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Symposium: Governing Wicked Problems

Introduction

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INTRODUCTION

“Wicked problems.” It just says it all. Persistent social problems—poverty, food insecurity, climate change, drug addiction, pollution, and the list goes on—seem aptly condemned as wicked. But what makes them wicked, and what are we to do about them?

The concept of wicked problems as something more than a generic description has its origins in the late 1960s. Professor Horst Rittel of the University of California, Berkeley, Architecture Department posed the term in a seminar to describe “that class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing.”¹ Rittel and his colleague Melvin Webber later refined the concept in a 1973 publication, *Dilemmas in a General Theory of Planning*,² in which they developed their now-famous list of ten distinguishing properties of wicked problems:

1. There is no definitive formulation of a wicked problem.
2. Wicked problems have no stopping rule.
3. Solutions to wicked problems are not true-or-false, but good-or-bad.
4. There is no immediate and no ultimate test of a solution to a wicked problem.
5. Every solution to a wicked problem is a “one-shot operation”; because there is no opportunity to learn by trial-and-error, every attempt counts significantly.
6. Wicked problems do not have an enumerable (or exhaustively desirable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan.
7. Every wicked problem is essentially unique.

1. C. West Churchman, *Wicked Problems*, 14 MGMT. SCI. B-141, B-141 (1967) (describing Rittel’s seminar discussion). Churchman’s short guest editorial is the first mention in the literature of the term used in this sense.

2. Horst W.J. Rittel & Melvin M. Webber, *Dilemmas in a General Theory of Planning*, 4 POL’Y SCIS. 155 (1973).

8. Every wicked problem can be considered to be a symptom of another problem.
9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution.
10. The planner has no right to be wrong.³

The concept and, in particular, "The List," as it might be called, has caught on. By 2019, their article had been cited in 2,969 Web of Science publications spanning a diverse array of disciplines.⁴ Environmental science and policy categories dominate the citations,⁵ but significant numbers are found in articles covering subjects such as urban planning, public administration, economics, engineering, computer science, art, and many others.⁶ Legal scholars have also gravitated to the concept of wicked problems, mentioning it in over four hundred law journal articles (most of which are not in the Web of Science collection) and covering a broad span of topics including the opioid crisis, food waste, pollution, state fragility, water resources, discrimination, land development, and many others.⁷

3. *Id.* at 161–67.

4. Catrien J.A.M. Termeer, Art Dewulf & Robbert Biesbroek, *A Critical Assessment of the Wicked Problem Concept: Relevance and Usefulness for Policy Science and Practice*, 38 POL'Y & SOC'Y 167, 168 (2019).

5. *Id.* Environmental studies, environmental sciences, environmental engineering, green sustainable science technology, ecology, and water resources combined account for 1,175 of the citations. *Id.*

6. *Id.*

7. See generally Sam Bateman, *Solving the "Wicked Problems" of Maritime Security: Are Regional Forums Up to the Task?*, 33 CONTEMP. SE. ASIA 1 (2011) (arguing that many of the problems related to the maritime security environment of the Asia Pacific are wicked problems); Matthew Burris, *Thinking Slow About Sexual Assault in the Military*, 23 BUFF. J. GENDER L. & SOC. POL'Y 21 (2015) (arguing that the prevalence of sexual assault in society at large is a wicked problem); Nathalie J. Chalifour & Heather McLeod-Kilmurray, *The Carrots and Sticks of Sustainable Farming in Canada*, 17 VT. J. ENV'T L. 303 (2016) (arguing that achieving sustainable farming is a wicked problem because of the difficulty in making farmers internalize the cost); Stephen R. Miller, *Planning for Wildfire in the Wildland-Urban Interface: A Guide for Western Communities*, 49 URB. LAW. 207 (2017) (arguing that wildfire response can be thought of as a wicked problem); Sarah J. Morath, *Regulating Food Waste*, 48 TEX. ENV'T L.J. 239 (2018) (arguing that food waste in America is a wicked problem because it requires a comprehensive and systematic solution); Gregory S. Parks & Sarah J. Spangenburg, *Hazing in "White" Sororities: Explanations at the Organizational-Level*, 30 HASTINGS WOMEN'S L.J. 55 (2019) (arguing that hazing has been difficult to curtail because the institutions policing it have not addressed it as a wicked problem); Sue Swenson & Charlie Lakin, *A Wicked Problem: Can Governments be Fair to Families Living with Disabilities?*, 63 FAM. RELS. 185 (2014) (labeling the difficulty in managing government aid to those with disabilities a wicked problem); Nicolas P. Terry, *Structural Determinism Amplifying the Opioid Crisis: It's the Healthcare, Stupid!*, 11 NE. U. L. REV. 315 (2019) (arguing that the healthcare system in the United States and the opioid crisis are wicked problems).

To a large extent, however, the fame of Rittel and Webber's ten-point list has overshadowed the deeper governance theory they developed in their article. The vast majority of the publications citing Rittel and Webber's article do so simply to adopt the concept of wicked problems, with a quick sentence or two about what Rittel and Webber had in mind about wickedness (often with The List set out), to fit the problem under consideration into that category of social problems.⁸ It is as if without the prefix "wicked" a problem is not worthy of scholarly attention.

This is overwhelmingly the pattern in legal scholarship: the author claims a social problem is a wicked problem, cites Rittel and Webber, and that is the last we hear of them and of the concept. Only on rare occasion do legal scholars leverage Rittel and Webber more comprehensively, and even then it is usually to crunch through the ten characteristics rather than engage their broader commentary on the challenges of modern governance.⁹ The small subset of articles grappling with the wicked problems concept as part of a theory of governance appears mainly in policy science and planning journals.¹⁰

The purpose of this Article is to close that gap—to provide in legal scholarship a concise summary of wicked problems theory from its roots in Rittel and Webber's article through its evolution in policy science and planning scholarship. Not coincidentally, this sets the stage for introducing the theme of the *Vanderbilt Law Review's* 2019 Symposium, *Governing Wicked Problems*, and the other articles in this Symposium issue.

