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Message From the Editor

Update on *Strefling Oil* Decision/Contents/See You in October (Maybe Later)

In our Fall issue, Jim Enright reported that the Michigan Court of Appeals had interpreted a key phrase in Part 201 of NREPA in a way that may expand the liability of those who own contaminated property. "Better Late than Never?—The Michigan Court of Appeals Interprets 'Responsible for an Activity Causing a Release' in Part 201," 33 MELJ No. 1 (Fall 2014). Since then, the Michigan Supreme Court declined to review the Court of Appeals decision. If you deferred reading Jim's article, you may want to read it now.

To keep you occupied until fall, this combined Spring-Summer issue provides a bit more material than normal. Former ELS Chair John Tatum, with Robert A. Antonoplis of the Disney Corporation, give us a behind-the-scenes explanation of the process a Superfund PRP Group used to allocate cleanup costs among various classes of PRPs. Professor Nick Schroeck of Wayne Law School summarizes a recent Michigan Court of Appeals decision holding that DEQ incorrectly claimed that a 35 acre pond used to receive a township's treated wastewater Is a "water of the State" under Part 31 of NREPA. Prof. Schroeck goes beyond the holding to remind us that even though a water feature may not be a "water of the United States" under the federal Clean Water Act and EPA's recently promulgated "Clean Water Rule," it may nonetheless be subject to regulation by state authorities.

Jacob Byl, a recent graduate of Vanderbilt Law School, explains that it is often difficult to protect endangered species in Michigan because we have few large tracts of land under common ownership. But he concludes that there are legal tools that can be used to protect species even in states like Michigan. John Yowell, a recent University of Maryland Law graduate, discusses environmental disasters caused by several invasive fish species, and makes some creative proposals to borrow tools from the Toxic Substances Control Act to prevent such problems in the future. Remember the petcoke debacle on the Detroit riverfront? Erica Shell, a recent graduate of Wayne Law School, provides an exhaustive history of that episode and analyzes environmental justice issues that accompanied it.

Finally, the Council of the Environmental Law Section decided this past winter to budget funds for only three, rather than the customary four, issues of the *Journal* during the 2014-2015 fiscal year. It also voted to approve a budget for the 2015-2016 fiscal year that will fund only two issues of the *Journal*, although the Council acknowledged that final budget decisions for next year must be made by the Council members who take office in October 2015. Because this is

the third issue this fiscal year, the *Journal* will not be published again until October 2015, at the earliest. See you in October!

Christopher J. Dunsky
Editor, *Michigan Environmental Law Journal*

A Waste Weighted Allocation Process

Robert A. Antonoplis and John L. Tatum[1]

The division of financial responsibility for cleanup under Superfund has become more difficult since the Supreme Court's decision in *Burlington Northern & Santa Fe Railway Co. v. United States,* 556 U.S. 599 (2009). Allocation among jointly and severally liable responsible parties was the old standard. Apportionment, or divisibility,[2] among responsible parties is now part of account for different types of waste and other factors. This paper explores a real world scenario where two of the apportionment factors used in *Burlington*—separate parcels of land, and different periods of time—did not apply. However, separate contaminant streams or waste types did. An allocation with a melded volume analysis and weighting based on site-specific data for those waste streams successfully provided the "rough justice" that ultimately resolves Superfund disputes.

Background

The scenario discussed here involved a solvent recycler site in Southern California that operated from approximately 1976 until 1991. The recycler processed both drums and bulk shipments of solvents and other materials for about 3,000 parties. As a result of the recycling operations, as well as spills and leaks of various chemicals, the soil and groundwater beneath the property became contaminated with percholoroethylene (PCE), trichloroethylene (TCE), Freon 11 and 113, and other contaminants. Contaminated groundwater extended downgradient in multiple plumes four and a half miles from the facility. Because the owner/operator of the recycling facility was insolvent, EPA named companies that sent large volumes of waste to the facility as potentially responsible parties (PRPs). For over 15 years, a group of PRPs has been remediating the site starting with drum removal and progressing through interim groundwater pumping and treatment. The interim response has also included some soil vapor extraction in locations close to the site. The next stage of cleanup will involve remediating the plume extending beyond the immediate site. The EPA has estimated that cleanup costs will exceed $70 million. EPA's Record

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[1] Bob Antonoplis is a graduate of the University of California and Loyola Law School. He is a member of the California Bar and is environmental counsel to the Walt Disney Company. John Tatum is a graduate of Stanford University and Willamette Law School. He is a member of the Michigan and Oregon bars and his practice is focused on environmental mediation.

[2] A person sued in a cost recovery action may try to establish that "there is a reasonable basis for division of harm according to the contribution of each person." MCL 324.20129(1). This is known as apportionment. It is an attempt to apportion harm and avoid joint and several liability. It should be distinguished from allocation, which is an attempt to use a contribution action to allocate damages in an equitable manner among parties already found to be jointly and severally liable. Michigan Environmental Law Deskbook, Chapter 5, Part V, Section 5.39.

of Decision (ROD) identified PCE, TCE, Freons 11 and 113, and 1,4-dioxane as contaminants of concern (COC) in the groundwater.

EPA used hazardous waste manifests to identify the PRPs. The hazardous waste manifests contained waste descriptions and waste volume data. The data source was consistent in that it was collected from the Uniform Manifests sent to the State of California from November 1982, when the use of Uniform Manifests was first implemented, until operations at the site ceased in 1991. Documents that predate 1982 were available, but were relatively inaccessible and disorganized.[3]

The Allocation Process

The objective for this cost allocation was to develop a system that would be:

1. Easy to understand
2. Based on objective criteria
3. Adopted quickly with minimal transaction costs
4. Fair

Identification of Waste

The Uniform Manifest documenting the shipment of material to a site for recycling generally provides the following information:

- General waste descriptions required by USDOT. These are chosen by the generator, but are generally not terribly precise;.
- A more detailed description or list of components contained in the waste is sometimes provided in detail lines.
- Additional descriptions of the waste can also be found found in annotations and comments.

