

## CONSERVATION-RELIANT SPECIES AS A BOUNDARY OBJECT FOR INTERDISCIPLINARY ENGAGEMENTS

MELINDA MORGAN\*

Whether you believe the Endangered Species Act (ESA) is a success depends on which end of the binary you focus: extinction or recovery. On the one hand, the ESA is very good at keeping species from going extinct. In the decades since the ESA's passage in 1973, only four species have been confirmed extinct with another twenty-two possibly extinct following protection from the ESA.<sup>1</sup> On the other hand, the ESA has not been all that successful in fully recovering species. To date, only thirty-nine species have been fully recovered under the Act.<sup>2</sup>

Most species fall somewhere between these two extremes, making it difficult at times to gauge the efficacy of the ESA. By creating the concept of Conservation-Reliant Species (CRS),<sup>3</sup> Professor Dale Goble and his colleagues accomplished two important tasks. The first was to offer a more nuanced approach to thinking about the recovery of species. By moving to a continuum rather than a binary, the CRS model of recovery allowed for more productive discussions regarding the real needs of species and what was necessary for their ongoing success.<sup>4</sup>

This Essay reflects mainly on the second contribution—the utility of CRS as a boundary object for interdisciplinary engagements related to the protection of species.<sup>5</sup> A boundary object is anything that facilitates communication between people inhabiting different “social worlds,” in this case biologists, legal scholars, activists, managers, and others.<sup>6</sup> As a boundary object, CRS opened up important

---

\* Melinda Morgan, J.D. University of Idaho 1998. Professor Goble was her mentor and advisor on her law review comment, *Was the Lorax an Outfitter and Guide? A Shift in Idaho's Standing Doctrine: Boundary Backpackers v. Boundary County and Selkirk-Priest Basin Ass'n v. State*, 34 IDAHO L. REV. 127 (1997). Professor Goble continued this mentorship throughout the author's career, including her work as a nonprofit environmental lawyer with Land and Water Fund of the Rockies and Western Resource Advocates, and later her move to academia. She is currently an associate professor in environmental studies at the University of New Mexico, extends thanks to her research assistant Laurel Ladwig for her editorial assistance, and can be reached at mhbenson@unm.edu.

1. Noah Greenwald, Kieran F. Suckling, Brett Hartl & Loyal A. Mehrhoff, *Extinction and the U.S. Endangered Species Act*, PEERJ 1, 3 (2019), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6482936/pdf/peerj-07-6803.pdf>.

2. *Id.*; see also Maile C. Neel, Allison K. Leidner, Aaron Haines, Dale D. Goble & J. Michael Scott, *By the Numbers: How is Recovery Defined by the US Endangered Species Act?*, 62 BIOSCIENCE 646 (2012).

3. J. Michael Scott, Dale D. Goble, John A. Wiens, David S. Wilcove, Michael Bean & Timothy Male, *Recovery of Imperiled Species Under the Endangered Species Act: The Need for a New Approach*, 3 FRONTIERS ECOLOGY & ENV'T 383 (2005).

4. *Id.* at 385–86.

5. Interdisciplinary research is a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice. See *generally* COMM. ON FACILITATING INTERDISCIPLINARY RESEARCH, COMM. SCI., ENG'G, & PUB. POLICY, NAT'L ACAD. OF SCI., NAT'L ACAD. OF ENG'G, & INST. OF MED., *FACILITATING INTERDISCIPLINARY RESEARCH* (2005), <https://doi.org/10.17226/11153> [hereinafter *FACILITATING INTERDISCIPLINARY RESEARCH*].

6. See Susan Leigh Star & James R. Griesemer, *Institutional Ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology*, 19 SOC. STUD. OF SCI. 387, 388 (1989).

dialogues not only among scholars from different disciplines but also with natural resource managers tasked with ESA implementation and enforcement.

