.”<sup>45</sup> To quell the rhetoric surrounding the issue of forest preservation, the Secretary called for the National Academy of Sciences to report on the general subject of forest administration.

The National Academy of Sciences responded with a report in May 1897. According to the National Academy of Sciences, the “importance of the conservation of the mountainous watersheds which collect the scanty supply for the arid regions of North America can hardly be overstated.”<sup>46</sup> The report recognized the importance of vegetation in the preserving the “natural regimen” of mountain streams.<sup>47</sup> The scientists found that when the vegetation was removed from the forests, the natural water flow cycle was replaced with “destructive floods in the spring, and dry beds in the months when the irrigation flow is most needed.”<sup>48</sup>

The scientists determined that fire and pasturage were the true threats to the reserved forests.<sup>49</sup> During this period, sheep pasturage was severely devastating the forest ecosystem. The

---

<sup>43</sup> See Letter, *supra* note 35, *reprinted in* H. REP. NO. 52-2437, at 3 (2nd Session, 1893).

<sup>44</sup> See Report of the Secretary of the Interior (1895), *reprinted in* H. REP. NO. 54-1593, at 5-6 (1st Session, 1896).

<sup>45</sup> *Id.*, at 5-6.

<sup>46</sup> Report of the Committee appointed by the National Academy of Sciences upon the Inauguration of a Forest Policy for the Forested Lands of the United States to the Secretary of the Interior (May 1, 1897), *reprinted in* S. REP. NO. 5-105, at 10 (1987).

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

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

<sup>49</sup> See *id.*, at 19. Although sheep were the culprit of the times, the arguments made in the report are analogous and applicable to the present problem of unmanaged cattle grazing in the national forest.

report documented that “[e]very blade of grass, the tender, growing shoots of shrubs, and seedlings trees are eaten to the ground. The feet of these ‘hoofed locusts,’ . . . tread out the plants sheep do not relish and, loosening the forest floor, produce conditions favorable to floods. . . . [Pasturage,] by destroying the seedling trees, on which the permanency of the forest depends, prevents natural forest reproduction, and therefore ultimately destroys the forests themselves.”<sup>50</sup>

The National Academy of Scientists called for the abolition of pasturage within the reserved forests.<sup>51</sup> Their report reminded the administration that the forest reserves belong “to the people of the whole country, and not to those of any one section. It is right, therefore, that the forest reserves should be managed for the benefit of the people of the whole country, and not for any particular class or section.”<sup>52</sup> The scientists feared that if pasturage and other activities within the forest reserves were not abolished, the “forests will sooner or later be ruined and the objects defeated for which they have been established.”<sup>53</sup>

Finally, the report addressed DOI’s direct question to the Academy of Scientists regarding the forest’s affects on the western state’s water supply. The report concluded that the forests were “necessary to prevent destructive spring floods, and corresponding periods of low water in summer and autumn when the agriculture of a large part of the Western North America is dependant upon irrigation.”<sup>54</sup> The report urged the passage of legislation to protect the nation’s forests for water conservation. It acknowledged that legislation was “essential to [the] national welfare to protect the forested lands of the public domain, for their influence on the flow of streams . . . .”<sup>55</sup>

---

<sup>50</sup> *Id.*, at 20.

<sup>51</sup> *Id.*, at 23.

<sup>52</sup> *Id.*, at 22-23.

<sup>53</sup> *Id.* at 23. The report called for lands that were more valuable for pasturage to be excluded from forest reservations. *See id.*, at 29. However, an exception was made for cattle grazing “in moderate numbers,” but only where the rancher had property adjoining the forest reserve. *Id.*, at 25.

<sup>54</sup> *Id.*, at 36.

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

Despite the overwhelming scientific support, however, it was not the science community's recommendation that spurred the Senate into considering Rep. McRae's forest protection legislation. It was the unilateral power vested in the President to reserve the forest from settlement that inspired the Senate to consider the forest reserves legislation. Awakened to the reservations potential to inhibit the economy of the western states by President Cleveland's forest reservations in 1897, the Senate was forced to take up the issue of forest reservations.<sup>56</sup>

In 1897, President Cleveland, acting upon the advice of the National Forest Commission, set aside thirteen forest reservations with an estimated acreage of 21,400,000 acres.<sup>57</sup> Immediate protest arose in the western states where the reserves were located.<sup>58</sup> The protest was over the inclusion of settled areas inside the boundaries of the reservations.<sup>59</sup> The inclusion of these settlements ended their expansion and bankrupted their economy.<sup>60</sup> Even the sponsors of forest protection disapproved of the magnitude of the new reservations.<sup>61</sup> The Senate took up the pending forest legislation to abolish the reserves of 1897.<sup>62</sup> The Senate added an amendment to the existing bill that would override the reservations made by the President.<sup>63</sup>

---

<sup>56</sup> See Bassman, *supra* note 25, at 509.

<sup>57</sup> Report of the Committee appointed by the National Academy of Sciences upon the Inauguration of a Forest Policy for the Forested Lands of the United States to the Secretary of the Interior (May 1, 1897), *reprinted in* S. REP. NO. 5-105, at 18 (1987).

<sup>58</sup> The reserves were located in Washington, California, Wyoming, Montana, Utah, South Dakota, and Idaho. See Bassman, *supra* note 25, at 509.

<sup>59</sup> Rep. Jones, speaking on the House floor, stated that "more than twenty towns and villages, some of them very prosperous and flourishing and quite populous" were included. 30 CONG. REC. 987 (1897).

<sup>60</sup> See *id.* The settlers could not remain in their homes without "doing acts which they, as law-abiding citizens of this country, dislike very much to do. They are forbidden under penalties of law to cut a stick of timber, almost forbidden to cross their own threshold." *Id.* (statements of Rep. Jones).

<sup>61</sup> Rep. McRae stated that "I do not approve of the manner in which the reservations were made." 30 CONG. REC. 96 (1897). Rep. Lacey also stated that the reservations of 1897 proscribed settlement "of lands that ought not to be included: and as concerning the policy of forest reservations, I want so much of a modification of that order as will save it from hostile legislation as against the original purpose of the law itself." 30 CONG. REC. 964 (1897).

<sup>62</sup> See Bassman, *supra* note 25, at 510.

<sup>63</sup> See *id.*

Yet, the Senate's attempt to abolish outright the 1897 forest reservations failed.<sup>64</sup> Instead, the House modified the legislation, giving the new President, William McKinley, the authority to revoke any portion of the reservations for the benefit of the public interest.<sup>65</sup> The Senate was successful, however, in securing changes in the manner by which timber would be harvested in the forest reserves.<sup>66</sup> While these changes were met with little enthusiasm in the House, Representative McRae, the principle architect of the forest protection legislation, reminded that Chamber that the bill's purpose was to "prescribe the manner and method which the timber growing thereon, the mineral contained therein, the water power furnished by them, and the pasturage within the same shall be used, so as to not injure or destroy the primary objects for which they were established."<sup>67</sup>

After the House debated the bill and made minor alterations, the bill was sent to the conference committee. After the conference committee drafted a final report on the bill, both chambers passed it and President William McKinley signed it into law as part of the Organic Act on June 4, 1897.<sup>68</sup>

### III *Judicial Interpretation of the Organic Act*

The Organic Act initially reached the Supreme Court in the form of a grazing rights case.<sup>69</sup> In the *United States v. Grimaud*, the government charged the defendants with grazing on the forest reserve without a permit. The defense raised a separation of powers argument. The defense insisted that the Congressional delegation of authority to the Secretary of Agriculture to establish rules and regulations regarding the grazing permit system was an unlawful transfer of Congress's legislative

---

<sup>64</sup> *Id.*

<sup>65</sup> *Id.* See also 16 U.S.C. § 473 (1998).