The Symposium explored three key questions: Where do we go from here with wicked problems theory? Is there anything to be learned about governing wicked problems from governance theories that have gained traction since Rittel and Webber's article, such as resilience theory and adaptive governance theory? What insights are there for wicked problems in the twenty-first century, such as climate change, biodiversity loss, evolving technologies, and lack of affordable urban housing, which all seem to be rapidly increasing in their "wickedness"?

We develop these themes in four parts. Part I of the Article goes back to the roots of wicked problems theory to unpack what Rittel and

8. As one commentary puts it, many references to the article "entail little more than name-dropping a buzzword to attract attention." Termeer et al., *supra* note 4, at 176.

9. See, e.g., Sharon Lewis, *The Tissue Issue: A Wicked Problem*, 48 JURIMETRICS 193 (2008) (working through the criteria for purposes of regulation of human body tissue); Alan Z. Rozenshtein, *Wicked Crypto*, 9 U.C. IRVINE L. REV. 1181 (2019) (arguing that balancing privacy and security concerns in regard to the accessibility of encrypted data is a wicked problem).

10. See *infra* Parts II and III (discussing the first and second generations of wicked problems theory literature).

Webber had to say about governance of social problems in the latter stages of the twentieth century. Part II traces the evolution of wicked problems theory over the following forty years under three broad categories: refinements to the original theory, extensions of the original theory, and critiques. Part III describes the “second generation” of the theory, examining how the modern theories of complexity science and evolving governance systems sharpen our understanding of wicked problems scholarship. Part IV provides summaries of the contributions to this Symposium issue.

Whether called “wicked” or not, there is a growing sense that the social problems of our future are rapidly growing more complex. Reaching global scales, they are increasingly fragile to cascade failure. Intertwined in vast social-ecological-technological systems, they seem out of control. This Symposium issue was convened with the clear understanding that new ways of thinking about social problems and their governance are needed now more than ever.

I. THE ROOTS OF WICKED PROBLEMS THEORY

The wicked problems concept is about more than a list of ten maddening features of complex social problems. Rittel and Webber were writing in the early 1970s, which witnessed rising polarization in American politics in realms such as the environment, the military, urban renewal, women’s rights, welfare, policing, and race relations.¹¹ As planners, they were focused on the changing role and status of the broader class of professionals in society, which they saw as in transition from solving definable, understandable, and consensual social problems to hammering away at problems mired in contested goal formulation, problem definition, and equity issues.¹² The tools and competencies professionals used to solve the “tame” problems of prior eras drew from scientific methods, rational choice inquiry, operations research, and efficiency analysis, and their successes with these tools elevated the stature of professionals and their methods.¹³ It was an impressive record. As Rittel and Webber put it, the streets had been paved, roads connected, housing built, dread diseases controlled, clean water

11. Rittel & Webber, *supra* note 2, at 155–56.

12. *Id.* at 156.

13. *Id.* at 156, 160.

supplied, sanitary sewers installed, and so on—all to the benefit of society and to the reputation of professionals.¹⁴

But by the 1970s, the public and private clients of professionals' expertise had grown restive, voicing "ever-louder public protests against the professions' diagnoses of the clients' problems, against professionally designed governmental programs, against professionally certified standards for public services."¹⁵ Rittel and Webber posited that this backlash was due to two factors. First, with the "tame" problems solved, there was growing social awareness that not nearly as much progress had been made on problems that were more complex and systemic. Second, these kinds of problems exposed a "growing awareness of the nation's pluralism and of the differentiation of values that accompanies differentiation of publics."¹⁶ These two forces led to more and more societal process having "the character of zero-sum games. As the population becomes increasingly pluralistic, inter-group differences are likely to be reflected as inter-group rivalries of the zero-sum sorts."¹⁷

As a consequence, professionals were becoming less successful at solving problems, or even at satisfying most clients that they were making progress. Whereas "tests for efficiency . . . were once so useful as measures of accomplishment," they were being replaced "by a renewed preoccupation with consequences for equity."¹⁸ The "interacting open systems" in which emerging complex social problems operated were increasingly resistant to "the professionalized cognitive and occupational styles that were refined in the first half of [the twentieth] century."¹⁹ In short, as national consensus on social goals and the problems facing them eroded, professionals found themselves in a moment of crisis.

Almost fifty years later, what are our nation's goals today? What are the problems we face? What are professionals supposed to do about them? Is there more consensus on those questions today than when Rittel and Webber wrote in 1973? That is, of course, intended as a rhetorical question. There is no societal consensus on our problems or solutions. This would have come as no surprise to Rittel and Webber, who have proven to be quite prescient in their take on the role of

14. *Id.* at 156.

15. *Id.* at 155.

16. *Id.* at 156.

17. *Id.* at 168.

18. *Id.* at 156.

19. *Id.* As planners, Rittel and Webber had in mind the academic debate underway at the time over "the rational choice assumptions embedded in comprehensive planning approaches to societal problems." Termeer et al., *supra* note 4, at 170.

professionals in governance. They predicted this state of affairs in their assessment of goal formulation, problem definition, and the modern “open systems” social context of wicked problems.

A. Goal Formulation

Rittel and Webber characterize goal finding as one of the central functions of planning and policy,²⁰ suggesting that “the search for explicit goals was initiated in force with the opening of the 1960s.”²¹ Indeed, they make reference to President Eisenhower’s 1960 Commission on National Goals, which identified fifteen goals as objectively the right goals.²² That was the first and last such commission. Rittel and Webber argued that with the rising pluralism in Western democracies, that kind of “[g]oal-finding is turning out to be an extraordinarily obstinate task.”²³ American optimism in progress and the goodness of the social order was eroding, yet the planning and other social professions refused to concede that “planning for betterment” was becoming impossible when the nation could not agree about what was better.²⁴ Objective social indicators, reasoning, rational discourse, and civilized negotiation were becoming more difficult to find and apply as tools for defining goals for perfecting the future.