Of Professor Goble's many academic achievements, his work related to the ESA generally and CRS specifically may go down as some of his most lasting achievements. By quantitative standards, his work on CRS is highly impactful; Google Scholar reports that his papers on CRS rank among his most cited works and have wide-ranging influence, both in and outside the academy.<sup>7</sup>

The concept of CRS is an enduring gift, created by Professor Goble and other colleagues who were also friends and unapologetic co-conspirators in their efforts to keep species from going extinct. The interdisciplinary teams that generated the three main manuscripts that advanced the CRS concept varied, with two key figures providing consistency and leadership: Professor Goble and his colleague, wildlife biologist Dr. Michael Scott, both from the University of Idaho.<sup>8</sup> Professor Goble provided legal expertise on the ESA, while Dr. Scott's leadership of Idaho's Cooperative Fish and Wildlife Research Unit and experience with ESA recovery efforts brought scientific background and practical experience.<sup>9</sup> Their teams included not only legal scholars and scientists but also individuals with expertise in public affairs and members of nongovernmental organizations (NGOs) working to protect endangered species.<sup>10</sup>

It should be noted that, while not explicitly coining the term "conservation reliance," law professor Holly Doremus is generally credited with originating the general idea in 2000, arguing that:

A healthy view of recovery and delisting would separate the two concepts. Recovery should be seen as the provision of biological security. Delisting should be understood as requiring the additional provision of regulatory security outside the ESA, such that the special regulatory protections of the ESA are no longer necessary.<sup>11</sup>

The first paper taking this idea a step further and introducing the CRS concept into the literature came in 2005 with a paper led by Michael Scott and published in *Frontiers in Ecology and the Environment*.<sup>12</sup> While acknowledging that there is no

---

7. You can find Professor Goble's Google Scholars page, with links to much of his peer-reviewed scholarship, at Dale D. Goble, GOOGLE SCHOLAR, <https://scholar.google.com/citations?user=eAhKYcQAAAAJ&hl=en&oi=sra> (last visited May 14, 2020).

8. See, e.g., Scott et al., *supra* note 3.

9. U.S. Geological Survey's Cooperative Fish and Wildlife Research Unit program was created in 1935 and there are currently 40 units located in universities in 38 states. See *Cooperative Research Units*, U.S. GEOLOGICAL SURV., [https://www.usgs.gov/ecosystems/cooperative-research-units?qt-programs\\_l2\\_landing\\_page=0#qt-programs\\_l2\\_landing\\_page](https://www.usgs.gov/ecosystems/cooperative-research-units?qt-programs_l2_landing_page=0#qt-programs_l2_landing_page) (last visited May 14, 2020); *AOU Conservation Award, 2006: J. Michael Scott*, 124 AUK 353 (2007) [hereinafter *AOU Conservation Award*].

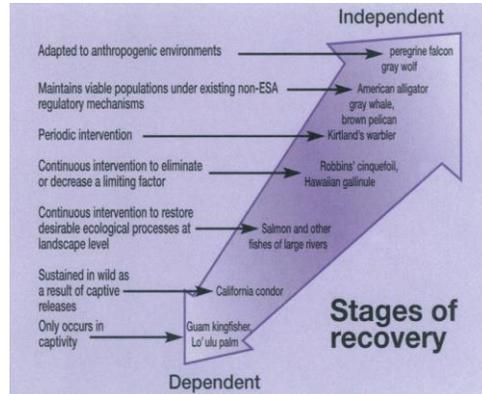
10. See *AOU Conservation Award*, *supra* note 9, at 354.

11. See Holly Doremus, *Delisting Endangered Species: An Aspirational Goal, Not a Realistic Expectation*, 30 ENVTL. L. REP. 10434, 10453 (2000). See also Holly Doremus & Joel E. Pagel, *Why Listing May Be Forever: Perspectives on Delisting Under the Endangered Species Act*, 15 CONSERVATION BIOLOGY 1258, 1261 (2001) ("We expect that the majority of currently listed species, both plants and animals, will need the protection of the ESA in perpetuity.").