<sup>66</sup> See Bassman, *supra* note 25, at 511-512.

<sup>67</sup> 30 CONG. REC. 966 (1897).

<sup>68</sup> See Bassman, *supra* note 25, at 513.

<sup>69</sup> See *U.S. v. Grimaud*, 220 U.S. 506 (1911).

authority to an executive officer.<sup>70</sup> The lower courts ruled in favor of the defendants and dismissed the charges.<sup>71</sup>

The United States Supreme Court reversed the dismissal of the charges. The unanimous opinion began with the recognition of the purposes of the forest reservations: to “protect the forest and secure the favorable conditions of water flows.”<sup>72</sup> The Court recognized that the pasturage of cattle on forest reservations “at will and without restraint, might interfere seriously with the accomplishment of the purposes for which they were established. But a limited and regulated use of the pasturage *might not be inconsistent* with the object sought to be attained by the [Organic Act of 1897].”<sup>73</sup> The Court held that promulgating the regulations at issue was not a legislative function; the executive officers did not go outside the “circle of that which the act itself had affirmatively required to be done.”<sup>74</sup> The Court approved of executive officers drafting these reservation specific regulations because these officers knew the idiosyncrasies of the local range.<sup>75</sup>

Within this authority, however, the Court recognized that these officers must make rules and regulations that supported the purposes of the Organic Act. The opinion made clear that executive officers had to “confin[e] themselves within the field covered by the statute” and were obligated to “administer the law and carry the statute into effect.”<sup>76</sup> Consequently, the rules and regulations must advance the purpose of the forest reserves.

---

<sup>70</sup> *Grimaud*, 220 U.S. at 510.

<sup>71</sup> *Id.*

<sup>72</sup> *Grimaud*, 220 U.S. at 515.

<sup>73</sup> *Grimaud*, 220 U.S. at 516 (emphasis added). In fact, the Secretary of the Interior told Congress that “grazing can probably be allowed without injury” in only a “few of the reserves, or in portions of reserves.” The Secretary pointed out, however, that “whenever” DOI permits grazing under the rules and regulations of the department, a reasonable charge should be collected. Letter from E.A. Hitchcock, Secretary of the Interior, to the Speaker of the House of Representatives (April 12, 1900), *reprinted in* H. REP. NO. 56-598, at 1 (1st Session, 1900).

<sup>74</sup> *Grimaud*, 220 U.S. at 518.

<sup>75</sup> *Grimaud*, 220 U.S. at 516.

<sup>76</sup> *Grimaud*, 220 U.S. at 518.

In another grazing case decided the same day as *Grimaud*, the Court held that the property clause of the U.S. Constitution authorized the United States government to exclude cattle from the forest reservations.<sup>77</sup> That case, *Light v. United States*, involved a rancher that purposefully grazed on the reservation without a permit because the federal government refused to fence out cattle, contrary to state law.<sup>78</sup> The *Light* Court observed that the United States could “prohibit absolutely” or otherwise condition the manner by which the federal territory was used.<sup>79</sup> That Court made it clear that it is not the judiciary’s prerogative to determine how the nation’s land is used. The opinion explained that the Court could not “interfere when, in the exercise of its discretion, Congress establishes a forest reserve for what it decides to be national and public purposes.”<sup>80</sup>

The *Light* Court ultimately held that the state fence out policy covered only stray cattle that wandered onto unfenced land. Stressing that the state law did not protect cattle owners for “wanton and willful trespass,” the Court affirmed the injunction preventing unlawful grazing on the reserve.<sup>81</sup>

Although these cases outlined the national policy regarding grazing on the forest reserves, the watershed case defining the purpose of the forest reserves came in *United States v. New Mexico*.<sup>82</sup> There, the United States claimed reserved water rights in the Rio Mimbres to fulfill the purpose of the Gila National Forest reservation. The New Mexico Courts had held that while water rights were

---

<sup>77</sup> See *Light v. U.S.*, 220 U.S. 523 (1911).

<sup>78</sup> The prevailing Colorado law in effect required the owner of land to erect and maintain a fence to keep cattle off of the owner’s property. Failure to build a fence disqualified the owner for collecting damages by trespassing cattle. See *Light*, 220 U.S. at 526.

<sup>79</sup> *Light*, 220 U.S. at 536.

<sup>80</sup> *Light*, 220 U.S. at 537.

<sup>81</sup> *Light*, 220 U.S. at 537-538. Today’s courts take a hostile view to the notion that one can graze on public lands without meeting the Secretary of Agriculture’s rules and regulations. The court recently admonished the notion that because the cattle of a ranch were grazed on public land before the establishment of the national forest a permit was not required. The court found that “plaintiff’s pleadings in this case . . . border on the frivolous and sanctionable and reflect a lack of research into the most basic legal concepts and principles applicable to the case, and . . . are directly contradicted by an unbroken line of Supreme Court precedent.” See *Diamond Bar Cattle Co. v. U.S.*, 168 F.3d 1209, 1215 (10th Cir. 1999) (quoting *Hunter v. U.S.*, 388 F.2d 148, 151 (9th Cir. 1967)) (internal quotations omitted).

<sup>82</sup> See *U.S. v. New Mexico*, 438 U.S. 696 (1978).

reserved for the purpose for which the land was withdrawn, that purpose did not include cattle grazing.<sup>83</sup>

Initially, the *New Mexico* opinion reiterated the fact that Congress has implied power to reserve unappropriated water for public land withdrawals for specific federal purposes.<sup>84</sup> However, as that Court pointed out, the “reserved water doctrine” appropriates only enough water to fulfill the specific purpose of a reservation.<sup>85</sup> Thereafter, the opinion set out to define the purpose of the national forest.

The opinion then delved into the history of the Organic Act of 1897. After reviewing its national and legislative history, the Court confirmed that the Organic Act was the product of a Congress concerned with both “a shortage of timber and of watersheds with which to encourage stream flows while preventing floods.”<sup>86</sup> Labeling the Organic Act a “charter for forest management,” the opinion held that there were only two purposes of the forest reserves: “to conserve water flows, and to furnish a continuous supply of timber for the people.”<sup>87</sup> Of the two, the *New Mexico* Court clearly found that the overarching purpose of the reservations was the protection of water flow in the national forest.<sup>88</sup>

The opinion devoted an entire section to the discussion of the forest reserve’s mission to preserve a water supply.<sup>89</sup> The Court explained that water conservation was the “very purpose for

---

<sup>83</sup> See *New Mexico*, 438 U.S. at 697. The State District Court held that water rights for grazing in the forest should be adjudicated “to the permittee under the law of prior appropriation and not to the United States.” See *New Mexico*, 438 U.S. at 704 (quoting from the state district court opinion).

<sup>84</sup> See *New Mexico*, 438 U.S. at 698.

<sup>85</sup> See *New Mexico*, 438 U.S. at 700.

<sup>86</sup> *New Mexico*, 438 U.S. at 705.

<sup>87</sup> *New Mexico*, 438 U.S. at 706-707.