Of course, one has to ask what exactly was “the nation” that was setting goals in 1960, when Rittel and Webber say it was easier to achieve consensus. Every member of the Commission on National Goals was a white male.²⁵ It was ostensibly nonpartisan, but the members were of only mildly diverse political and socioeconomic orientations.²⁶ Indeed, in their references to planners and professionals, Rittel and

20. Rittel & Webber, *supra* note 2, at 157.

21. *Id.* at 156.

22. *Id.* at 157. The Commission was operated under the auspices of the nonprofit American Assembly, housed in Columbia University. See *Commission on National Goals*, WIKIPEDIA, https://en.wikipedia.org/wiki/Commission_on_National_Goals (last updated Apr. 21, 2020, 14:57 UTC) [<https://perma.cc/E99F-FGHZ>] (noting the members of the Commission and the process for deciding the fifteen goals). The report was sent to the President in November 1960 and published in book form by Prentice Hall in December 1960. See THE AM. ASSEMBLY, GOALS FOR AMERICANS: PROGRAMS FOR ACTION IN THE SIXTIES 3–20 (1960). A copy of the original report is available from, of all places, the CIA reading room. See THE AM. ASSEMBLY, THE REPORT OF THE PRESIDENT’S COMMISSION ON NATIONAL GOALS 1 (1960), <https://www.cia.gov/library/readingroom/docs/CIA-RDP80B01676R000900020006-7.pdf> [<https://perma.cc/A3MS-QYDB>]. The domestic goals centered around promoting equality, democracy, education, economic growth, and individual integrity. *Id.*

23. Rittel & Webber, *supra* note 2, at 157.

24. *Id.* at 157–58.

25. See *Commission on National Goals*, *supra* note 22 (click on each member’s name for a brief biography).

26. See *id.*

Webber use only the male gender.²⁷ Looking back, their suggestion that goal formulation was becoming increasingly difficult because “the population [became] increasingly pluralistic”²⁸ and because “the high-scale societies of the Western world [were] becoming increasingly heterogeneous”²⁹ speaks volumes about who had a seat at the policy formulation table in the 1960s and prior. The population did not change nearly as much as the politics. Yet, notwithstanding their limited worldview, Rittel and Webber identified the problem with goal formulation—it became really hard. It has not gotten any easier.

B. Problem Definition

According to Rittel and Webber’s “when planning was easy” narrative, when the Commission on National Goals was doing its work and its goals were (to them) clear, efficiency was seen as both the explanation for and solution to social problems.³⁰ Problems arose where efficiency was lacking, and solutions were designed around efficient measures that the technically skilled professional could implement with the simplified end in mind.³¹ Why was this perspective also unravelling?

For Rittel and Webber, problem definition requires “knowing what distinguishes an observed condition from a desired condition.”³² Their perceived rise in pluralism made it more difficult to identify desired positions, but as social problems increasingly operated in “interconnected networks of systems,” it became just as difficult to identify observed conditions with any certainty.³³ Under those conditions, even if desired ends are agreed, planners cannot easily locate “where in the complex causal networks the trouble really lies.”³⁴ Indeed, to a large extent Rittel and Webber attribute this growing problem with problem definition to be the result of planners becoming more aware of the problems they were being asked to solve. As they put it, “as we become more sophisticated about the complex workings of open societal systems, it becomes ever more difficult to make the planning idea operational.”³⁵

27. Rittel & Webber, *supra* note 2, at 162.

28. *Id.* at 168.

29. *Id.* at 167.

30. *Id.* at 158.

31. *Id.*

32. *Id.* at 159.

33. *Id.*

34. *Id.*

35. *Id.*

C. Open Systems

When one reads the wicked problems literature, it is easy to get the impression that Rittel and Webber simply put The List out there without the foregoing context on the erosion of goal formulation and problem definition in modern governance. As Termeer et al. suggest, “[t]he 10 claims made by Rittel and Webber can . . . be read as a set of arguments against purely rational approaches to policy. In the subsequent literature, however, these claims have largely been picked up as defining characteristics of a particular type of policy problems”³⁶ Perhaps it is better to think of them as both. In elaborating on each of the claims, Rittel and Webber devote considerable attention to what makes a problem “wicked” as opposed to “tame,” yet there is no mistaking that their purpose is to challenge rationalism as the method of professionals’ problem-solving.

To a large extent, The List is self-explanatory with regard to each characteristic—the elaborations and examples Rittel and Webber provide in the article are for the most part just that. One gets the gist of the concept just by reading The List. Stepping back, however, one theme dominates throughout the full article as defining both the core characteristic of wicked problems and the core challenge to rationalist governance—the open system property of wicked problems. Indeed, before getting to The List, Rittel and Webber devote a full page of the article to their argument that “the classical paradigm of science and engineering—the paradigm that has underlain modern professionalism—is not applicable to the problems of open societal systems.”³⁷ The List, then, is their attempt to define why those open systems defy that problem-solving paradigm.

Every one of the characteristics of a wicked problem Rittel and Webber describe thus is an extension or consequence of their conception of social problems as operating in “large and interconnected networks of systems.”³⁸ This is why “any solution, after being implemented, will generate waves of consequences,” some of which could “yield utterly undesirable repercussions which outweigh the intended advantages” of the solution.³⁹ Ultimately, “[t]he planner who works with [such] open systems is caught up in the ambiguity of their causal webs.”⁴⁰

It is this overarching property of wicked problems that Rittel and Webber use in the final part of their article to return to their

36. Termeer et al., *supra* note 4, at 170.

37. Rittel & Webber, *supra* note 2, at 160.

38. *Id.* at 159.