The difficulty with the data found on Uniform Manifests is that it is anything but uniform. In this case, the variation in descriptions of components in materials lists and annotations was enormous. (E.g., variations in describing trichloroethane ranged from “1,1,1” to “111” to “Trich” to multiple trade names.) Most of this information was hand written. A raw classification of the waste categories from about 13000 manifests yielded about 2500 categories. What was clearly needed was a more functional and objective means to characterize the waste identified into discrete categories that could form the basis for an allocation.

An initial attempt to classify waste categories utilized searches for text fragments from descriptions of materials sent to the site, as recorded on the manifests. Examples of text fragments include:

- Freon ~ Freon | R-1* | Fluro | 5120 (a trade name)
- Alcohol ~ Alcoh | Isopro | methan|

[3] An alternative document collection might be used at another site, so long as the documents relied on are consistent in identifying and describing the waste and specifying volume. The primary criterion is that the information be sufficiently detailed to assign objective waste categories and to document unusual transactions.

- BTEX ~ Benz | Tolu | EthylB | Xyle |
- Chloro ~ Perc | Tetrach | Trich | Flexo and Quick (trade names)

This classification or speciation is most effective when an experienced industrial chemist or engineer reviews the manifests. [4] In this case, engineering review of the set of labels and descriptions used on the manifests enabled identification of reasonable / manageable groups based on the types of waste described. [5] Generic or clearly labeled or identified chemicals or chemical components are easily grouped. Other DOT and material descriptions are more difficult to place in appropriate categories.

For example, the classification "Paint Waste NOS"[6] when there is no other information on the manifest may be the best classification that can be made. An assessment of the relative volumes for material shipments that were difficult to classify showed that while they were accurate, their volumes were not significant against total site volume.

The fact that EPA identified certain chemicals as COCs for the purpose of selecting site remedies played an important role in classifying waste shipments for allocation purposes. The trade names and industrial names for chemicals and mixtures containing those chemicals differ from the CAS[7] numbers and the chemical names used in the ROD. The commercial names used in DOT descriptions, comments, and component identifications in Uniform Manifests had to be merged into appropriate classes and then matched to the COCs for later evaluation.

Some examples of the classifications used are:

1. Alcohol. This classification included materials described as isopro*, paint waste where the component description identified the alcohol, ethyl methyl and n-butyl Alcohols.

2. Chloro. This classification included 1,1,1 Trichloroethane and variations on that name, Percholoroethylene plus chemical and trade name variations, Chlorinated solvent and trade name variations.

3. Freon. This classification was subcategorized to Freon NOS, Freon Other and specific Freons where they were identified on the manifest. R-11 and R-113 were COCs in the ROD, and each constituted its own category.

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[4] Speciation analysis, according to IUPAC (International Union of Pure and Applied Chemistry), is the analytical activity of identifying and/or measuring the quantities of one or more individual chemical species in a sample. This is much more precise than the activity described here, but analogous.

[5] Teresa Sabol Spezio, PE, of CDM Smith had the background and engineering judgment to provide this detailed review.

[6] N.O.S. is a U.S. DOT abbreviation for *Not Otherwise Specified*.

[7] CAS = Chemical Abstracts Services—the source for CAS registry numbers which provide a unique, unmistakable identifier for chemical substances.

These classes were then used to group the manifests and their volumes for review by the parties.

Certain decisions and assumptions simplified the classification process and advanced the goal of minimizing transaction costs. First, a shipment line item was classified by the primary chemical or material described on the manifest without regard for the concentration expressed. That classification implied no discount or reduction in volume for the concentration expressed by the generator or found on the waste profile. Second, the full volume of waste sent to the recycling facility at the inbound (waste-in) volume was counted, without any discount for arguments that some recycled materials had been returned to the generator. Third, the argument that the facility was merely a transfer facility was also waived. These decisions eliminated a set of arguments that some PRPs could have asserted, but which would have substantially lengthened the allocation process. Any attempt to consider these arguments would have been a vain effort to achieve greater precision than was warranted by the data.

Party Review

Party review of the classifications—and an opportunity for the parties to challenge the classification system—was crucial for a number of reasons, not the least of which was the need for each party to understand and accept the characterizations applied to its waste streams. The engineering review of individual manifests was tempered by the parties' explanation of the characteristics of the waste streams from particular plants, locations, and EPA ID numbers. Information from the PRPs enabled variations in the use of DOT names and manifest completion to be properly characterized and standardized. Additional sources for waste stream classification included contemporaneous material data safety sheets (MSDS) and waste stream profiles created by the receiving recycling facility.

A Panel composed of group members reviewed the initial engineering characterizations, as well as the additional effort by each PRP to characterize its waste. A third party allocation consultant conducted an initial review of party "challenges," and the Panel then reviewed the consultant's recommendations. Appeals and presentations to the Panel as well as to the group's Steering Committee and to the group as a whole were an important part of the process as that helped assure each party that its issue had been reviewed and acknowledged.

Modeling

The next step was development of a model weighting each identified waste class. This model involved volume multipliers for each defined waste category. The model included a rough approximation of the relative cleanup costs for the COC components from the ROD as well as an appropriate discount for waste categories that did not contain COC components identified in the ROD. Paint waste, for example, may include a number of solvents as well as cleaners, metals and other components, but unless there was additional information on the manifest, a shipment of paint waste was not categorized as containing a COC component.

Volumes or tonnages of waste categories that were deemed not to contain COCs were discounted. That discount impacted the allocation among liable parties, though it was not a

formula for divisible harm. A final differentiation involved the marker COCs for the extended plume and then the primary remedy driver COCs for the base plume.