<sup>88</sup> “Congress authorized the national forest system *principally* as a means of enhancing the quantity of water that would be available to the settlers of the West.” *New Mexico*, 438 U.S. at 713 (emphasis added). After a discussion of the effect of the Multiple-Use Sustained Yield Act of 1960 on reserved water rights, the Court interpreted the 1960 Act “reaffirming the *primacy* of a favorable water flow.” *New Mexico*, 438 U.S. at 715 (emphasis added).

<sup>89</sup> Part II, Section B of the opinion. See *New Mexico*, 438 U.S. at 711-713.

which Congress did create the national forest system.”<sup>90</sup> The states would use the water captured by the forest to benefit domestic, mining, milling and irrigation uses.<sup>91</sup> Even within these statutory uses of water, the Organic Act did not consider cattle grazing to be a primary consumer of the water accumulated through forest preservation.

Yet, stockwatering rights appear to be the actual reason the Court reviewed the case.<sup>92</sup> But after careful consideration of the legislative history and the language of the Organic Act, the Court held that “stockwatering was not itself a direct purpose of reserving the land.”<sup>93</sup> Since stockwatering was not a direct purpose of the forest reservations, the Organic Act reserved no water for cattle under the implied water rights doctrine. To obtain water for the cattle, ranchers were required to secure their water rights independent of the forest reservations using state appropriation laws.<sup>94</sup>

The *New Mexico* Court then explained the holding’s ramifications on cattle grazing in the national forest. The opinion observed that the Organic Act foresaw many uses for the national forests. But, as with these other uses, the Act allowed stockwatering only if it was not inconsistent with the principle purpose of the forest reservation: securing a favorable water supply.<sup>95</sup> Stated differently, the Organic Act did not condone cattle grazing when it undermined the purpose of securing a favorable water flow. The opinion stated frankly that “[i]f stockwatering could not take place in the Gila National Forest, Congress’ purpose in reserving the land would not be defeated.”<sup>96</sup>

Having established the purpose and intent of the Organic Act, the focus of this discussion will now turn to the science of riparian lands and how grazing impacts their function.

---

<sup>90</sup> *New Mexico*, 438 U.S. at 711-712.

<sup>91</sup> *See New Mexico*, 438 U.S. at 712. *See also* 16 U.S.C. § 481 (1999).

<sup>92</sup> Not only did the Court’s opinion track the outcome of stockwatering rights at every stage in the proceeding, it also devoted an entire section of its opinion to the issue. *See New Mexico*, 438 U.S. at 703-705 & 715-717.

<sup>93</sup> *See New Mexico*, 438 U.S. at 716.

<sup>94</sup> *Id.*

<sup>95</sup> *Id.*

<sup>96</sup> *Id.*



The science concerning the hydrology of riparian ecosystems is in its nascent stage.<sup>97</sup>

Although our intuition recognizes an intimate connection between the stream condition and that of the riparian zone, this relationship has yet to be quantified.<sup>98</sup> However, after years of field experiments and observation, riparian scientists have agreed on some basic hydrological functions.

The most important observation of riparian zones is that when covered with vegetation these areas act like sponges and absorb water during excess runoff.<sup>99</sup> This bank storage phenomenon is critical because it reserves water for periods of lower flow. During the dry summer months when the rain and runoff cease, riparian lands release stored water to maintain stream flows.

<sup>100</sup> Of all the factors that influence water storage in the stream bank, the biggest enhancement for its water storage capacity is the presence of riparian vegetation.<sup>101</sup>

---

<sup>97</sup> See L.J. Bren, *Riparian zone, stream, and floodplain issues: a review*, 150 J. OF HYDROLOGY 277, 277 (1993).

<sup>98</sup> *Id.*, at 286

<sup>99</sup> See Richard Braun, *Livestock Grazing in Riparian Zones: Ensuring Fishery Protection in Federal Rangeland Management*, ANADROMOUS FISH LAW MEMO, Oct. 1986, at 3. See also U.S. GENERAL ACCOUNTING OFFICE, PUBLIC RANGELANDS: SOME RIPARIAN AREAS RESTORED BUT WIDESPREAD IMPROVEMENT WILL BE SLOW 10 (GA1.13:RCED-88-105, June 1988); L.J. Bren, *Riparian zone, stream, and floodplain issues: a review*, 150 J. OF HYDROLOGY 277, 286 (1993); Karl A. Gebhardt, et al., Use of Hydrology in Riparian Classifications, in PRACTICAL APPROACHES TO RIPARIAN RESOURCE MANAGEMENT: AN EDUCATIONAL WORKSHOP 53, 56 (Robert E. Gresswell, et al., eds., U.S. Bureau of Land Management, BLM-MT-PT-89-001-4351, May 1989); MARK M. BRINSON ET AL., RIPARIAN ECOSYSTEMS: THEIR ECOLOGY AND STATUS 67 (Dept. of Interior, FWS/OBS-81/71, Sept. 1981); Wayne Elmore & Robert E. Beschta, *Riparian Areas: Perceptions in Management*, 9 RANGELANDS 260, 262 (1987); Leonard F. Debano & Larry Schmidt, Interrelationships Between Watershed Condition and Health of Riparian Areas in Southwestern United States, in PRACTICAL APPROACHES TO RIPARIAN RESOURCE MANAGEMENT: AN EDUCATIONAL WORKSHOP 45, 46 (Robert E. Gresswell, et al., eds., U.S. Bureau of Land Management, BLM-MT-PT-89-001-4351, May 1989); ED CHANEY ET AL., U.S. ENVTL. PROTECTION AGENCY, LIVESTOCK GRAZING ON WESTERN RIPARIAN AREAS 3 (EP 1.2:L 75/2/993, Aug. 1993); Andrew Brooks et al., *Floodplain Restoration and Riparian Zone Management*, in RIVER CHANNEL RESTORATION: GUIDING PRINCIPLES AND SUSTAINABLE PROJECTS 201 (Andrew Brooks & F. Douglas Shields Jr., eds., 1996); Berton L. Lamb & Eric Lord, *Legal Mechanisms for Protecting Riparian Resource Values*, 28 WATER RESOURCES RESEARCH 965, 966 (1992).

<sup>100</sup> See Leonard F. Debano & Larry Schmidt, Interrelationships Between Watershed Condition and Health of Riparian Areas in Southwestern United States, in PRACTICAL APPROACHES TO RIPARIAN RESOURCE MANAGEMENT: AN EDUCATIONAL WORKSHOP 45, 46 (Robert E. Gresswell, et al., eds., U.S. Bureau of Land Management, BLM-MT-PT-89-001-4351, May 1989)[hereinafter Debano].

<sup>101</sup> See Debano & Schmidt, *supra* note 99, at 46.