39. *Id.* at 163.

40. *Id.* at 167.

primary theme of governance theory in an increasingly pluralistic and differentiated society in which there is no longer a *unitary* public welfare (if there ever was).⁴¹ This has profound implications for policy, as it is possible that “there is no aggregate measure for the welfare of a highly diversified society” that is both “objective and nonpartisan.”⁴² How, they ask, are governance institutions to manage wicked problems in a “planful way” given their open system nature, untraceable causalities, and diverse distributional impacts?⁴³ How indeed, one might just as urgently ask today.

As suggested above, Rittel and Webber’s depiction of a world in which social problems transformed in the early 1970s from simple to open systems perhaps underestimated how open they were before the 1970s. Political and professional elites just did not see them that way. Goals for all of society were defined by a narrow band of society and in such a way as to be amenable to technocratic solution actions. Regardless, the message Rittel and Webber sent to social professionals going forward—that those days were over—was not only on target then, but also prescient regarding our present social context.

The roots of wicked problems theory thus go deeper than The List. Rittel and Webber formulated the concept of a wicked problem to expose a transition in the methods and metrics of governance from a rationalist obsession with efficiency to a pluralistic debate over equity. At the end of the day, however, the article proved an anticlimax. The authors had no answers for how to move forward, conceding they had “neither a theory that can locate societal goodness, nor one that might dispel wickedness, nor one that might resolve the problems of equity that rising pluralism is provoking.”⁴⁴ Those theories remain elusive, to say the least.

II. THE FIRST GENERATION OF WICKED PROBLEMS THEORY

Although many of the citations to Rittel and Webber simply attribute the source of The List, there are also more than enough publications delving into the meaning of the wicked problems concept as a class of problems and its implications for governance.⁴⁵ Early “first generation” contributions generally fell into three categories—refinements of The List, extensions of The List and its governance

41. *Id.* at 168.

42. *Id.*

43. *Id.* at 167–68.

44. *Id.* at 169.

45. See, e.g., Brian W. Head, *Forty Years of Wicked Problems Literature: Forging Closer Links to Policy Studies*, 38 POL’Y & SOC’Y 180 (2018) (summarizing the various themes).

implications, and critiques of the wicked problems concept. As a recent survey concluded, however, “[d]espite many new insights, the 10 characteristics of Rittel and Webber still dominate the debate.”⁴⁶ Nevertheless, it is worth identifying some of the more prominent entries in the continuing debate.

A. Refinements

Less than a decade after its publication, Rittel and Webber’s article was already being described as “the seminal article” on intractable social problems.⁴⁷ Yet, stepping back from it, The List is a bit of a jumble, lacking any readily apparent basis for the order and number of the attributes. Refinements thus followed in the literature.

One early and useful such contribution, by Bayard Catron, insightfully reorganized the ten attributes around four sets of claims having to do with wicked problems: (1) the ontology (their existence), (2) the epistemology (our ability to understand), (3) the methodology (how we approach them), and (4) the ethics (acting rightly).⁴⁸ Under this rubric, The List would be reorganized as follows:

Ontological claims

1. There is no definitive formulation of a wicked problem.
7. Every wicked problem is essentially unique.
8. Every wicked problem can be considered to be a symptom of another problem.

Epistemological claims

6. Wicked problems do not have an enumerable (or exhaustively desirable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan.
9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem’s resolution.

Methodological claims

2. Wicked problems have no stopping rule.
4. There is no immediate and no ultimate test of a solution to a wicked problem.

46. Termeer et al., *supra* note 4, at 170.

47. Bayard L. Catron, *On Taming Wicked Problems*, 3 DIALOGUE 13, 13 (1981).

48. *Id.* at 14–15.

Ethical claims

3. Solutions to wicked problems are not true-or-false, but good-or-bad.
5. Every solution to a wicked problem is a “one-shot operation”; because there is no opportunity to learn by trial-and-error, every attempt counts significantly.
10. The planner has no right to be wrong.

Other efforts to categorize the ten attributes include one dividing them into problem-related attributes (claims 1, 6, 7, 8, and 9) and solution-related attributes (claims 2, 3, 4, and 5), another focusing on indeterminacy and irreversibility, and another dividing them into claims of complexity, diversity, and uncertainty.⁴⁹ Despite these valuable insights, The List persists in its original order and number and is invariably the first version to be referenced by most authors, if any others are mentioned at all.

A different and more influential approach, by John Alford and Brian Head, focuses on the degree of wickedness using dimensions of the wicked problem concept.⁵⁰ They divide the wicked problems concept into two problems: increasing complexity of the problem and solution, and increasing difficulty of achieving stakeholder cooperation.⁵¹ “Tame problems” operate when those dimensions are at their easiest to achieve, and “very wicked problems” are at the opposite extreme, with various descriptions of complexity fitting in other boxes of their matrix.⁵² Factors driving problems along the spectrum include structural complexity, knowability, knowledge fragmentation, knowledge framing, interest differentiation, and power distributions.⁵³ This approach proves useful in two respects. First, it goes “beyond the dichotomous analytical framing of wicked versus tame problems”;⁵⁴ and second, their driver factors offer some explanatory power for assessing *why* wicked problems have the attributes captured in The List.

49. Termeer et al., *supra* note 4, at 170 (summarizing these contributions).

50. See John Alford & Brian W. Head, *Wicked and Less Wicked Problems: A Typology and a Contingency Framework*, 36 POLY & SOC'Y 397 (2017).

51. *Id.* at 402.

52. *Id.*

53. *Id.* at 407.