Several tools are available for developing such a model. In this instance, MS Excel was used to show the discounts and weights and to evaluate the impacts that various changes in the discounts and weights would have on individual PRPs and on groups of PRPs. The Excel Solver tool provided a means to view the results of multiple variations of weighting factors. Graphic presentations of those results identified how changes in weighting factors would affect each PRP. The graphs also facilitated grouping parties according to types of waste, illustrated the impact of weighting changes, and suggested a possible range of weight factors that could result in final allocation. This enables the PRP group to develop the fairest—or put another way, an equally unfair—allocation.

Negotiation

Negotiation among PRPs centered on the relative weight factors for COC containing and non-COC containing waste categories. An important element in negotiations among PRPs, or groups of PRPs, is the "cost of failure to reach agreement." If the collective group fails to agree on a cost allocation, then individual PRPs and small groups of PRPs will proceed down a litigation path with substantial transaction costs. In litigation, each subgroup of PRPs is likely to incur expenses in excess of a million dollars, including expert fees to develop detailed scientific assessments of plumes, etc. The costs of formal mediation or arbitration includes not just the cost of the mediator or arbitrator, but also all the internal preparation and consulting time for formal presentations, as well as document exchange and review, analysis, and preparation of written arguments and responses. Although they can be somewhat less expensive, the cost of mediation and arbitration can approach the cost of litigation. Again, expenses of litigation, arbitration, or formal mediation can exceed a million dollars per party or group of parties.

A negotiated allocation process can proceed with dramatically lower costs. The Excel and Solver analysis used at this site identified the major interest groups, who in turn were encouraged to identify representative parties to participate in the mediation/negotiation. A member company with a mixed waste stream acted as the mediator in the negotiation. The mediator party's mixed waste stream offered a presumption of neutrality, and allowed it to objectively explain the financial impact of changes in the weighting formulae.

Discussions about the costs (including internal company costs) of litigation, formal mediation and arbitration helped all PRPs understand the implications of failure to agree on an allocation. Internal company costs to participate in the litigation and pseudo-litigation scenarios are also substantial although more difficult for third parties to estimate. Also difficult to assess were of the benefits of moving forward as a group, such as: consistent counsel, consistent administration, consistent engineering evaluation, consistent interface with the EPA, and opportunities for buyout, although difficult to quantify, also played a role in persuading PRPs to agree on an allocation of costs.

These assessments were generally undertaken in a large group format, but were on occasion more effective when presented and discussed in smaller interest group sessions. The smaller sessions provided an opportunity for the groups to more frankly evaluate their options, contributions and the costs and benefits of going forward separately or together. Shuttle discussions coupled with the modeling provided the opportunity for each group to evaluate just what would ultimately constitute a good mediated settlement.

The primary features of this internal-to-the-group or self-mediated process were:

1. An easy to understand baseline of source documents.
2. Standardized data classified into objective, understandable groupings which related to the ROD.
3. Simplified decisions that minimized transactions costs.
4. Process steps to assure that each company had a full understanding of its documents.

With this baseline and an ability to see the effects of discount changes, frank negotiation yielded an agreement, i.e. an outcome with which all parties were equally unhappy, but which they nearly all considered acceptable. The group, with one defection, moved forward to resolve its liability with the EPA and implement a cleanup in less time and with lower transaction costs than would have been expected. That is real progress in Superfund terms.

What is a Pond? Michigan Court of Appeals Interprets "Waters of the State" Under Michigan Law

Nick Schroeck and Justin Sterk[1]

A waterbody in Michigan that fails to meet the designation of "waters of the United States" under the Clean Water Act, 33 U.S.C. § 1251 *et seq.*, may still meet the state's designation of "waters of the state" under Michigan's Natural Resources and Environmental Protection Act, MCL § 324.20101 *et seq.* As illustrated by a the recent unpublished opinion from the Michigan Court of Appeals case, *Charter Twp. of Plainfield v. Department of Natural Resources & Environment*,[2] point sources that are not subject to the federal National Pollutant Discharge Elimination System (NPDES) permit program could still be required to obtain a state permit.

Plainfield involved the Charter Township of Plainfield's (Township) sewer waste water treatment plant and its byproducts, including sewage sludge and backwash water. The receiving location of the Township's treated waste water is the Coit Avenue Gravel Pit (CAP), which also stores the byproducts from the treatment plant's operation. The CAP is an open area between thirty-five and thirty-eight acres and is closed off from other bodies of water. There is no natural surface outlet to the nearby Grand River or to any other stream.

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[1] Nick Schroeck is an assistant (clinical) professor and director of the Transnational Environmental Law Clinic at Wayne State University Law School. Justin Sterk is a student at the law school and works as a student attorney in the Transnational Environmental Law Clinic.

[2] Docket No. 316535 (Mar 10, 2015) is also available on the State Bar of Michigan website.

In Michigan "a person shall not discharge any waste or waste effluent into the waters of this state unless the person is in possession of a valid permit from the department."[3] The Township originally applied to the DNRE[4] for a permit to use the CAP to hold backwash water and water softening sludge in 1987, but was told that a NPDES permit was not required due to the DNRE's conclusion that the CAP was not a "water of the state" which, in Michigan, includes both groundwater and surface water.[5] The DNRE reasoned that the CAP met the exemption in the Michigan Administrative Code that "surface waters of the state" explicitly did not include "drainage ways and ponds used solely for wastewater conveyance, treatment, or control."[6] This decision from the DNRE gave Plainfield Township license to use the CAP as part of its wastewater treatment program without any permitting requirements.