Riparian vegetation increases bank storage capacity by capturing suspended sediment in the stream's runoff. Vegetation acts as a filter, screening out alluvial matter caught in the water.<sup>102</sup> The deposition and retention of sediment increases the size of the bank and thus its capacity to hold water.<sup>103</sup> The deposited sediment also aggrades the streambed and channel, causing the water table to rise.<sup>104</sup> The rising water table, in turn, nourishes the riparian plant community and invigorates riparian plant growth.<sup>105</sup> This process intensifies the growth of riparian vegetation until a stream-riparian equilibrium is reached and the natural balance is achieved.<sup>106</sup> This balance favors a regulated sustained flow of water.<sup>107</sup>

Vegetative growth also serves to dissipate the water's energy, which again promotes water absorption. By slowing down the velocity of stream channels, the contact time between the water and the banks and beds increases. The longer the contact time, the greater the rate of percolation.<sup>108</sup> Sustained percolation not only recharges the immediate riparian zone, but may rejuvenate groundwater basins as well.<sup>109</sup> However, groundwater recharge is more likely to be in mountainous areas where creeks and streams lie above fault-fracture zones leading to underground aquifers.<sup>110</sup>

Riparian vegetation also reduces flood damage.<sup>111</sup> During spring runoff periods and heavy rains, water more easily infiltrates healthy riparian ecosystems. This infiltration reduces flood

---

<sup>102</sup> See Harold H. Winegar, *Camp Creek Channel Fencing – Plant, Wildlife, Soil, and Water Response*, 4 RANGEMAN'S J. 10, 11 (1977).

<sup>103</sup> See MARK M. BRINSON ET AL., RIPARIAN ECOSYSTEMS: THEIR ECOLOGY AND STATUS 67 (Dept. of Interior, FWS/OBS-81/71, Sept. 1981)

<sup>104</sup> See Winegar, *supra* note 102, at 12.

<sup>105</sup> See Wayne Elmore & Robert E. Beschta, *Riparian Areas: Perceptions in Management*, 9 RANGELANDS 260, 262 (1987).

<sup>106</sup> See Debano & Schmidt, *supra* note 99, at 46.

<sup>107</sup> See *id.*

<sup>108</sup> See *id.*

<sup>109</sup> See Dan McGlothlin et al., Ground Water, Geomorphic Processes, and Riparian Values: San Pedro River, Arizona, in PROCEEDINGS OF THE SYMPOSIUM ON WATER-USE DATA FOR WATER RESOURCE MANAGEMENT 537, 538-539 (Marvin Waterstone & R. John Burt, eds., 1988).

<sup>110</sup> See Debano & Schmidt, *supra* note 99, at 46.

<sup>111</sup> See PUBLIC RANGELANDS, *supra* note 5, at 10.

peaks.<sup>112</sup> Riparian vegetation also adds resistance to the downward movement of water over the entire watershed, which attenuates water's energy and reduces floodwater damage.<sup>113</sup> More importantly, the vegetation's roots hold the stream bank in place and reduce the erosion during a flood. This maintains the hydrologic integrity of the overall watershed structure.<sup>114</sup>

The upshot of these observations leads to the current paradox.<sup>115</sup> While many believe and have been taught that riparian vegetation is phreatophytic<sup>116</sup> and therefore detrimental to the water supply,<sup>117</sup> just the opposite is true. Summer flows improve in streams and creeks where riparian vegetation is allowed to recover.<sup>118</sup> In some cases, intermittent streams that did not flow during the late summer became perennial.<sup>119</sup> In others, substantial increases in water flows were documented.<sup>120</sup> Indeed, a consensus among hydrologists and rangeland scientists is emerging which recognizes that healthy riparian vegetation is instrumental in securing a favorable water supply throughout the year and reducing the devastation wrought by flooding.

---

<sup>112</sup> See Andrew Brooks et al., *supra* note 99, at 201.

<sup>113</sup> See Leonard F. DeBano & William R. Hansen, Rehabilitating Depleted Riparian Areas Using Channel Structures, *in* PRACTICAL APPROACHES TO RIPARIAN RESOURCE MANAGEMENT: AN EDUCATIONAL WORKSHOP 53, 56 (Robert E. Gresswell, et al., eds., U.S. Bureau of Land Management, BLM-MT-PT-89-001-4351, May 1989). This study documents overgrazing and excess timber harvesting in the watershed above Silver City, New Mexico. After the ground cover was stripped away, torrential rains gouged an eleven-meter deep ditch through the middle of Main Street on July 21, 1895.

<sup>114</sup> See DeBano & Schmidt, *supra* note 99, at 46.

<sup>115</sup> See Elmore & Breschta, *supra* note 99, at 262 (outlining the clash between long held beliefs and modern scientific observation).

<sup>116</sup> A phreatophyte is a "long-rooted plant that absorbs its water from the water table or other permanent ground supply." WEBSTER'S NEW WORLD DICTIONARY 1019 (Victoria Neufeldt & David B. Guralnik, eds., 3rd College ed., 1988). Phreatophytes are considered detrimental because they transpire much of the water they draw out of the ground into the air through evapotranspiration, leaving less behind for other beneficial uses.

<sup>117</sup> One rangeland text states that for riparian vegetation "[o]veruse and intentional removal of phreatophytes unquestionably increases water yield." HAROLD F. HEADY & R. DENNIS CHILD, RANGELAND ECOLOGY AND MANAGEMENT 453 (1994).

<sup>118</sup> See generally PUBLIC RANGELANDS, *supra* note 5.

<sup>119</sup> See Elmore & Beschta, *supra* note 99, at 262.

<sup>120</sup> For example, where riparian vegetation was allowed to regenerate along Mahogany Creek, Nevada over a ten year period, stream flow increased by four-hundred per cent and the stream depth increased by fifty per cent. PUBLIC RANGELANDS, *supra* note 5, at 24.

Stockmen grazing in the national forests have long considered riparian areas to be “sacrifice areas” that defied practical management.<sup>121</sup> Poor management, coupled with the fact that cattle spend an inordinate amount of time in riparian habitats,<sup>122</sup> resulted in the current state of severely degraded riparian lands.<sup>123</sup> Exacerbating the public’s failure to recognize these lands as severely damaged is the fact that they have been that way for so long that within this generation not even the stockmen using them are cognizant of how they would normally appear and function.<sup>124</sup>

When cattle graze riparian habitats heavily a natural progression follows. Initially, the stream banks are stripped of vegetation. Then either rains or spring runoff wash away the soil comprising the stream banks. Without vegetation to filter and hold soil and sediment, downcutting of the streambed begins.<sup>125</sup> As the streambed drops vertically in relation to the surrounding land, the water table also descends. The riparian vegetation, whose survival depends on the high water table, dies, and is replaced by sagebrush and bunch grass.<sup>126</sup>

<sup>121</sup> See ED CHANEY, ET AL., U.S. ENVTL. PROTECTION AGENCY, *MANAGING CHANGE: LIVESTOCK GRAZING ON WESTERN RIPARIAN AREAS* 4 (EP 1.2:L 75/2/993, July, 1993).

<sup>122</sup> See Tim Goodman, et al., *Cattle Behavior with Emphasis on Time and Activity Allocations Between Upland and Riparian Habitats*, in *PRACTICAL APPROACHES TO RIPARIAN RESOURCE MANAGEMENT: AN EDUCATIONAL WORKSHOP* 95 (Robert E. Gresswell, et al., eds., U.S. Bureau of Land Management, BLM-MT-PT-89-001-4351, May 1989).

<sup>123</sup> A 1993 report that inventoried federal riparian lands listed sixteen per-cent as being very poor condition (less than twenty per-cent of ecological potential for vegetation); thirty-eight per-cent as poor (twenty-one to forty per-cent); thirty-one per-cent as fair (forty-one to sixty per-cent); and only fifteen per-cent as being in good condition (greater than sixty per-cent of potential vegetation). See ED CHANEY ET AL., U.S. ENVTL. PROTECTION AGENCY, *LIVESTOCK GRAZING ON WESTERN RIPARIAN AREAS* 5 (EP 1.2:L 75/2/993, Aug. 1993).