12. See J. Michael Scott, Dale D. Goble, John A. Wiens, David S. Wilcove, Michael Bean & Timothy Male, *Recovery of Imperiled Species Under the Endangered Species Act: The Need for a New Approach*, 3 FRONTIERS ECOLOGY & ENV'T 383 (2005).

single definition of what constitutes “recovery” under the ESA, the authors point out that the linear nature of the ESA’s process often *unnecessarily* assumes that ongoing management efforts will no longer be needed once a species qualifies for delisting.<sup>13</sup> In proposing a shift from a “not recovered/recovered” binary to a more nuanced continuum recognizing the relative dependence of species on ongoing human intervention or management, the authors argue that the ESA’s goals could be more realistically accomplished.<sup>14</sup> “If a species can be delisted when there is a reasonable certainty that the human intervention needed to sustain the species in the wild will be supplied, then the objective of the ESA becomes one of fostering that intervention.”<sup>15</sup>

Figure 2 from the *Frontier* paper outlines the recovery continuum, with examples ranging from species that exist only in full captivity (heavily reliant) to those fully adapted to anthropogenic threats (independent).<sup>16</sup> This more nuanced approach allowed species to be viewed operationally as “recovered” at several levels along this continuum.<sup>17</sup> “If different points along this continuum are to qualify as ‘recovered’ given the necessary management or intervention to stabilize a population or habitat, the key issue becomes whether there is a reasonable certainty that the human intervention will continue.”<sup>18</sup> Professor Goble’s legal expertise is particularly evident in the article in the recommendation for “recovery management agreements”: biologically defensible and legally enforceable contracts that would provide the continued conservation management of species following delisting.<sup>19</sup>



20

13. *Id.* The goal of the ESA is: “to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species.” 16 U.S.C. § 1531(b) (2018). The law itself focuses on the recovery of individual species by engaging a linear process: (1) placing it on a list of species in need of protection, (2) prohibiting the “take” to protect it from harm, (3) developing a recovery plan to bring it back, and (4) delisting the species when recovery efforts are no longer needed. See Scott et al., *supra* note 12, at 383–84.

14. Scott et al., *supra* note 12, at 385.

15. *Id.*

16. *Id.* at 385 fig.2.

17. *Id.* at 385.

18. *Id.*

19. *Id.* at 387–88.

20. Scott et al., *supra* note 12, at 385 fig. 2.

Their second major contribution was in *Conservation Letters* in 2010, again led by Michael Scott and involving a diverse group; they conducted a quantitative assessment of all of the final recovery plans to examine their post-recovery management provisions.<sup>21</sup> They determined that 84% of the species listed under the U.S. Endangered Species Act were “conservation-reliant,” requiring continuing management actions upon delisting.<sup>22</sup> This finding—that the overwhelming majority of listed species live with threats that cannot be eliminated but only managed—made a compelling case of a reconceptualization of recovery.<sup>23</sup>

The third and final seminal paper was in *BioScience*, led by Professor Goble in 2012, wherein the authors noted that “[e]ven species that have met their biological recovery goals often require continuing, species-specific management, because existing regulatory mechanisms are seldom sufficiently specific to provide the required ongoing management.”<sup>24</sup> In addition, the paper further refined the concept of conservation reliance by delineating between two forms of conservation reliance: population reliance and threat reliance.<sup>25</sup> Population-reliant species require ongoing support managing species reintroduction, migration, and other issues related to maintaining viable population numbers, while threat-reliant species mainly require habitat-focused management interventions.<sup>26</sup>

Combined, these three papers set forth a basic framework for thinking about species recovery that began to have traction, not just in the academy, but also within the federal agencies responsible for managing and recovering endangered species. By 2014, both the US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) began employing the concept of “conservation reliance” when discussing efforts to recover and delist species under the ESA.<sup>27</sup>

---

21. J. Michael Scott, Dale D. Goble, Aaron M. Haines, John A. Wiens & Maile C. Neel, *Conservation-Reliant Species and the Future of Conservation*, 3 CONSERVATION LETTERS 91, 91 (2010).