However, in 2009, the DNRE informed the Township that it now considered the CAP to be "surface waters of the state" because it was hydrogeologically connected by groundwater to the Grand River. The Township filed its initial complaint in Kent County Circuit Court, asserting that: (1) the Township was entitled to a declaratory judgment that the waters of the CAP are not "waters of the state"; (2) equitable estoppel barred the DNRE from ruling that the CAP is "waters of the state"; (3) collateral estoppel barred the DNRE from ruling that the CAP is "waters of the state"; and (4) the DNRE's attempt to rule that the CAP is "waters of the state" constituted inverse condemnation. After the DNRE moved to dismiss counts two through four, the Township filed an amended complaint seeking only declaratory judgment that the waters of the CAP are not "waters of the state." The DNRE argued that the CAP was not a "pond" and was not used "solely" for wastewater conveyance, treatment, or control because it was hydrogeologically connected by groundwater to the adjacent Grand River. The Township contended that the CAP was not "waters of the state" subject to NPDES permitting because it was a "pond" that was "solely" used for wastewater conveyance, meeting the exemption. The Township also argued that the DNRE should be prevented from defending the case on estoppel grounds, given the years in which the DNRE had advised the Township that the CAP was exempt from permitting.

On January 17, 2013, the trial court granted summary disposition to the DNRE, ruling that the CAP constituted "waters of the state" because the waters in the CAP are drawn from and interchange with the groundwater system which includes the Grand River. The court held that the CAP was not a "drainage way or pond used solely for wastewater conveyance, treatment, or control."

The Township appealed. The Court of Appeals reversed and remanded to the trial court to (1) determine whether the DNRE is barred from asserting that the CAP is not a pond, (2) if

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[3] MCL § 324.3112(1)

[4] Pursuant to Executive Reorganization Order No. 2011-1, signed by Governor Snyder on Jan 4, 2011, to be effective Mar 13, 2011, the DNRE was split into the DNR and DEQ. MCL § 324.99921. For consistency, the agency is referred to as DNRE throughout this article.

[5] MCL § 324.3101(z).

[6] Michigan Admin. Code R. 323.1044(u).

necessary, determine whether the CAP is a pond, and (3) conduct any other proceedings not inconsistent with its opinion.

The central question for the Court of Appeals was whether, for purposes of Michigan Administrative Code Rule 323.1041, the CAP constituted "waters of the state" or instead was merely a "pond." The pertinent section of the statute provides as follows:

> "A person shall not directly or indirectly discharge into waters of the state a substance that is or may become injurious to (a) the public health, safety or welfare, (b) domestic, commercial, industrial, agricultural, recreational, or other uses that are being made or may be made of such waters, (c) the value or utility of riparian lands, (d) livestock, wild animals, birds, fish, aquatic life, or plants or their growth or propagation, or (e) the value of fish and game."[7]

Further, "a person shall not discharge any waste or waste effluent into waters of this state unless the person is in possession of a valid permit from the department,"[8] and "waters of the state means groundwaters, lakes, rivers, and streams and all other watercourses and waters, including the Great Lakes, within the jurisdiction of this state."[9] The legislature delegated authority to DNRE to "protect and conserve water resources of the state" and to "have control of the pollution of surface or underground waters of the state and the Great Lakes, which are or may be affected by waste disposal of any person."[10] The legislature also delegated to DNRE the authority to "promulgate rules to carry out its duty to protect Michigan's water resources."[11] In carrying out this authority, the DNRE defined surface waters of the state to mean (1) the Great Lakes and their connecting waters, (2) all inland lakes, (3) rivers, (4) streams, (5) impoundments, (6) open drains, (7) wetlands, and (8) other surface bodies of water within the confines of the state, but explicitly exempting "drainage ways and ponds used solely for wastewater conveyance, treatment, or control."[12]

The Township argued that the CAP is used solely for wastewater conveyances, treatment, or control and is exempt from Part 4 of the Michigan Administrative Rules governing water resource protection and the DNRE's permitting authority. The Township's specific argument concerned the word "used" and that it was meant in the context of human use. The DNRE maintained that the CAP is not used *solely* for wastewater conveyances, treatment, or control because the CAP's naturally occurring interchange of water with the groundwater system was also sufficient to constitute a *use*.

The trial court agreed with the DNRE's interpretation, but the Court of Appeals reversed, calling the lower court's view of the regulation overbroad. The Court of Appeals reasoned that if the

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[7] MCL 324.3109.
[8] MCL 324.3112(1).
[9] MCL 324.3101(z).
[10] MCL 324.3101(1).
[11] MCL 324.3103(2).
[12] Michigan Admin. Code R 323.1044(u).

mere movement of groundwater through a pond constituted a use, then there was no pond that could qualify for the exemption unless it was artificially lined, which is not required within the text of the exemption. The Court further explained that statutes must be read in the context of their placement and their purpose in the scheme of administrative rules and that the purpose of this provision was to allow an exemption under certain defined circumstances. The Court of Appeals concluded that the only use of the CAP is wastewater conveyance, treatment, or control and that the use was consistent with exempting the CAP from designation as "surface waters of the state" under Rule 323.1044(u).

The issue of whether or not the CAP could be considered a "pond" under Rule 323.1044(u) is left to be decided by the trial court on remand. The Court of Appeals noted that the regulation failed to properly define "pond" and that the dictionary provides little assistance. Webster's dictionary defines pond as a body of water smaller than a lake, sometimes artificially formed, and defined lake as a body of fresh or salt water of considerable size, surrounded by land. The Court found that the vagueness of the definition did not lead to a conclusion that the CAP was or was not a pond as a matter of law.

Beyond the application of a number of Michigan's water protection statutes, this case serves as a reminder that potential dischargers must comply not only with federal water quality standards and permit programs, but regulation at the state level as well. The federal Clean Water Act generally prohibits discharges of pollutants from point sources into waters of the United States[13] and the United States Supreme Court has held that a waterbody is a "water of the United States" if it has a significant nexus to navigable waters of the United States.[14] The Clean Water Act also gave authority to the states to expand on the standards set by Congress.[15]

However, in Michigan, a second designation of "waters" must be met: waters of the state. Michigan's NPDES permits use a slightly more expansive definition of "waters" to determine applicability. As illustrated by *Plainfield,* even if a discharge is not into "waters of the United States," the discharge is not necessarily exempt from NPDES permitting requirements at the state level.

[13] 33 U.S.C. § 1251(a)(1).
[14] *Rapanos v. United States*, 547 U.S. 715 (2006)
[15] 33 U.S.C. § 1370.