<sup>124</sup> Indeed, many residents will declare that a given stream has not changed since their grandparents were alive. But this observation overlooks the fact that due to the extreme overgrazing in the west at the turn of the century, and the continual grazing ever since, many are not aware that their grandparents were aware of what a normal or healthy riparian area looks like. See Platts, *supra* note 9, at 17. See also Elmore & Beschta, *supra* note 99, at 261.

<sup>125</sup> There is a historical debate about whether grazing is responsible for widespread arroyo formation. See e.g. JAME RODNEY HASTINGS & RAYMOND M. TURNER, *THE CHANGING MILE: AN ECOLOGICAL STUDY OF VEGETATION CHANGE WITH TIME IN THE LOWER MILE OF AN ARID AND SEMIARID REGION* 43-46 (1965); See also LYNN JACOBS, *WASTE OF THE WEST: PUBLIC LANDS RANCHING* 105-107 (1991).

<sup>126</sup> See Elmore & Beschta, *supra* note 99, at 261.

In addition to denuding the riparian vegetation, cattle also compact the soil.<sup>127</sup> As the soil is compacted the infiltration of water into the riparian zone is reduced.<sup>128</sup> This amplifies the surface runoff. More runoff in turn accelerates the water's velocity and exponentially increases the stream's erosive potential.<sup>129</sup> Thus, soil compaction decreases the riparian zone's ability to neutralize flood damage.

Lastly, cattle trample and degrade the stream bank's structure.<sup>130</sup> Where cattle graze along riparian areas the stream banks collapse and slope more gradually towards the water.<sup>131</sup> Bank collapse is associated with a widening of the stream channel and a decrease in water depth.<sup>132</sup> This exposes more water surface area to the sun, which increases the water temperature and evaporation. More importantly, the physical impact of grazing in the riparian zone decreases stream bank stability.<sup>133</sup> Destabilization takes place when grazing tramples and uproots plants such that the roots of these plants are no longer an effective aid in holding together the bank soil. Grazing also destroys structures in the stream.<sup>134</sup> Both the decrease of bank stability and the destruction of in-stream structures increase erosion and the loss of alluvial fill that is critical to water storage.

---

<sup>127</sup> See CHANEY ET AL., *supra* note 123, at 6.

<sup>128</sup> See Thomas L. Thurow, *Hydrology and Erosion*, in *GRAZING MANAGEMENT: AN ECOLOGICAL PERSPECTIVE* 141, 151 (Rodney K. Heitschmidt & Jerry W. Stuth eds, 1991).

<sup>129</sup> For example, doubling the velocity of streamflow quadruples its erosive force and provides sixty-four times more sediment carrying capacity. See CHANEY ET AL., *supra* note 123, at 34.

<sup>130</sup> See Catherine Clifton, *Effects of Vegetation and Land Use on Channel Morphology*, in *PRACTICAL APPROACHES TO RIPARIAN RESOURCE MANAGEMENT: AN EDUCATIONAL WORKSHOP* 121, 126 (Robert E. Gresswell, et al. eds., U.S. Bureau of Land Management, BLM-MT-PT-89-001-4351, May 1989).

<sup>131</sup> See William S. Platts & Roger L. Nelson, *Characteristics of Riparian Plant Communities and Streambanks with Respect to Grazing in Northeastern Utah*, in *PRACTICAL APPROACHES TO RIPARIAN RESOURCE MANAGEMENT: AN EDUCATIONAL WORKSHOP* 73, 76-79 (Robert E. Gresswell, et al. eds., U.S. Bureau of Land Management, BLM-MT-PT-89-001-4351, May 1989).

<sup>132</sup> See Clifton, *supra* note 130, at 128.

<sup>133</sup> See Platts & Nelson, *supra* note 99, at 78. Over a variety of vegetative covers, the overall stream bank stability was increased 276 per-cent when grazing was eliminated. *Id.*

<sup>134</sup> See *id.*, at 80. While the structures at issue here were man made, the same is true for natural structures such as beaver ponds. Since ungrazed areas have an abundance of small trees whereas grazed areas do not, beaver tend to build their lodge dams in ungrazed portions of rangelands. See Charles D. Dieter & Thomas R. McCabe, in *PRACTICAL APPROACHES TO RIPARIAN RESOURCE MANAGEMENT: AN EDUCATIONAL WORKSHOP* 135, 138 (Robert E. Gresswell, et al. eds., U.S. Bureau of Land Management, BLM-MT-PT-89-001-4351, May 1989).

Recent field studies of the relationship of grazing to water flow have demonstrated a direct link between the two. During the last thirty years, the science of riparian ecosystems has increasingly captured the interest of forest managers and hydrologists. In an effort to determine the impact of grazing in the arid western forests, these scientists have reviewed the long-term effects of grazing in riparian habitats. These studies conclusively demonstrate that grazing reduces the ability of riparian lands to deliver the full potential of a stream's sustained flow.<sup>135</sup> Furthermore, grazing decreases the riparian ecosystem's capability to minimize the adverse effects of flooding.<sup>136</sup> The following case studies provide some insight into the negative impacts of grazing on riparian ecosystems.

The most widely reported study of the riparian-grazing relationship is that of Camp Creek, Oregon.<sup>137</sup> That study portrayed the history of Camp Creek and its relationship with grazing. In 1875, before widespread grazing began in the west, the Surveyor General of Oregon described the Camp Creek valley as a meadow that included several marshes. Extensive grazing took place both in the uplands and the valley during the next twenty-five years. Stripped of its stabilizing vegetation, water runoff cut arroyos four to six feet deep. This erosion and down cutting caused the water table in the valley to drop. Consequently, the valley's vegetation changed from a wet meadow to sagebrush and rabbitbrush.

In 1965 an experiment began to improve wildlife habitat. One mile of the eroded gully was fenced off to exclude cattle and allow the vegetation to recover. To hasten riparian recovery, land

---

<sup>135</sup> Even studies that do not call for the elimination of grazing in riparian zones concede that grazing has a detrimental impact on average annual flow rates by minimizing the water absorbing action of stream banks and increasing erosion in riparian habitats. See generally CHANEY ET AL, *supra* note 123; PUBLIC RANGELANDS, *supra* note 5.

<sup>136</sup> See generally CHANEY ET AL, *supra* note 123; PUBLIC RANGELANDS, *supra* note 5.

<sup>137</sup> See Winegar, *supra* note 102.

managers planted grasses and trees. By 1974, four miles of the creek were fenced, however, cattle still grazed around the enclosure.<sup>138</sup>

The improvements in the riparian zone and water table were dramatic. By 1978, riparian vegetation had completely reestablished in the fenced portion of the creek. By filtering and depositing alluvium from the water, the vegetation elevated the creek's channel six feet. Most importantly, within the fenced enclosure a year round continuous flow developed.<sup>139</sup> This observation was in contrast to the areas just above and below the enclosure where the water flow was intermittent. During severe droughts when the main source of water for the creek dried up, water began to flow just a few feet within the enclosure, persisted for the four miles within it, and then disappeared just outside the fence.<sup>140</sup>

Camp Creek is not the only evidence of such a remarkable stream recovery. Scientists observed the same results in other Oregon creeks. Excluding cattle for six years along Willow Creek, Oregon also reestablished perennial flow.<sup>141</sup> Miles of the creek above and below the fenced enclosure around Willow Creek remain dry during the summer. Yet within the enclosure where riparian vegetation recovered water flows year round. Bear Creek, Oregon also rejuvenated year round flow after the exclusion of grazing.<sup>142</sup> For six years land managers eliminated grazing around a five and one-half miles portion of Bear Creek. Afterwards, managers allowed short intervals of grazing. The improved riparian conditions caused the water supply to evolve from intermittent to perennial flows.