22. *Id.* at 92–93 (reviewing the final recovery plans for 1,136 listed species: 495 animals and 641 plants).

23. *Id.* at 93–94; see also John A. Wiens, Dale D. Goble & J. Michael Scott, Correspondence, *Time to Accept Conservation Triage*, 488 NATURE 281 (2012) (“US species are imperiled by threats that cannot be eliminated, only managed.”).

24. Dale D. Goble, John A. Wiens, J. Michael Scott, Timothy D. Male & John A. Hall, *Conservation-Reliant Species*, 62 BIOSCIENCE 869, 869 (2012) (citing Dale D. Goble, *The Endangered Species Act: What We Talk About When We Talk About Recovery*, 49 NAT. RES. J. 1 (2009)).

25. *Id.* at 870. Professor Goble et al. explain:

Although the ability of a species to persist is ultimately related to the characteristics and condition of both populations and the threats they face, conservation actions are often focused primarily either on managing populations or on managing threats. For example, species such as the northern Idaho ground squirrel (*Spermophilus brunneus*) live in isolated patches of habitat and may require some level of direct human intervention to move among those patches, even after local population sizes are stable. In contrast, other species may persist without direct population management if appropriate habitat is available.

*Id.* at 870–71 (citation omitted).

26. *Id.* at 870.

27. See Daniel J. Rohlf, Carlos Carroll & Brett Hartl, *Conservation-Reliant Species: Toward a Biology-Based Definition*, 64 BIOSCIENCE 601, 602 (2014) (emphasizing the ESA’s policy goal of restoring self-sufficient species in the wild).

Not surprisingly, the CRS concept and its uptake by the federal agencies responsible for species recovery has had its critics.<sup>28</sup> Led by law professor Dan Rohlf, a group of similarly diverse colleagues, that included members of the environmental community,<sup>29</sup> raised concerns that any focus on conservation measures and policy in the delisting process could represent a shift away from biological indicators and a goal for the self-sufficiency of species in the wild.<sup>30</sup> They argue: “although Goble and colleagues may dismiss as ‘idealistic’ the notion of delisting species as *recovered* only when they are self-sufficient in the wild, this goal is still enshrined in federal law.”<sup>31</sup> These critics also produced a number of papers.<sup>32</sup>

A rigorous analysis regarding the unfolding of the CRS concept, including debates both within academia and its engagement by both by agencies and the courts<sup>33</sup> is beyond the scope of this Essay. However, the fact that there *are* debates and an active engagement of the CRS concept in all of these venues *is* the focus of this Essay. Conservation Reliance—a simple yet novel conceptualization of how species actually experience the world as they navigate the myriad of ongoing issues they face in this rapidly changing world—is an idea that resonates with people. As a result, it created the capacity for a shared conversation about the very real challenge of how to achieve better recovery results under the ESA.

In short, CRS has proved to be a very useful way of thinking about many species facing recovery challenges under the ESA. It is also an excellent example of how an interdisciplinary team can create a boundary object that advances their work. A boundary object can be many things—a physical map, a theoretical concept or a computer model. At its essence, a boundary object creates the capacity for shared understanding and learning among people coming from disparate backgrounds.<sup>34</sup> Susan Star and James Griesemer write: “Boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites.”<sup>35</sup>

Boundary objects are critical for the types of interdisciplinary engagements Professor Goble and his colleagues undertook throughout his career. The first contribution of the boundary object is perhaps the most obvious. It *bounds* the

---

28. See Carlos Carroll, Daniel J. Rohlf, Ya-Wei Li, Brett Hartl, Michael K. Phillips & Reed F. Noss, *Connectivity Conservation and Endangered Species Recovery: A Study in the Challenges of Defining Conservation-Reliant Species*, 8 CONSERVATION LETTERS 132 (2014).

29. *Id.* at 133–34 (arguing that that federal agencies have used a broad definition of conservation reliance to justify delisting of species even if they remain dependent on artificial translocation).