Protecting Endangered Species in Michigan's Patchwork of Land

Jacob Byl, Vanderbilt Law School

I. Introduction

The Endangered Species Act (ESA) is a powerful federal law that was passed to protect "fish, wildlife, and plants" because these natural resources are "of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people."[1] Some of the most publicized and controversial endangered species regulatory activity has occurred in western states. For example, the northern spotted owl (NSO) in the Pacific Northwest garnered headlines in the 1990s as the conservation of old-growth forest was pitted against logging interests.[2] Protection of the delta smelt fish is poised to become a major factor in determining how water is used in arid parts of California.[3] Although the most publicized endangered species tend to live in the West, there are many endangered species in the East as well.[4]

It is important to consider how land management differs across regions when comparing legal protection of endangered species. This article discusses how ownership and management of land in a state like Michigan are more fragmented than in western states where the federal government is often the largest landowner. As discussed below, the patchwork of land in Michigan makes it more difficult to assemble large plots of land for habitat. The smaller proportion of federally owned land in Michigan also means that agency consultations under § 7 of the ESA play less of a role in efforts to conserve listed species. The same patchwork of land that poses these challenges to endangered species conservation also positions Michigan to take a lead in experimenting with voluntary conservation mechanisms that are increasingly important to ESA implementation. Regulators and attorneys representing clients who are dealing with endangered species in Michigan should encourage more frequent use of voluntary conservation mechanisms such as safe-harbor agreements and conservation easements, which are discussed below.

II. The Need for Large, Contiguous Areas of Land for Habitat

Many endangered species require large, contiguous areas of land for habitat. The Karner blue butterfly (KBB) is an endangered insect that occupies oak savanna in the Midwest United States, including portions of 10 counties in Southern and Western Michigan.[5] KBB is threatened by the disappearance of the oak-savanna ecosystem as development and the suppression of natural disturbance regimes, primarily periodic fires, have destroyed suitable habitat.[6] An additional threat is the fragmentation of the remaining oak savanna, which can lead to populations of KBB becoming isolated and suffering from a lack of genetic diversity.[7] Consequently, KBB

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[1] Endangered Species Act, 16 USC 1532(a)(3).
[2] Forest History Society, U.S. Forest Service History: The Northern Spotted Owl (accessed Jun 28, 2014).
[3] *Consolidated Delta Smelt Cases*, 717 F.Supp.2d 1021 (E.D. Cal. 2010) (allowing preliminary injunction because environmental group plaintiffs demonstrated likelihood of success on the merits of ESA claim).
[4] U.S. Fish & Wildlife Service, Listings & Occurrences for Each State (accessed Jun 28, 2014).
[5] Michigan Dep't of Natural Res., Karner Blue Butterfly Habitat Conservation Plan (KBB Plan) at 9 (accessed Jun 30, 2014).
[6] *Id.* at 10.
[7] *Id.*

conservation efforts seek to support the natural savanna communities and "maintain connectivity among occupied patches to support dispersal among existing subpopulations of KBB."[8]

Other species require even larger tracts of suitable land for habitat. For example, the northern spotted owl that inhabits the Pacific Northwest has home ranges that vary from about 3,000 acres to over 14,000 acres of forest depending on habitat conditions.[9] Red-cockaded woodpeckers that inhabit old-growth pine forests in the Southeast require 125 to 200 acres per nesting group.[10] The Kirtland's warbler in Michigan requires a much more modest 30 to 40 acres of habitat per nesting pair in order to successfully raise young.[11] All these species are examples of how assembling appropriate blocks of habitat can require land that may cross property lines and political boundaries. Wildlife is not known for respecting the lines that humans draw on maps.

For efforts to conserve species like the KBB and NSO to be successful, it is important to manage large tracts of land as habitat.[12] Each species mentioned above requires habitat that relies, at least to some degree, on a natural disturbance regime (e.g., wildfires) that has been largely impacted by humans, most notably by suppressing natural fire patterns.[13] The species now rely on human intervention to improve habitat conditions, often with prescribed burning.[14] To assemble and manage large blocks of contiguous habitat, the owners of that large area have to be identified, notified, and persuaded to participate in habitat improvement activities. This task often falls on the U.S. Fish & Wildlife Service (FWS), the main federal agency tasked with implementing the ESA. Many activities also require coordination among multiple local land-use planning bodies. As discussed in the next section, the difficulty of these tasks can vary greatly depending on whether one is looking at ESA projects in the West or in the East.

III. Assembling Plots of Land in the West & the East

This section describes the more centralized land ownership in Western states and how that makes assembling large blocks of land for endangered species habitat relatively easy. This article then discusses difficulties associated with the more fragmented ownership in the East and the patchwork of both ownership and land-use regulatory powers in the state of Michigan.

A. The Federally Owned Lands of the West

As mentioned above, many of the most publicized ESA controversies have arisen in western states. For historical reasons, the largest landowner in that part of the country is the federal government. For example, in California 48% of the land is owned by the federal government with 21% managed by the U.S. Forest Service (USFS), 15% managed by the Bureau of Land

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[8] *Id.* at 14.
[9] U.S. Fish & Wildlife Service, Species Fact Sheet: Northern Spotted Owl (accessed Jun 26, 2014).
[10] U.S. Fish & Wildlife Service, Red-Cockaded Woodpecker Recovery (accessed Jun 28, 2014).
[11] U.S. Fish & Wildlife Service, Endangered Species: Kirtland's Warbler (accessed Jun 28, 2014).
[12] See Scott *et al.*, Conservation-Reliant Species & the Future of Conservation, 3 Conservation Letters 91, 95 (Wiley Periodicals 2010) (describing habitat needs of NSO and similar species) (accessed Jul 13, 2015).
[13] *Id.* at 92-94.
[14] *Id.*

Management (BLM), 8% managed by the National Park Service, and 4% managed by the Department of Defense.[15] The state of Oregon is 53% federal land, and, in the most extreme example, Nevada is 81% federal land.[16]

When it comes to assembling land for endangered species habitat, having large blocks of land owned and managed by the federal government makes coordinating with landowners relatively easy. Wildlife habitat is one of the express uses in the multiple-use mandates of the USFS and the BLM, so these agencies have an express call to manage their land in ways that take wildlife and endangered species into consideration.[17] Even agencies that have more tenuous connections to wildlife management, such as the Department of Defense, are easier to identify, contact, and consult than private landowners when it comes to bringing together a large block of land for endangered species habitat.