54. Termeer et al., *supra* note 4, at 170.

B. Extensions

Several influential contributions to the wicked problems literature take The List as a given and extend attributes or theory from there. Perhaps the most popularized example, by Kelly Levin et al., is that of “super wicked problems.”⁵⁵ Focusing on climate change, they append to The List four additional attributes to define a new class of problems: (1) time is running out; (2) those who cause the problem also seek to provide a solution; (3) the central authority needed to address them is weak or nonexistent; and (4) irrational discounting occurs that pushes responses into the future.⁵⁶ These features aptly describe the climate change problem.⁵⁷ But Levin et al. spend little time elaborating on them; rather, they develop an insightful theory of forward-looking, path-dependent policy interventions designed to overcome the four super-wicked attributes.⁵⁸ Having hitched their list to The List, however, their governance theory has to a large extent suffered the same fate as Rittel and Webber’s original work—they are cited mainly for their list, far less so for their theory.⁵⁹

Another frequently cited contribution, by Nancy Roberts, leverages Alford and Head’s wickedness spectrum concept to develop a theory of “coping strategies” for wicked problems.⁶⁰ If conflict over both problem definition and its solution become high, thus fitting the wicked problems class (what Roberts calls Type III problems), Roberts suggests three possible governance approaches.⁶¹ If power over the solution is centralized rather than dispersed (which per Levin et al. would disqualify it from being a super wicked problem), authoritative strategies can be developed. If power over the solution is dispersed but not contested, collaborative strategies can be employed to reach solutions. If power is both dispersed and contested, solutions must be devised and vetted in competitive strategies, such as politics and markets.

55. Kelly Levin, Benjamin Cashore, Steven Bernstein & Graeme Auld, *Overcoming the Tragedy of Super Wicked Problems: Constraining Our Future Selves to Ameliorate Global Climate Change*, 45 POL’Y SCI. 123, 124 (2012).

56. *Id.*

57. See, e.g., Richard J. Lazarus, *Super Wicked Problems and Climate Change: Restraining the Present to Liberate the Future*, 94 CORNELL L. REV. 1153 (2009).

58. Levin et al., *supra* note 55, at 124–49.

59. See, e.g., B. Guy Peters, *What Is So Wicked About Wicked Problems? A Conceptual Analysis and a Research Program*, 36 POL’Y & SOC’Y 385, 388 (2017); Termeer et al., *supra* note 4, at 170.

60. Nancy Roberts, *Wicked Problems and Network Approaches to Resolution*, 1 INT’L PUB. MGMT. REV. 1, 2–3 (2000), <https://journals.sfu.ca/ipmr/index.php/ipmr/article/view/175/175> [<https://perma.cc/QUE8-YKS9>].

61. *Id.* at 3–7.

C. Critiques

Not all wicked problems literature embraces the wicked problems concept. Critiques come in two forms—critiques of the concept itself and critiques of its use in the literature.

A recurrent theme in scholarship critiquing Rittel and Webber directly is that their tame/wicked dichotomy relies on a “strict, ontological demarcation of wicked and tame problems according to the branches of science [that] is a serious misconception, and as such very misleading.”⁶² Rittel and Webber did (it seems unnecessarily for their purposes) diminish the challenges of the kind of problems the natural and engineering sciences solve, which they describe as definable, separable, findable, and thus “tame” in comparison to the wicked problems planners and other social science professionals confront.⁶³ Even very early and generally favorable reviews of their article fault them for this oversimplification.⁶⁴ Their central point was that planners should stop “mimicking the cognitive style of science and the occupational style of engineering.”⁶⁵ For that, they did not need to portray the natural sciences and engineering as confined to tame (albeit often very complicated) problems.

Another criticism of Rittel and Webber is that, although they describe the class of wicked problems as part of their “invocation for a community of rationalistic researchers to critically reflect on their paradigm,”⁶⁶ they provided no coherent research program for going forward. But is this a fair criticism? After all, the title of the article, *Dilemmas in a General Theory of Planning*, suggests that it was the invocation that was their central purpose, not charting a research agenda for policy studies. Again, The List seems to have hijacked their theory of governance and become the larger focus of such critiques.

This rings true in the stream of criticism aimed at scholars leveraging the wicked problems concept. For example, Guy Peters complains that “describing . . . policy problems as wicked problems has become a fad in the academic literature,” whereas there is in fact a “paucity of problems that meet [the] full definition of a wicked problem.”⁶⁷ Peters also objects that “the concept of wicked problems has

62. Nick Turnbull & Robert Hoppe, *Problematizing ‘Wickedness’: A Critique of the Wicked Problems Concept, from Philosophy to Practice*, 38 POL’Y & SOC’Y 315, 318 (2019).

63. Rittel & Webber, *supra* note 2, at 160.

64. See, e.g., Catron, *supra* note 47, at 16 (noting that “the history of science is replete with examples of shifts in the way phenomena are perceived and classified”).

65. Rittel & Webber, *supra* note 2, at 160.

66. Turnbull & Hoppe, *supra* note 62, at 320.

67. Peters, *supra* note 59, at 386, 390.

taken on a normative element that was not necessarily intended by the formulators of the concept,” by which he means scholars insist that wicked problems must be solved and centralized, forceful action will be required.⁶⁸ Going further, Mirko Noordegraaf et al. identify three themes in wicked problems literature that are open for critique.⁶⁹ They argue that scholars often ignore the microlevel experience of wicked problems by people, overstate and even romanticize the extent to which cooperation and trust can overcome wicked problems, and offer no practical managerial insights.⁷⁰ In short, wicked problems theory needs more modesty in claiming which problems are wicked and a more practice-informed orientation for approaching those that are.⁷¹

III. THE SECOND GENERATION OF WICKED PROBLEMS THEORY

Recent wicked problems literature reveals an emerging “second generation” of thought about both the governance challenge Rittel and Webber described and the conception of wicked problems.⁷² For example, some scholars posit that complexity science can help inform conceptions of wicked problems.⁷³ The focus of complexity science is complex adaptive systems—systems “in which large networks of components with no central control and simple rules of operation give rise to complex collective behavior, sophisticated information processing, and adaptation via learning or evolution.”⁷⁴ One dominant attribute of complex adaptive systems is feedback between the system components—the connections through which information flows between them to trigger responses.⁷⁵ “Another important property, driven largely by intercomponent feedback, is emergence, the core idea of which is that the system exhibits macroscopic behavior that could not be predicted by examining the system components, interconnections, and interactions at microscopic scales.”⁷⁶ “A third central property of

68. *Id.* at 386.