---

<sup>138</sup> See PUBLIC RANGELANDS, *supra* note 5, at 60.

<sup>139</sup> See *id.*

<sup>140</sup> See William S. Platts et al., Increasing Summer Flow in Small Streams Through Management of Riparian Areas and Adjacent Vegetation: A Synthesis, *in* RIPARIAN ECOSYSTEMS AND THEIR MANAGEMENT: RECONCILING CONFLICTING USES 206, 208 (U.S. Dep't of Agric. Forest Serv. Gen. Technical Report, RM-120 1985).

<sup>141</sup> See *id.*

<sup>142</sup> See PUBLIC RANGELANDS *supra* note 5, at 26.

Another exemplar of this effect is Horse Haven Creek, Oregon.<sup>143</sup> Within this watershed, annual precipitation ranges from nine to fifteen inches. Dilapidated riparian conditions led the local rancher operating the allotment to fence six miles of the creek. For three years the enclosure rested. Then the rancher grazed the riparian area, but only for a short duration in the spring. The improvement of the riparian vegetation allows streams to flow year round more often. In fact, streams that “used to go dry in some years now flow in years with half as much precipitation.”<sup>144</sup>

Range managers observed similar results in other states as well. On the Sedow Allotment in the Tonto National Forest, Arizona, the forest service eliminated year round cattle grazing.<sup>145</sup> The Forest Service reduced grazing by fifty per-cent and changed portions of the allotments to a five pasture rest rotation system. Under this system, riparian lands were given spring-summer rest every two out of three years to promote vegetative growth and reproduction. What were “sandy draws” for past decades developed into places with “flowing water and abundant vegetation and wildlife.”<sup>146</sup> Moreover, the cottonwoods reestablished in areas where none existed previously.<sup>147</sup>

Improvement of the riparian zone around Mahogany Creek, Nevada, quantified the influence a healthy riparian ecosystem has on water flow.<sup>148</sup> Initially, range managers sought to reduce grazing in the allotment to improve degraded riparian conditions. However, even the reduced grazing prohibited true recovery of riparian lands. After cattle and sheep were fenced out of from riparian areas, vegetation rebounded with vigor. Curleaf mountain mahogany seedlings

---

<sup>143</sup> See CHANEY ET AL., *supra* note 123, at 30.

<sup>144</sup> See *id.*

<sup>145</sup> See CHANEY ET AL., *supra* note 123, at 10.

<sup>146</sup> See CHANEY ET AL., *supra* note 123, at 11.

<sup>147</sup> After five years in one riparian area, more than one thousand cottonwoods and thirty-two hundred willows from one quarter to twenty-five inches in diameter were documented where none existed before. See CHANEY ET AL., *supra* note 123, at 11. See also PUBLIC RANGELANDS, *supra* note 5, at 30.

<sup>148</sup> See CHANEY ET AL., *supra* note 123, at 16. See also PUBLIC RANGELANDS, *supra* note 5, at 24.



developed within the riparian enclosure while nearly none were detected outside the fence. Grass cover increased throughout the enclosure.

The vegetative regrowth stabilized stream banks and reduced erosion. The stream channel became narrower and deeper. Ten years after the grazing exclusion, the developing riparian ecosystem had increased the stream's water depth fifty per-cent and the summer stream flow *four hundred per-cent*.<sup>149</sup> What makes this increase truly astonishing is that the watershed's precipitation comes almost exclusively in the form of winter snows.<sup>150</sup> The summer flow in the absence of rain confirms that the riparian ecosystem's potential to regulate the watershed discharge and augment the year round water supply is indeed significant.

A study of West Rocky Creek demonstrates the impact grazing has on the overall water table as well.<sup>151</sup> Extensive cattle overgrazing at the turn of the century stripped the watershed of its dominant native grasses. The loss of grass decreased the ability of precipitation to infiltrate and recharge groundwater supplies. Due to the lack of groundwater recharge, the perennial West Rocky Creek became intermittent in 1918. Mesquite and juniper replaced the lost grasslands. In the 1930's, as grazing continued, the springs that fed the creek dried up completely.

After three decades of only sporadic flows associated with heavier than usual rainfall, ranchers began a rehabilitation program for the range associated with the creek.<sup>152</sup> They removed the mesquite and juniper and reseeded approximately thirty-two thousand acres of the watershed with grasses in the beginning of the 1960's. Thereafter, ranchers decreased grazing in the area. Riparian vegetation began a comeback. In the 1970's, the springs that were the water source for

---

<sup>149</sup> See CHANEY ET AL., *supra* note 123, at 17 (emphasis added).

<sup>150</sup> See CHANEY ET AL., *supra* note 123, at 16.

<sup>151</sup> See CHANEY ET AL., *supra* note 123, at 18.

<sup>152</sup> Although the example of West Rocky Creek may pertain more to the rehabilitation of an entire range than solely riparian areas, West Rocky Creek helps elucidate and quantify the impact of grazing on late summer water flow.

West Rocky Creek began to flow again. During a severe drought in 1984, the creek ran the entire year with flows ranging from one-hundred and fifty to four-thousand gallons per minute. The improvements from reduced grazing had a direct influence on not only water quantity, but the quality of water entering the local reservoirs as well. The vegetation filtered out sediment that otherwise would have filled the local reservoir and reduces its life span. In addition, the vegetative improvements reduced flooding severity.

New Mexico lands have also validated the detrimental effect grazing has on the water supply as Silver City's experience demonstrates.<sup>153</sup> Between 1870 and 1887 the groundcover of the watershed above Silver City, New Mexico Due was stripped away due to overgrazing, mining and timber harvesting. Without the protective groundcover, torrential rains during the 1890's and early 1900's gouged a ditch down the main street of town. By the end of this period, the erosion associated with these rains and floods had ripped a seventeen-meter arroyo that ran twenty-four kilometers in length.

Alarmed at the devastation wrought by the poor watershed conditions, the town of Silver City and the United States Department of Agriculture made a joint agreement to improve the watershed.<sup>154</sup> Starting in 1927, land managers prohibited grazing and fuel wood harvesting in the watershed. Until 1933 the vegetation in the area was allowed to grow back naturally. However, in 1933 a Civilian Conservation Corporation [hereinafter CCC] camp was established. The CCC worked to rejuvenate riparian lands by planting seedling trees such as cottonwood, willows and

---

<sup>153</sup> See DeBano & Hansen, *supra* note 113, at 142-144.

<sup>154</sup> The Gila National Forest, which encompassed the watershed, was set aside in 1908, after both the damage to the forest and town was completed. *Id.*, at 143.

boxelder. The CCC also worked on the waterways, placing channel structures across the streams and creeks.<sup>155</sup>

The lack of grazing,<sup>156</sup> the CCC's enhancements, and time have created a more natural watershed with a vastly improved hydrologic functioning. The lack of grazing was essential in restoring the natural hydrologic conditions as it allowed the riparian to mature. In this case, however, the installation of the check dams accelerated the rejuvenation process. Initially, the check dams filled with sediment carried by runoff. The collected sediment absorbed water and raised the water table. Riparian vegetation grew rapidly on the barren creek banks after the water tables rose. After the riparian vegetation reestablished, the stream channels and groundwater supplies stabilized. Streams that were formerly infrequent are now perennial. Restored groundcover has reduced the flooding events and enhanced municipal water supplies.

