

# Research & Policy Brief Series

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## What is Cumulative Impact Assessment and Why Does it Matter?

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### What is the Issue?

Development projects and policies often have notable impacts on communities, individuals, and ecosystems. New shopping malls and wind farm installations are but two examples of projects capable of initiating significant change. When environmental, social and economic impacts of such projects are evaluated, the effects are typically examined individually and in response to a specific proposed action. Unfortunately, this approach to evaluation – one action at a time – can overlook important cumulative impacts. Both informed decision making and adequate protection of people, communities, and the environment are undermined when cumulative impacts are ignored.

### Examples of Cumulative Impacts

- The number of lakefront homes on a sparsely developed lake doubles over 20 years. While each new structure may comply with local sanitary and land use codes, and have little or no impact on the lake, the increased nutrient load resulting from the doubling of development may cause problematic levels of aquatic weed growth.
- The completion of a major highway reconstruction project results in more than a dozen new stores and restaurants along a previously sleepy commercial strip. While the traffic increase induced by each store individually is not significant, the combined traffic creates congestion on residential streets, negatively affecting driver and pedestrian safety.
- A service road to a new cell tower is built through a remote forest. Over time, as increasing numbers of recreationists use this road to access the forest, this use alters the aesthetically unique site and degrades nearby trout streams.
- A few dozen natural gas wells are drilled in a rural county over a decade, having little impact on the local economy or environment. When high fuel prices result in a rapid increase in well numbers, a broad spectrum of impacts follows the road and pipeline construction. While some impacts are immediately evident, others do not emerge for years.



Source: "Keuka Lake shore development." 42°29'31.03"N and 77°07'20.48"W.  
Google Earth. Imagery date 5/1/07. Access date 10/1/10.

or linked set of resources (for example, when fish habitat silts up due to runoff from many small, unrelated upstream construction sites or logging operations). While individual impacts may appear modest or inconsequential, over time and in combination with other impacts, they can significantly degrade the natural and human environment. Total impact is often greater than the sum of the parts.

### Cumulative Impact Assessment – Challenges

Cumulative impacts involve relationships between discrete actions. Because many of these relationships can be complex and hard to identify, they are often over-looked. In addition, other practical and conceptual factors complicate the assessment of cumulative impacts. These include: (a) observing and isolating “cause and effect” relationships is complex; (b) impacts may simultaneously compound and offset each other (c) the distribution of “winners and losers” associated with projects and policies may differ from one context to another; and (d) evaluating the impacts and feedback effects like those between ecological change and human/social behaviors requires cross-disciplinary expertise. These factors raise the likelihood that cumulative impact assessments will generate disagreement, expense, and complex engagement with policy.

### Approaches to Cumulative Impact Assessment

Specifying and assessing cumulative impacts of projects and policies is difficult but important. Approaches to cumulative impact assessment can be characterized as those tailored to the requirements

of environmental law, and those that are more broadly policy-oriented. The former typically respond to a particular proposed development that triggers a formal Environmental Impact Statement (EIS). They are shaped by both environmental law and court decisions. Fundamentally, the purpose of any EIS is to produce detailed information on environmental impacts, based on expertise and scientific standards, which decision makers take into account. However, the rigor with which agencies require cumulative impacts to be examined as part of an EIS is uneven. Even when undertaken with a close eye on meeting basic legal requirements, the law was intended to ensure that environmental impacts were not overlooked. Within this tradition, other kinds of impacts, cumulative or not, are often excluded from formal analysis.

The less widely used policy-focused approach offers a more common-sense, proactive and big-picture evaluation of cumulative impacts. While it may lack the immediately motivating force and some of the prescriptive authority of the legal (EIS) approach, it provides a less technical yet more comprehensive basis for evaluating cumulative impacts. This is especially true of impacts broadly influencing community quality of life and economic well-being, which often fall outside the legally mandated scope and intent of “environmental” impact assessment. In contrast, regional and municipal comprehensive planning traditions offer an existing institutional framework for

### Cumulative Impacts: A Closer Look

Each of the previously described situations shares a common characteristic: while the impact of a single change may be limited, the combined effects of multiple similar or related changes are of much greater consequence. Cumulative impacts occur when the individual effects of many actions combine over time and/or space. They typically have a combined impact greater than the individual projects added together. Actions may be causally linked: a given action influences the likelihood that other actions will follow (for example, when extending a sewer line increases the likelihood that farmers will sell their land for development, and each sale increases the chance of additional sales). Actions may also be linked when they are seemingly small and independent of each other but have an impact on the same resource

shaping policy that naturally encompasses a big-picture approach. These traditions address social, economic and environmental topics simultaneously. Moreover, they are intended from the start to provide an integrated framework for evaluating generalized future development and conservation alternatives on a community and regional scale. Though generalized alternatives are turned into reality project by project over time, the alternatives are usually well enough defined for important cumulative impacts to be evaluated.

### Legally Required Cumulative Impact Assessments in NYS

Although typically focused on single project impacts, federal environmental regulations have, for more than 30 years, explicitly required projects undergoing federal environmental review to consider cumulative impacts. In NYS, the State Environmental Quality Review Act (SEQRA)<sup>1</sup> similarly acknowledges the importance of examining cumulative impacts. Where it is determined that the cumulative impacts of multiple proposed actions or projects may be significant when combined over time or space, SEQRA requires that these impacts be formally assessed in an EIS before permits allowing the actions can be issued. The law requires that significant harmful or negative impacts, whether cumulative or not, must be mitigated insofar as is practical. There are no legal mandates to analyze or respond to positive cumulative impacts.