69. Mirko Noordegraaf, Scott Douglas, Karin Geuijen & Martijn Van Der Steen, *Weaknesses of Wickedness: A Critical Perspective on Wickedness Theory*, 38 POL’Y & SOC’Y 278, 284–85 (2019).

70. *Id.*

71. *Id.* at 292. For a summary of critiques of the wicked problems concept, see Termeer et al., *supra* note 4.

72. Head, *supra* note 45, at 183–84; Termeer et al., *supra* note 4, at 174.

73. Head, *supra* note 45, at 191; Brian Head & John Alford, *Wicked Problems: Implications for Public Policy and Management*, 47 ADMIN. & SOC’Y 711, 724 (2013); Moira Zellner & Scott D. Campbell, *Planning for Deep-Rooted Problems: What Can We Learn from Aligning Complex Systems and Wicked Problems?*, 16 PLAN. THEORY & PRAC. 457 (2015).

74. MELANIE MITCHELL, *COMPLEXITY: A GUIDED TOUR* 13 (2009).

75. See J.B. Ruhl & Daniel Martin Katz, *Measuring, Monitoring, and Managing Legal Complexity*, 101 IOWA L. REV. 191, 228–29 (2015) (describing negative and positive feedback).

76. *Id.* at 229–30.

complex adaptive systems is self-organized structure, such that, as system scale grows, the system organizes spontaneously (with no central controller or plan) around a set of deep structural rules that lend stability to the system behavior.”⁷⁷ These three key system attributes produce the dynamics of the underlying system behavior. Alas, they also make understanding system behavior—and even more so predicting it—excruciatingly difficult.

Although Rittel and Webber wrote before the development of complexity science and its terminology, their article is replete with conceptions of governing “open system” problems that resonate directly in complexity science. For them, problem-solving could not be separated from problems, as “problem-solving action directed to any one node in the network . . . induc[es] problems of greater severity at some other node.”⁷⁸ All solution actions are consequential, leaving traces in the system that cannot be undone.⁷⁹ It seems likely that, had Rittel and Weber had the tools and language of complexity science at their disposal in 1973, they would have embraced them in their characterization of wicked problems. It makes sense, therefore, that wicked problems theorists have increasingly made that connection as complexity science has developed since then.

There is also increasing connection being made between wicked problems and evolving theories of governance, such as adaptive management, resilience thinking, collaborative networks, and experimentalist governance.⁸⁰ Having rejected the rationalistic premises of traditional planning, Rittel and Webber could find no other governance theory substitute at the time. They expressed concern about experimental approaches on the one hand,⁸¹ and about more cautious incrementalist approaches on the other.⁸² But even those governance theories, as developed at the time, were aimed at *solving* social problems. The new wave of governance theories is aimed at *managing*

77. *Id.* at 204. For more on complexity science and its relevance to governing wicked problems, see Barbara A. Cosens, J.B. Ruhl, Niko Soininen & Lance Gunderson, *Designing Law to Enable Adaptive Governance of Wicked Problems*, 73 VAND. L. REV. 1687 (2020).

78. Rittel & Webber, *supra* note 2, at 159.

79. *Id.* at 163.

80. See, e.g., Ruth DeFries & Harini Nagendra, *Ecosystem Management as a Wicked Problem*, 356 SCIENCE 265, 267–68 (2017); Head, *supra* note 45, at 191–92; Noordegraaf et al., *supra* note 69, at 280; Edward P. Weber & Anne M. Khademian, *Wicked Problems, Knowledge Challenges, and Collaborative Capacity Builders in Network Settings*, 68 PUB. ADMIN. REV. 334 (2008).

81. Rittel & Webber, *supra* note 2, at 163.

82. *Id.* at 165.

social problems, recognizing they are inherently complex and subject to high degrees of uncertainty.⁸³

The wicked problems concept has been criticized for its tendency to frame problems as so intractable that policy actors are “inclined to retreat instead of addressing the problems.”⁸⁴ But these new paths of research leveraging the concept and its governance context suggest that work continues on the wicked problems project to both refine the description of problems on society’s horizon and to sharpen the explanatory capacity of wicked problems theory.⁸⁵ With such efforts, the attributes captured in The List (and the four additions for super wicked problems) can become less threatening and more informative about how to think about and manage social problems. The articles in this Symposium issue tap into these themes, exploring how both new theories of governance and new kinds of wicked (and super wicked) problems can contribute to that end.

IV. THE NEXT GENERATION OF WICKED PROBLEMS THEORY

Twelve leading scholars contributed to this Symposium. While all the articles address both theory and practice, their focus falls into two groups. Robin Craig, Barbara Cosens and coauthors, and Scott Campbell and Moira Zellner focus on how systems theories that have developed since 1970 change how we analyze wicked problems. Their pieces describe the application of resilience theory, complexity theory, causal loop analysis, and ecological panarchy, among others, to the challenges posed by wicked problems. Taken together, these provide a superb description of cutting-edge theory.

The second group applies wicked problems theory to the specific challenges of climate change, biodiversity loss, zoning, and emerging technologies. Interestingly, they all reject core features of the classic wicked problems analysis and certain parts of The List. Richard Lazarus, Gary Marchant, Alejandro Camacho, Michael Vandenberg and Jonathan Gilligan, and Christopher Serkin call for variants of adaptive management, muddling through, or “silver buckshot” strategies rather than silver bullets.