The large blocks of federally owned land enable ESA conservation to encompass vast areas without requiring the coordination of a huge number of parties. Of the 9.6 million acres designated as critical habitat for the NSO in a 2012 rule, 9.5 million acres are on federally owned land.[18] The FWS considered designating an additional 3.9 million acres on private and state-held land, but excluded those areas because of anticipated administrative difficulties and political resistance.[19]

B. The Patchwork of Ownership in the East

In the eastern part of the country, regulators rarely have the luxury of being able to focus on federally owned land because the federal government owns and manages a much smaller share of the land. Connecticut has the lowest percentage of federally owned land with less than 1%.[20] In Michigan, 10% of the land is owned by the federal government.[21] With percentages in the single or low double digits, the federal government does not have the special status as the largest landowner in the East that it has in the West. This means that assembling large tracts of land for endangered species habitat often requires regulators to coordinate with federal land managers, state and local managers, and private landowners.

For example, habitat for the KBB that is currently occupied by the butterfly in Michigan consists of 51% publicly owned land and 49% privately owned land.[22] Of the publicly owned land, 57% is owned by the federal government.[23] The remaining 43% is owned by a mix of state, county, and local owners.[24] If endangered species biologists determine that a certain type of habitat

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[15] Gorte *et al.*, Federal Land Ownership: Overview & Data, 7-5700 Congressional Research Serv., at 8, 11-12 (accessed Jun 26, 2014).
[16] *Id.*
[17] *See* Multiple-Use Sustained-Yield Act of 1960, 16 USC 528-531.
[18] U.S. Fish & Wildlife Service, Designation of Revised Critical Habitat for the Northern Spotted Owl, 77 Fed. Reg. 71877 (2012).
[19] *Id.* at 71945.
[20] Gorte, *supra* note 15 at 8.
[21] *Id.*
[22] KBB Plan, *supra* note 5 at 9.
[23] *Id.*
[24] *Id.*

intervention is needed to save the KBB, regulators must identify and reach out to all these parties. Although some private landowners welcome habitat improvement activities on their lands, many landowners are skeptical of any activity that involves having federal experts tell them how to use their land.[25] This is especially true when the proposed interventions restrict traditional land uses such as agriculture and forestry that are simultaneously livelihoods and inherited ways of life.[26] Although coordinating habitat activities among federal agencies may not be easy, it is easier than coordinating among ten- or hundred-fold more landowners, many of them understandably reluctant to accept limitations on the use of their properties.

C. Fragmented Land Use Planning in Michigan

In the State of Michigan, dispersed land-use planning authority adds another dimension of fragmentation. Most states have between 300 and 500 decision-making bodies with land-use planning authority, but Michigan has more than 1,800 of such local government bodies.[27] With so many local government bodies, regulators have a formidable task to coordinate any effective implementation plans for ESA regulations. With a mix of publicly and privately owned land and dispersed land-use planning power, the Michigan landscape is rightly considered a patchwork when dealing with endangered species habitat.

IV. Consultations Under the Endangered Species Act

The difference between land ownership in the West and the East poses a second issue in addition to the comparative difficulty of assembling large tracts of land in the East for suitable endangered species habitat. One conservation mechanism of the ESA is the § 7 requirement that federal agencies act in "furtherance of the purpose" of the ESA and consult with FWS to ensure that "any action authorized, funded, or carried out" by a federal agency does not "jeopardize the continued existence of any endangered species or . . . result in the destruction or adverse modification of habitat of such species which is determined . . . to be critical."[28] Section 7 consultations are automatically triggered when one of the land management agencies does something major on federal land that may impact endangered species.[29] On private land this is not the case—there is a requirement to consult FWS only when there is a federal nexus, such as a permit required under the Clean Water Act or federal grant money is involved.[30]

This means that § 7 consultations are almost automatic in the West because so much land is owned by the federal government. In the East, consultations are rare because they occur only when there is a federal nexus to the proposed project. For example, sale of a license to harvest timber on federal land would trigger a consultation, but a timber harvest on privately held land would not unless there were a federal nexus. Removing a layer of ESA protection may be seen

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[25] *See* American Farm Bureau Federation, Farmers Focus on Impact of the Endangered Species Act, Michigan Farm News 7 (2014) (describing concerns that farmers have about regulators restricting their traditional practices).
[26] *Id.*
[27] KBB Plan, *supra* note 5 at 26.
[28] 16 USC 1536(a)(1)-(2).
[29] *Western Watersheds Project v. Kraayenbrink*, 632 F3d 472 (9th Cir. 2011).
[30] *See Karuk Tribe of California v. U.S. Forest Serv.*, 681 F3d 1006, 1021 (9th Cir. 2012) ("Where private activity is proceeding pursuant to a vested right or to a previously issued license, an agency has no duty to consult under Section 7 if it takes no further affirmative action regarding the activity").

as a positive or negative thing depending on the perspective of the stakeholder. For a developer seeking to clear forest to build a subdivision in Michigan, it is probably beneficial that there will be a § 7 consultation only if there is a federal nexus for the project. For an environmental group like the Defenders of Wildlife, it is probably negative that the developer might not be subject to some ESA protections.