Although specific procedures are required to be followed when the impacts of proposed projects are examined, SEQRA allows the permitting agency room for case by case judgment, even for the initial determination of the kinds of environmental cumulative impacts that may be significant and deserve a “hard look”. Courts rarely hold decision makers accountable because they made the “wrong” decision. Instead, they tend to be judged on adherence to required procedures, thoroughness, and whether their final decision is clearly based on evidence and rationales that are not arbitrary.

Legally required approaches to cumulative impact assessment evolved in a context directed at highlighting environmental factors relevant to a larger decision making process. While these approaches were often dismissed as unimportant prior to the passage of SEQRA, the law now forces decision makers to consider environmental impacts. However, many social, economic and institutional impacts are still not systematically examined, presented as only positive, viewed as unmeasurable, and/or explained away as a purely local occurrence. As such, they are typically not subject to the same review standards as environmental impacts; or they are viewed through the narrow and “unscientific” lens of effects on “community character”. We suggest that a more inclusive framework involving both natural and socioeconomic impacts is preferable, giving balanced consideration to a full range of possible outcomes. This would facilitate a broad look over the time scales, geographies, and interaction effects that distinguish cumulative impacts, and emphasize foresight and policy over administration and reaction to particular proposed actions.

### An Alternative Approach: Regional and Comprehensive Planning

An approach drawing on regional and comprehensive planning traditions has also evolved for cumulative impact analysis. It is distinguished by an emphasis on policy analysis and weighing trade-offs between competing goals, centering attention on the larger decision making process. This approach emphasizes the use and generation

of data/information in resource management decisions. Rather than being either-or substitutes, the planning and legal approaches overlap in many ways and are ideally complementary.

Interestingly, some drafters of the SEQRA in NYS intended environmental impact assessment law as a transitional regime that would eventually be replaced by “real comprehensive planning at the local, regional, and state level”<sup>2</sup>. While this has not yet happened, decision making bodies interested in broad topics involving whole systems like “ecosystem management and sustainable development” have increasingly employed the planning approach<sup>3</sup>. The planning approach offers an alternative, institutionally familiar, and broader policy-oriented framework for analysis and decision making.

Comprehensive plans, in addition to having time-tested and familiar procedures, have flexible structure and content in NYS. Comprehensive plans offer a framework for developing a living planning document that creates and captures community consensus around the kinds of growth and economic development that are considered most desirable or undesirable, and the existing community and natural resource assets that are felt to be most worthy of protection. In addition, by their nature, cumulative impacts often cross boundaries and are often best addressed in plans by agencies with regional perspectives.

Procedures already exist in NYS for linking the legal and planning approaches to cumulative impact assessment. A formal impact assessment (normally, a “generic” EIS (GEIS)) of a municipal comprehensive plan is required upon its legal adoption. Since a comprehensive plan and a GEIS are likely to contain many of the same elements, a GEIS and comprehensive plan are beneficially prepared in tandem and can enhance the strengths of each approach by ensuring systematic evaluation of the full range of cumulative impacts implied by the comprehensive plan, not solely the environmental impacts required by SEQRA.

### Conclusion

Many of the most momentous impacts of development result not from the effects of any single action, but from the combination of individually minor effects of multiple and subtly related actions over time. Informed decision making and the adequate protection of people, communities, and the environment are often not possible unless cumulative impacts are considered. While assessing cumulative impacts is challenging and costly, such assessments ideally proceed by drawing on the strengths of both SEQRA law and complementary planning frameworks. Improving the institutional and technical capacity to assess cumulative impacts of projects and policies can contribute to improved quality of life and greater protection of the natural environment. Accordingly, cumulative impact assessment should be a priority.<sup>4</sup>

<sup>2</sup> Paul Bray, *The Historical Development of SEQRA*, Discussion, Albany Law Review, Vol. 65, pp. 325-334

<sup>3</sup> Council on Environmental Quality, *Considering Cumulative Effects Under the National Environmental Policy Act*, January 1997, See <http://ceq.hss.doe.gov/nepa/ccenepa/ccenepa.htm>; Harry Spaling and Barry Smit,

*Cumulative Environmental Change: Conceptual Frameworks, Evaluation Approaches, and Institutional Perspectives Environmental Management* Volume 17, Number 5, 587-600. See <http://www.springerlink.com/content/wh78387h201w683m/fulltext.pdf>

<sup>4</sup> C.f. Zhao Ma, Dennis R. Becker and Michael A. Kilgore, *The Integration of Cumulative Environmental Impact Assessments and State Environmental Review Frameworks*, Staff Paper Series No. 201 Department of Forest Resources, College of Food, Agricultural and Natural Resource Sciences University of Minnesota St. Paul, Minnesota January 2009 at [http://www.forestry.umn.edu/prod/groups/cfans/@pub/@cfans/@forestry/documents/asset/cfans\\_asset\\_184736.pdf](http://www.forestry.umn.edu/prod/groups/cfans/@pub/@cfans/@forestry/documents/asset/cfans_asset_184736.pdf)

<sup>1</sup> The State Environmental Quality Review Act requires most projects or activities proposed by a state agency or unit of local government, and all discretionary approvals (permits) from a NYS agency or unit of local government, to undergo an environmental impact assessment.