## VII        *Grazing Increases the Severity of Flood Damage.*

As alluded to in last two case studies, eliminating or reducing grazing diminishes flood events and impacts. This is because reducing or eliminating grazing allows riparian vegetation to grow denser. Thick riparian vegetation attenuates a flood's damage in many ways. First, it acts to resist water flow. This retards the velocity and thus the kinetic energy of the water. A reduction in the water's energy decreases the erosive power of the flood. Second, riparian plants act to promote water infiltration along stream banks. The plant's roots keep the soil from compacting and promote the efficient percolation of water into the ground. The synergy of these two effects multiplies the prophylactic control riparian vegetation has over flood impacts, keeping erosive damage to a minimum. As the velocity of water is decreased, the contact time between the stream bank and

---

<sup>155</sup> These structures were mostly gully check dams. *Id.* These are dams that prevent the further erosion of the watershed by capturing the stream's water and allowing the sediment to settle out.

<sup>156</sup> As of 1989, grazing was still prohibited in the watershed. *Id.*

water rises. When coupled with efficient absorption, additional water is stored in the banks of a stream and diverted from the immediate rush of water through the watershed. This reduces the mass and, therefore, the force of water moving down the watershed. Most importantly, riparian plant life acts as a physical barrier that prevents erosion of the channel by holding the soil in place. Yet vegetation along the stream bank not only prevents erosion, but also filters out suspended soil. The addition of this soil hastens bank development and enhances its water storage capabilities. The case studies below detail the results of this inherently elegant design of nature.

For instance, Sheep Creek, Montana is a large perennial stream.<sup>157</sup> By 1974, overgrazing of sheep and cattle reduced the lands surrounding the stream to mostly bare ground. At that time, land managers established a pilot project area to test a rest-rotation grazing system. The system called for no summer use and complete rest in an enclosure of one and one-half miles of Sheep Creek. In 1984, the area experienced a major flood event. Scientists estimated that a flood of this size only occurs once every one-hundred to one-hundred and fifty years. The areas above and below the fenced out area suffered massive erosion that destroyed riparian ecosystems. However, just inside the fenced out area, riparian areas not only survived the deluge, but also trapped the sediment flood waters washed through it. This sediment helped rebuild the stream banks, increase bank and channel stability and water clarity. The sediment captured in this one event essentially saved 118,000 cubic feet of soil from being deposited downstream to a federal reservoir.

Projects in the San Francisco River, New Mexico watershed also document the savings from improved riparian lands.<sup>158</sup> Although forest managers reduced grazing in the late 1950's and early 1960's, the grazing damage in the High Clark Draw was so bad that managers developed additional programs to restore the riparian environments there. Managers installed earthen and rock check

---

<sup>157</sup> See PUBLIC RANGELANDS, *supra* note 5, at 67.

<sup>158</sup> See DeBano & Hansen, *supra* note 113, at 144.

dams to capture sediment.<sup>159</sup> They also seeded the entire area after contouring severely eroded stream channels and lateral gullies. Grazing was prohibited for two years, then allowed to proceed at reduced rates.

This restoration project improved the overall watershed conditions. Riparian species grew in the High Clark Draw project area where none were present before, indicating that the overall water table was rising and soil moisture was improving. Seasonal flows improved. Below the project area, natural riparian ecosystem improvements after the grazing reduction reestablished perennial flow. Scientific analysis of the results estimated that the watershed would have an eighty-seven per-cent reduction in annual sediment delivery, and a sixty-three per-cent reduction in peak flows after fifteen years.

Likewise, the Camp Creek experiment showed just how an improved riparian ecosystem reverses the effects of erosion due to flooding.<sup>160</sup> Cattle were excluded from riparian grazing through a fence out project that began in 1965. A wildlife biologist performed measurements of the no grazing policy's impact on water quality in the early 1970's. The study measured turbidity, the amount of suspended solids that water carries. The results determined that the improved riparian ecosystem within the fenced out area decreased the sediment load on an average of 65 per-cent between the beginning and end of the enclosure. Depending on stream flow, the overall reduction of waterborne sediment reached as high as 40.7 tons per hour. As this sediment deposited along the steam bank the channel raised more than six feet.<sup>161</sup> These deposits reinforced the riparian rehabilitation by raising water tables, increasing the stream bank water storage capacity, and stimulating riparian plant growth.

---

<sup>159</sup> A total of ten check dams were installed: four earthen and six rock. *Id.*

<sup>160</sup> See Wingar, *supra* note 102, at 11.

<sup>161</sup> See PUBLIC RANGELANDS, *supra* note 5, at 60.

These case studies reveal that cattle grazing, especially in riparian ecosystems, compromise the ability of western watersheds to regulate water flow and prevent flood damage.<sup>162</sup> This paper contends that when a reduction in the riparian land's ability to regulate water flow or decrease flood damage takes place through grazing in our national forests, the effect is contrary to the intent of the Organic Act. Therefore, when grazing in the national forest causes these effects it must be banned pursuant to the Organic Act of 1897.

It is clear from the language of the Organic Act is that its framers envisioned it as a method of "securing favorable conditions of water flow."<sup>163</sup> In fact, it was the drafter's frustration with the lack of watershed protection led to the creation of the Organic Act.<sup>164</sup> To protect fully this purpose of the national forest the drafters explicitly placed the language securing water flows in the Organic Act. It is clear not only from the language of the Act, but the legislative history as well, that the drafters were concerned about preserving late season water flow and preventing the devastating effects of flooding. Because western grazing undermines the riparian land's ability to do both, it is illegal under the express terms of the Act.

The Secretary of Agriculture's determination that grazing on the national forest is permissible provides no refuge from this result.<sup>165</sup> Although courts usually give great deference to

---

<sup>162</sup> However, this statement is not limited to cattle grazing. All agricultural grazing seems to have this effect. It should also be noted that the context of this statement applies broadly only in the western national forests. Non-arid Eastern forests would qualify only if it can be shown that grazing does indeed affect the hydrological functioning of the watersheds.

<sup>163</sup> 16 U.S.C. § 475 (1998)

<sup>164</sup> The Act guaranteed water not only for the immediate inhabitants of the west, but for generations as well.