83. See Robin Kundis Craig & J.B. Ruhl, *Designing Administrative Law for Adaptive Management*, 67 VAND. L. REV. 1 (2014) (proposing that agencies incorporate an “adaptive management track” to enhance decisionmaking in select circumstances).

84. Termeer et al., *supra* note 4, at 176.

85. *Id.* at 177.

A. Wicked Problem Theories

In *Designing Law to Enable Adaptive Governance of Modern Wicked Problems*,⁸⁶ Barbara Cosens and her coauthors explore the role of law and government in adaptive governance. Starting from the scholarship in systems thinking, the piece argues that framing wicked problems as the result of open and interacting systems represents a major advance from Rittel and Webber's more linear scientific approach. In particular, they describe the essential facets of complexity theory, arguing that seven features of complex systems are the driving forces behind modern wicked problems. The article ends with a rejection of the traditional strategies of centralized command and control or reliance on markets in the face of increasing complexity. The authors make a pragmatic call for a "new governance" based on greater distributed self-organization through networked governance and collaborative governance. They end with specific examples of how law and policy can reinforce new governance through adaptive management.

Robin Craig provides a historical perspective. In *Resilience Theory and Wicked Problems*,⁸⁷ she takes a close look at the particular world of Rittel and Webber and explains why their approach was appropriate for its time but less directly relevant today. Using the framework of social-ecological-systems and resilience theory, she situates Rittel and Webber as essentially engineers, realizing that one could not calculate solutions to wicked problems on a slide rule. She groups The List into two baskets—social capriciousness (social goals are always dynamic and contested) and ecological panarchy (systems interact with one another in unpredictable ways, increasing complexity)—and demonstrates how resilience theory applies to the challenge of climate change. She argues that we now commonly accept the capricious nature of social change—social, cultural, and political diversity is simply a fact of twenty-first century America—and that calling this wicked is no longer a useful insight. Instead, she uses the idea of "trickster law" to argue that we should focus on the potential of resilience theory to guide our governance efforts in taming the wickedness of ecological panarchy.

In *Wicked Problems, Foolish Decisions*,⁸⁸ Scott Campbell and Moira Zellner focus on the field that spawned the original wicked

86. Cosens et al., *supra* note 77, at 1687.

87. Robin Kundis Craig, *Resilience Theory and Wicked Problems*, 73 VAND. L. REV. 1733 (2020).

88. Scott D. Campbell & Moira Zellner, *Wicked Problems, Foolish Decisions: Promoting Sustainability Through Urban Governance in a Complex World*, 73 VAND. L. REV. 1643 (2020).

problem theory—urban planning. Planning for cities remains as intractable as three decades ago. What has changed, though, is the advent of complex systems tools to mitigate and adapt to wicked problems instead of reliance on engineering and traditional statistical and mathematical analysis. They provide two case studies of current urban wicked problems—ecogentrification and megaregional sustainability—and use causal loop diagrams to reveal that the connections of variables for each case influence behavior of the larger urban system. The article explains how application of a complex system view, making visible the interconnected forces of an urban system, can inform governance with targeted interventions.

B. Wicked Problem Challenges

In the Symposium's keynote presentation and article, *The Super Wicked Problem of Donald Trump*,⁸⁹ Richard Lazarus revisits his influential 2009 publication, *Super Wicked Problems and Climate Change*,⁹⁰ which was the first law review article to examine climate change through the wicked problem framework. His 2009 piece was written in anticipation of impending climate legislation and proposed a series of “precommitment strategies” to make the measures more effective over the longer term. As we now know, of course, no legislation was passed. Lazarus explains how the legislation was thwarted and how executive authority took the place of congressional action. From today's vantage, he argues that climate change still warrants its wicked moniker, made super wicked by the temporal factor that the problem gets worse the longer we delay. Turning to the Trump Administration, he details efforts to roll back Obama-era climate policies and explains how Trump has exploited the super wicked nature of climate change to justify these actions—focusing on short-term economic concerns over distant harms. At the same time, these rollback options have faced significant obstacles through procedural and substantive administrative law requirements. Indeed, the Obama-era policies have exhibited more precommitment stickiness than expected.

In *De- and Re-Constructing Public Governance for Biodiversity Conservation*,⁹¹ Alejandro Camacho assesses the usefulness of the wicked problem framework to loss of biodiversity. He argues that while biodiversity loss clearly qualifies as wicked, this description offers little

89. Richard Lazarus, *The Super Wicked Problem of Donald Trump*, 73 VAND. L. REV. 1811 (2020).

90. Lazarus, *supra* note 57.

91. Alejandro E. Camacho, *De- and Re-Constructing Public Governance for Biodiversity Conservation*, 73 VAND. L. REV. 1585 (2020).

practical guidance for how best to conserve species and ecosystems. The current approach of permit-by-permit regulation is not working, and has proven even more inadequate in the face of climate change. The governance system has fragmented into overlapping, independent, and decentralized institutions. While some wicked problem analysts promote decentralized solutions, this can increase the threat of cumulative harms from habitat fragmentation and invasive species. A better approach, he argues, should focus on multispecies, ecosystem-based, and landscape-level planning. Based on his writings with Robert Glicksman,⁹² he calls for a move beyond the focus on procedural mechanisms, instead attending more closely to substantive and structural legal adaptive capacity, coupled with greater attention to ecological health and interventionist strategies.