V. Challenge Means Opportunity for Voluntary Conservation Mechanisms

Thus far the discussion has been about challenges posed by the more fragmented land ownership and management in the eastern part of the country. But the patchwork of land in Michigan can also be seen as an opportunity. A patchwork of land can allow for more experimentation with different conservation strategies. This can take the form of biological experimentation such as different habitat improvement methods. More important for environmental law practitioners, there can also be an opportunity to experiment with different legal mechanisms that can help conserve endangered species while giving landowners flexibility to use their land in ways that work for them. This section discusses safe-harbor agreements and conservation easements, two tools that may be attractive options to landowners, regulators, and conservation advocates in Michigan.

A. Safe-Harbor Agreements

Safe-harbor agreements (SHA) are contracts between landowners and ESA regulators.[31] A landowner promises to provide a quantity of suitable habitat in exchange for a promise that regulations will not become more onerous if the endangered species that the SHA is intended to protect does well and more members of the species take residence on the land.[32] Typically, a landowner is responsible for maintaining habitat that supports a "baseline" of endangered species.[33] Section 10 of the ESA authorizes the federal agencies that implement the ESA to issue incidental take permits for adverse modification of habitat that may harm species above the baseline, as long as there is a habitat conservation plan in place for the species.[34] Because safe-harbor agreements are voluntary, a landowner chooses whether or not to enter into one and can unilaterally end the agreement at any time.[35]

With a patchwork of private landowners in Michigan, the FWS can experiment with SHA terms and see what works well over time. For the KBB, the State of Michigan has already created a statewide habitat conservation plan, so that requirement for an incidental take permit is already in place.[36] Creation of a statewide habitat conservation plan is the type of activity that the State of Michigan engages in to make it easier for landowners to cooperate with federal regulators in conservation efforts.[37] With about a quarter of the occupied KBB habitat on federal land, FWS should feel comfortable experimenting with terms of SHA for habitat on the remaining private and state land.

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[31] U.S. Fish & Wildlife Service, For Landowners: Safe Harbor Agreements (*Safe Harbor Info*) (accessed Jun 30, 2014).
[32] *Id.*
[33] *Id.*
[34] 16 USC 1539(a)(1)-(2).
[35] Safe Harbor Info, *supra* note 33.
[36] *See* KBB Plan, *supra* note 5.
[37] *Id.* at 9.

B. Conservation Easements

Conservation easements are another legal tool that can be an attractive option for landowners seeking to maintain some flexibility while maintaining endangered species habitat.[38] In a typical conservation easement transaction, a landowner donates or sells the development rights for his or her property to a qualified land trust that holds the rights in perpetuity.[39] Because conservation easements often provide large tax benefits, they can be an important tool in estate planning for farms and other land-intensive industries.[40] A conservation easement must have a qualified conservation purpose or purposes; protection of endangered species habitat can easily fill that role and the FWS can feel comfortable knowing that the land will continue to be green space.[41] Landowners can often continue farming or harvesting timber on land with conservation easements, although some activities may be restricted to accommodate endangered species habitat.[42]

VI. Conclusion

As discussed above, endangered species regulation takes place in contexts that differ across regions of the country. Because the federal government is the largest landowner in the West, assembling large tracts of land for endangered species habitat is relatively easy and § 7 consultations are the norm for major projects. In the East, and especially in Michigan, assembling large tracts of land can be a real challenge because there is a patchwork of landowners and land-use planners. Section 7 consultations are rarer because they occur only when there is a federal nexus to activities.

Although the patchwork of land in Michigan creates challenges for endangered species protection, it also creates an opportunity to experiment with voluntary conservation tools. Safe-harbor agreements and conservation easements can be attractive options for landowners to have some flexibility while maintaining habitat for endangered species. With species like the KBB, regulators have some additional space to experiment with terms of voluntary conservation tools because there is a block of habitat owned by the federal government that already enjoys protections similar to habitat situated in the West. Practitioners should consider tools like SHA or conservation easements when advising clients about endangered species. With creative thinking by practitioners, regulators, and conservation advocates, Michigan could become a leader in developing regulatory innovations that protect endangered species habitat while allowing landowners flexibility in using their lands. Finding "win-win" situations like this is going to be important for the future success of the people and species impacted by the Endangered Species Act.

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[38] MCL 324.2141.

[39] Land Trust Alliance, FAQ: Conservation Easements (accessed Jun 30, 2014).

[40] *Id.*

[41] *Id.*

[42] *Id.*

Lessons Learned From Snakehead and Asian Carp Infestations, the Forces Battling Exotic Invasive Fish Species, and Proposals to Assist Prevention

John Yowell[1]

I. Introduction

Since its discovery from a Maryland pond in 2002,[2] headlines describing the snakehead invasion on local fish populations were accompanied with images of a monstrous predator with big teeth and a voracious appetite. In a similarly sensational fashion, a simple internet search of "Asian carp" elicits images of massive schools of fish chaotically leaping out of waters of the mid-western United States, creating hazards for boaters above the surface while crowding out native fish below. These and other invasive species throw native ecosystems out of balance, which causes large scale economic and environmental harm.[3] In addition to their sensationalistic nature, the snakehead and Asian carp infestations share another important characteristic—studying the origins of these infestations can lead to preventative measures to keep the next invasive species out of the headlines. This article examines lessons learned from previous infestations, preventative tools currently in place, and elements of the Toxic Substances Control Act that may serve as a model to improve public education and the regulatory process.

II. Background

Exotic invasive fish species infestations are not simply a problem for native ecosystems and the environment, but for the United States economy as well. Species within an ecosystem take millions of years to evolve together and create a balanced relationship. When a new species is introduced, it often throws the entire ecosystem out of balance,[4] which results in the crash of native fish populations. This can have a catastrophic effect on local economies,[5] as people have grown to depend upon the native fish for their livelihood, sustenance, and recreation. A 2005 study concluded "the conservative economic losses due to exotic fish is *$5.4 billion annually*."[6] (emphasis added). In addition to direct economic losses, large sums of money are spent trying to keep invasive species from spreading after initial introduction. For example, in 2010 and 2011, "the federal budget allocated approximately $120 million" to control Asian carp in an effort to keep them from entering the Great Lakes.[7]

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[1] Mr. Yowell is a 2014 graduate of the University of Maryland Carey School of Law and a member of the Maryland State Bar. He would like to thank Jason Newman, Mike Walker, and Sarah Widman for their assistance in researching, writing, and editing this article.