30. Rohlf et al., *supra* note 27, at 601 (“[We] believe that the definitions of conservation reliance in the scholarly literature to date cause confusion because they improperly mix legal and policy issues with what should be a biological concept.”).

31. Rohlf et al., *supra* note 27, at 610.

32. See generally Rohlf et al. *supra* note 27; Goble et al., *supra* note 24; Carroll et al., *supra* note 28.

33. See Carroll et al., *supra* note 28, *supp.*3 (providing a summary of agency engagement of the CRS concept).

34. See generally Susan Leigh Star & James R. Griesemer, *Institutional Ecology, ‘Translations’ and Boundary Objects: Amateurs and Professionals in Berkeley’s Museum of Vertebrate Zoology, 1907–39*, 19 SOCIAL STUDIES OF SCIENCE 387, 393 (1989).

35. *Id.*

team's inquiry and provides a basis for decision making regarding what is and is not going to be part of the project. In the case of CRS, for example, the ESA is embedded within the definition, bounding the definition to relate only to species listed under the Act. Issues relating how to define/scale/bound the research questions to be undertaken by a team are a particular challenge for interdisciplinary teams because they are taking on "wicked problems": complex, ongoing challenges that are seemingly intractable and subject to multiple interpretations.<sup>36</sup> Yet, increasingly, these "wicked problems" are the ones most worthy of our attention.<sup>37</sup> In their National Academy of Sciences report *Facilitating Interdisciplinary Research*, the Committee on Science, Engineering, and Public Policy found that "Interdisciplinary thinking is rapidly becoming an integral feature of research as a result of four powerful 'drivers': the inherent complexity of nature and society, the desire to explore problems and questions that are not confined to a single discipline, the need to solve societal problems, and the power of new technologies."<sup>38</sup>

The second contribution boundary objects offer interdisciplinary teams is creative expression beyond the cultural norms of past disciplinary expectations. By employing a shared concept that is not grounded in any particular discipline, an interdisciplinary team becomes able to engage in a level of co-production of knowledge that is not beholden to norms that have historically contextualized and often stymied their work. Ecologists and engineers venture into questions involving the societal impact of their work. Similarly, team members with expertise in arts, humanities, law, and social sciences gain the capacity to ask questions as part of a team that they would never have the ability to take on otherwise. This common ground is critical to transition from *multidisciplinary*, a situation in which everyone contributes a section from his or her discipline, to *interdisciplinary*, a co-investigation that involves shared learning and knowledge production.<sup>39</sup>

The fact that CRS became the subject of some debate within the literature points to its success as a boundary object. The CRS concept provided a framework for engagement regarding the role ongoing management should play for species under the ESA. It provided something Professor Rolf and his colleagues could respond to, giving rise to a fundamental disagreement regarding the role of human involvement in species persistence after delisting. While the substance of these arguments is beyond the scope of this Essay, their existence is to be celebrated. Open, frank, and respectful disagreements are critical to the success of ESA implementation moving forward.

Even more impressive is that the CRS concept moved beyond the academic literature and was of use to natural resource managers in the field. The reality is that the overwhelming majority of species will never be delisted without some type of commitment to ongoing management. In the case of CRS, Professor Goble and his colleagues created a concept of practical value that involved scholars and practitioners from a range of backgrounds and areas of expertise. The CRS concept is a remarkably useful boundary object providing a more productive evaluation of

---

36. Ruth DeFries & Harini Nagendra, *Ecosystem Management as a Wicked Problem*, 365 *Sci. 265*, 266 (2017) (citing Horst W.J. Rittel & Melvin M. Webber, *Planning Problems are Wicked Problems*, 4 *POLITY* 155 (1973)).

37. *Id.*

38. FACILITATING INTERDISCIPLINARY RESEARCH, *supra* note 5, at 188.

39. See FACILITATING INTERDISCIPLINARY RESEARCH, *supra* note 5, at 29.

what it would require of society to delist species and manage ongoing recovery efforts. For a scholar such as Professor Goble, it is hard to imagine a more worthy endeavor or lasting legacy.