<sup>165</sup> Although the Organic Act originally gave the Secretary of the Interior authority to administer the national forests, subsequent legislation transferred the entire jurisdiction, including this authority, to the Department of Agriculture. *See* ch. 288, § 1, 33 Stat. 628 (1905) (current version at 16 U.S.C. § 551 (1998)). Under the Act, the Secretary of Agriculture is responsible for making rules "to regulate their occupancy and use and to preserve the forests thereon from destruction." 16 U.S.C. § 551 (1998). This provision gives the Secretary the authority to permit grazing in the national forest.

administrative rulings regarding their authority to regulate, such rulings are void when an executive office or officer exceeds the scope of their regulatory authority. In determining whether an executive agency has exceeded its statutory authority to regulate upon a given matter, courts look to see if “Congress has ‘directly spoken to the precise question at issue. If the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress.’”<sup>166</sup>

On the issue of national forest grazing the Congressional voice is clear; the Secretary may regulate as long as the provisions “insure the objects of the reservations.”<sup>167</sup> As the Supreme Court emphasized in *New Mexico*, the principal object of the forest reservations was to secure “a means of enhancing the quantity of water that would be available to the settlers of the arid west.”<sup>168</sup> That Court acknowledged that

[f]orests exert a most important regulating influence upon the flow of rivers, reducing floods and increasing the water supply in low stages. The importance of their conservation on the mountainous watersheds which collect the scanty supply for the arid regions of North America can hardly be overstated. With the natural regimen of the streams replaced by destructive floods in the spring, and dry beds in the months where irrigating flow is most needed, the irrigation of wide areas now proposed will be impossible, and regions now supporting prosperous communities will become depopulated.<sup>169</sup>

Therefore the language of the Organic Act, the legislative history of the Act, and its judicial interpretation compel the conclusion that Congress has expressed unambiguously what the national forests were intended to do. The Congressional directive of the Organic Act’s purpose and its

---

<sup>166</sup> *National Credit Union Admin. v. First Nat’l Bank & Trust Co.*, 522 U.S. 479, 118 S. Ct. 927, 938 (1998) (quoting *Chevron U.S.A. Inc. v. Natural Resources Defense Counsel, Inc.*, 467 U.S. 837, 842-843 (1984)).

<sup>167</sup> 16 U.S.C. § 551 (1998).

<sup>168</sup> *U.S. v. New Mexico*, 438 U.S. 696, 711-713 (1978). The opinion recognized that the Act protected the right to harvest timber as a primary purpose of the forest reservations. However, given the legislative history of the Act, the Court concluded that timber harvests were secondary to the goal of water conservation. See *New Mexico*, 438 U.S. at 713 n.20.

<sup>169</sup> *U.S. v. New Mexico*, 438 U.S. 696, 712 (1978) (quoting S. Doc. No. 55-105, at 10 (1st Session, 1897)).

legislative history instructs us that that actions destructive of watershed preservation are outside the scope of agency regulatory, notwithstanding the Secretary's position on the issue.

The Congressional voice has long been recognized in Supreme Court decisions. Beginning with the first national forest grazing case, the Court qualified the use of the national forest for grazing, stating that a "limited and regulated use for pasturage might not be inconsistent with the object sought to be attained by the [Organic Act]."<sup>170</sup> The Court reinforced this position in later cases. The Court made clear that the judiciary could not compel lands "to be used for agricultural or grazing purposes, nor interfere when, in the exercise of its discretion, Congress establishes a forest reserve system for what it decides to be national and public purposes."<sup>171</sup> Finally, in the most authoritative interpretation of the Organic Act, *New Mexico* affirmed the national forest's primary role as a watershed protectorate and declared that even "[i]f stockwatering could not take place in the [national forests], Congress' purposes in reserving the land would not be defeated."<sup>172</sup> There the Court reiterated that the national forests could "be put to a variety of uses," as long as these uses were "not inconsistent with the two principle purposes of the forest."<sup>173</sup>

Yet, the latest science indicates that grazing on the national forest is inconsistent with the purpose of "securing favorable conditions of water flows." The case studies above amply demonstrate that grazing has a detrimental impact on water flow and flood prevention.<sup>174</sup> Repeatedly, when grazing is reduced or eliminated intermittent streams return to perennial flow.

---

<sup>170</sup> U.S. v. Grimaud, 220 U.S. 506, 516 (1911).

<sup>171</sup> Light v. U.S., 220 U.S. 523, 537 (1911).

<sup>172</sup> *New Mexico*, 438 U.S. at 716.

<sup>173</sup> *Id.*

<sup>174</sup> While not within the scope of this paper, it should be noted that evidence also suggests that overgrazing deters the growth of trees by eating the fresh seedlings. See CHANEY ET AL., *supra* note 123, at 8-11. Thus, grazing may undermine both purposes of the nation's forests: securing favorable water flows and a supply of timber.



As riparian vegetation reestablishes, the watershed reduces the incidents of flooding. Moreover the plant life along the streams and creeks do not just prevent erosion, but filters out sediment that deposits in the riparian zone and enhances its water storage capabilities. Camp Creek, Mahogany Creek, and Silver City and the studies above demonstrate the incompatibility of grazing with a sustained and stable water output from the national forests watersheds. As the Supreme Court so aptly noted, “changed circumstances or new knowledge may make what was previously permissible no longer so.”<sup>175</sup>

The fact that grazing has taken place for so long is of little consequence to this outcome. Although a rancher may have held a grazing permit since the establishment of the national forest, “[g]razing permits convey no right, title, or interest” in the land to the permit holder.<sup>176</sup> Grazing permits are considered “licenses which confer certain privileges to the permittee.”<sup>177</sup> The privilege the license grants to the holder is “the right of first refusal”; that is the permit creates a preference for its holder to use the land before the government gives another the right to use it.”<sup>178</sup> However, it “is safe to say that it has always been the intention and policy of the government to regard the use of the public lands for stock grazing . . . as a privilege which is withdrawable at any time for any use by the sovereign.”<sup>179</sup> While one can empathize with the plight of the rancher who uses and relies on national forest lands, not even investment-backed expectations of agricultural grazers creates an interest that defeats the statutory purpose of the nation’s forest reserves.<sup>180</sup>

Because the Secretary of Agriculture permits grazing when it has been proven to be inconsistent with the principle purpose of the forests reserves, the Secretary has exceeded the

---

<sup>175</sup> *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1019 n.8 (1992).

<sup>176</sup> *See Diamond Bar Cattle Co. v. U.S.*, 168 F.3d 1209, 1215 (10th Cir. 1999).

<sup>177</sup> *Hage v. U.S.*, 35 Ct. Cl. 147, 167 (1996).

<sup>178</sup> *Hage*, 35 Ct. Cl. at 170.

<sup>179</sup> *Hage*, 35 Ct. Cl. at 166.

<sup>180</sup> *See Hage*, 35 Ct. Cl. at 171.

The history of grazing demonstrates that it degrades the hydrologic functioning of the watershed, especially in riparian habitats. Grazing compromises the riparian ecosystem's ability to function normally by consuming streamside vegetation. The absence of vegetation promotes erosion and reduces the stream bank's capacity to hold water. Ultimately, this cause the water table to drop, often to the point where surface flow ceases. The drop in the water table also eliminates the remaining riparian plant species. This severely compromises the stream banks capacity to store flood waters, and therefore increases the volume of flood pulses and the intensity of flood damage.

Because agricultural grazing undermines the Organic Act of 1897's primary purpose of protecting the water supply while preventing floods, it is inconsistent with goal of this legislation. Not even the regulatory power vested in the Secretary of Agriculture to regulate forest land can permit activities inconsistent with the Organic Act's purpose. The authority granted to the Secretary is clear; she may regulate as long as her rules "insure the objects of such reservations." When perennial streams are grazed until they dry up, the object of the national forests is not served. When grazing deprives watersheds and riparian lands of their innate ability to absorb rain and snow, which in turn produces floods that damages lands, communities, and the reservoirs below, the objective of the national forest is defeated. Quite simply, the Organic Act of 1897 prohibits agricultural grazing on riparian lands, because grazing there thwarts the purpose of "securing favorable conditions of water flow."