Gary Marchant considers the challenge of *Governance of Emerging Technologies as a Wicked Problem*.⁹³ Time and again, traditional government regulation has proven inadequate to manage the risks of emerging technologies, whether synthetic biology, artificial intelligence, or nanotechnology. These technologies are particularly wicked because they pose what he calls a “pacing problem” (where technology development and commercialization far outpace the speed of government, whether through legislation, regulation, or judicial review), a jurisdictional problem (where the risks of emerging technologies do not neatly fit within the scope of any single agency), and the basic uncertainty of novelty. Instead, Marchant employs the wicked problem framework to highlight that no single solution exists and that, as a result, the ambition for governance strategies should be to acknowledge explicitly and promote a mix of substandard governance approaches. He develops a 2x2 matrix of policies, ex ante versus ex post and permissive versus prohibitive, to contrast the range of governance strategies that have been applied to emerging technologies. Each of these strategies is clearly inadequate as the sole governance mechanism, but Marchant proposes instead a combination of strategies among multiple actors with the goals of muddling through and implementing imperfect solutions.

92. See Alejandro E. Camacho & Robert L. Glicksman, *Legal Adaptive Capacity: How Program Goals and Processes Shape Federal Land Adaptation to Climate Change*, 87 U. COLO. L. REV. 711, 724–34 (2016) (defining the substantive and procedural components of legal adaptive capacity); ALEJANDRO E. CAMACHO & ROBERT L. GLICKSMAN, REORGANIZING GOVERNMENT: A FUNCTIONAL AND DIMENSIONAL FRAMEWORK 236–37 (2019) (distinguishing structural legal adaptive capacity).

93. Gary E. Marchant, *Governance of Emerging Technologies as a Wicked Problem*, 73 VAND. L. REV. 1861 (2020).

In *Beyond Wickedness: Managing Complex Systems and Climate Change*, Jonathan Gilligan and Michael Vandenbergh focus the wicked problems lens on climate change,⁹⁴ the same challenge Richard Lazarus addressed a decade earlier. They argue that the wicked problem framing creates more heat than light, with no positive guidance for how to solve wicked problems—“an inescapable Slough of Despond in which planners are doomed to failure no matter what they do.” Indeed, they charge that wicked problems can serve a rhetorical purpose for interests seeking to block progress by encouraging a policy paralysis. They see climate deniers using just this tactic to drive delay. This is especially concerning because the temporal aspects of wicked problems transform them into super wicked problems, where inaction has its own costs. As a way out, they promote Lindblom’s approach of “muddling through”—incremental management of wicked problems that allows midcourse adjustments by learning through trial and error. This strategy accepts there is no single best policy and a “silver buckshot” approach makes more sense than holding out for a silver bullet. The governance strategy best suited is one of incremental measures from polycentric governance.

This strategy is reinforced in Christopher Serkin’s examination of *The Wicked Problem of Zoning*.⁹⁵ Laying out the challenge of seventeen competing goals of zoning—from economic efficiency and distributional concerns to environmental protection, morality, and private rights—Serkin argues there can be no single answer to the problems created by contested land use. He describes the criticism over much of zoning policy as one of compromise and whittling away. Serkin, however, refutes this criticism as well as The List’s contention that a solution must be a “one-shot operation.” Because there is no holistic answer possible to zoning challenges, he champions incrementalism as an ideally paced approach that balances competing interests while respecting expectations and the resistance to fast change.

CONCLUSION

In the fifty years since the wicked problems concept first entered policy sciences theory and practice, it and The List have demonstrated remarkable staying power. Policy scholars have used them, revised them, extended them, and rejected them, and yet “wicked problems” remain firmly in the policy sciences lexicon and The List is repeated

94. Jonathan M. Gilligan & Michael P. Vandenbergh, *Beyond Wickedness: Managing Complex Systems and Climate Change*, 73 VAND. L. REV. 1777 (2020).

95. Christopher Serkin, *The Wicked Problem of Zoning*, 73 VAND. L. REV. 1879 (2020).

over and over. Why is that? The articles from the *Vanderbilt Law Review* Symposium suggest two reasons.

First, it is fair to say that Rittel and Webber put the nail in the coffin of rationalist, science-based policy theory. Offering nothing in its place, however, their article has served as an invitation for others to do so and has become a reference starting point. The first group of Symposium articles summarized above is representative. Complexity science, resilience theory, new governance, causal loops, and panarchy theory offer new ways of thinking about governance in the “open systems” context Rittel and Webber identified as the root of the social challenges the nation faced in the 1970s. These new theories face a similar challenge, though. Even if there are no single solutions to wicked problems, it is still unclear how best to manage them. Real-life applications of these theories remain few and far between. Wicked problems are not going away, so we need to focus on how we would determine which of the new governance theories warrant implementation, or even can be implemented. The theory-to-practice gap remains large.

Similarly, as the second group of Symposium articles demonstrates, the wicked problems framing offers a way of unpacking and evaluating the practical challenges of policy design and implementation for problems like climate change, biodiversity loss, technology, and land use. Whether one is “all in” with using the wicked problems frame to guide policy implementation or considers it a distraction or worse, it remains a useful reference point. Explaining what it means to “muddle through,” for example, is made easier by using the wicked problems framing, albeit rejecting the implications Rittel and Webber spelled out. Again, wicked problems are not going away; how to manage them remains open for debate.

In short, Rittel and Webber have enjoyed thousands of citations to their article, and are likely to receive thousands more, because the wicked problems concept and its attributes unpacked in *The List* capture the essence of the policy challenges of modern society. The wicked problem framing has served as a powerful platform for articulating new theories of governance and for describing and evaluating policy design and implementation in practice.

Perhaps the “wicked problem” label and *The List* are overused in this sense—referenced by scholars to position their theory or policy subject as having gravitas, but not fully explored. None of the articles in this Symposium could be accused of that lack of rigor. Rather, all of them demonstrate the value of engaging the wicked problems concept and *The List* more deeply, whether to leverage them or to argue their limits and flaws. This issue provides the most comprehensive legal

analysis of wicked problems to date. We hope that it spurs further research both on the theory of how to manage wicked problems and on practical tools to tame these most important and difficult challenges. We have no doubt that five decades from this Symposium scholars will still be wrestling with the best ways to govern wicked problems.