[2] Walter R. Courtenay Jr. and James D. Williams, Snakeheads (Pisces, Channidae)—A Biological Synopsis & Risk Assessment (U.S. Department of the Interior, U.S. Geological Survey Circular 1251, 2004), at 20.

[3] Pimentel, Zuniga, Morrison, Update on the Environmental & Economic Costs Associated With Alien-Invasive Species in the United States, *Ecological Economics* 52 (3): 273–288 (2005).

[4] U.S. Congress, Office of Technology Assessment, Harmful Non-Indigenous Species in the United States, OTA-F-565 (Washington, DC: U.S. Government Printing Office, Sep 1993) (*OTA*).

[5] Pimentel, *supra* note 3, at 1.

[6] Pimentel, *supra* note 3, at 6.

[7] Jenkins, Harmful Animal Invaders—The Economic Realities, National Environmental Coalition on Invasive Species (Jun 2010).

A. Defining Invasive Species

The National Invasive Species Council, created pursuant to Executive Order in 1999,[8] specifies that in order for a species to be classified as invasive, it must: (1) be nonnative to the ecosystem in question; and (2) cause or likely cause harm to the economy, environment, or human, animal or plant health.[9] The definition makes clear that currently observed damage to an ecosystem is not required for a species to be deemed invasive.[10] Additionally, it makes the distinction that although invasive fish species are nonnative to the ecosystems they harm, not all nonnative fish are invasive.[11] Every day people depend on nonnative fish as a source of recreation and their livelihood. For example, striped, largemouth and smallmouth bass, and rainbow trout, have been established in balance with native ecosystems for generations.[12] These and other nonnative species contribute to the sport fishing industry that generates billions of dollars to the U.S. economy.[13] Therefore in order for a species to be invasive it must not only be nonnative, but the harm or potential for harm must outweigh any benefit achieved by its presence.[14] It is this consideration that makes the evaluation difficult and variable across different sectors of the national economy and of regional ecosystems.

B. Vectors Through Which Infestations Occur

As it pertains to invasive species, a vector, or pathway, is the mode in which the species was introduced to the native ecosystem.[15] Vectors for infestation may include deliberate release of aquarium, bait, or food fish; accidental release through escape; connecting waterways through flooding or building of canals; release of contaminated ballast water; et cetera.[16] As deliberate activity becomes more proximate to infestation, public education becomes more apparent as a primary preventative measure. As purposeful activity has less causal connection to the release, the role of government regulation and response to threats serve as the primary preventative focus. It is also helpful to be cognizant of the natural origin of the invasive species. For example, if a species is exotic to the United States, then restricting the importation of the species is a viable option. But if the species in question is native to the United States, it makes sense to focus on intrastate activity and interstate transmission.

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[8] Exec. Order No. 13112, 64 Fed. Reg. 6183 (Feb 8, 1999).
[9] Nat'l Invasive Species Council, Invasive Species Definition Clarification & Guidance White Paper, at 2 (2006).
[10] *Id*., at 1.
[11] *Id*., at 4.
[12] OTA, *supra* note 4, at 56.
[13] Pimentel, *supra* note 3, at 6 ("Sport fishing contributes $69 billion to the economy of the United States") (internal citations omitted).
[14] Nat'l Invasive Species Council, *supra* note 9, at 3 ("For a nonnative organism to be considered an invasive species in the policy context, the negative effects that the organism causes or is likely to cause are deemed to outweigh any beneficial effects").
[15] Columbia River Basin Team, Columbia River Basin Interagency Invasive Species Response Plan: Zebra Mussels & Other Dreissenid Species, 100th Meridian Initiative (Sep 19, 2011), at I-4.
[16] *Id*. See also Aquatic Nuisance Species Task Force Strategic Plan (2013–2017) (May 3, 2012), at 6; Porter, Graham, Fishman, Status & Trends in State Invasive Species Policy: 2002-2009, Environmental Law Institute (May 2010), at 6, 15.

III. Snakehead Case Study

A. How the Infestation Occurred

In 2000, a resident of Crofton, Maryland ordered live snakeheads from a New York fish market.[17] A native of Hong Kong, his intent was to make a traditional fish soup to help heal his sick sister. But by the time he acquired the fish, the sister had regained her health, so he kept the fish in his home until they grew too large to contain.[18] Sometime between the summer of 2000 and May 2002,[19] he released the fish into a local pond.[20] By August 2002, 1,200 snakeheads were recovered from that pond by Maryland Department of Natural Resources personnel.[21]

B. Lesson Learned From Snakehead Infestation to Prevent the Next Invasive Establishment

Analysis of multiple snakehead specimens reveals that this one illegal release in Crofton, Maryland, is not the source of the entire Potomac River system infestation—there must have been "several independent introductions."[22] But considering the popularity of the species as a food fish, it seems likely that most, if not all, of the releases were similar in nature—they were released with somewhat benevolent intentions. It is disheartening that such infestations could be prevented if only the parties involved were properly informed of the consequences of their seemingly benign actions. But this provides a relatively simple answer to prevent such releases from happening again—public education. The Crofton resident's actions were not malicious: he only wanted to help his sister with a medicinal soup featuring the snakehead as the main ingredient. Once it became unnecessary to kill the fish, he fed them and then set them free in a local pond.[23] If people who wished to release a fish only knew of the dire consequences of their actions, infestations would probably be much less widespread. So a primary way to ensure prevention is for authorities to prioritize public education on the dangers these invasive species present to native ecosystems.

IV. Asian Carp Case Study

A. How the Infestation Occurred

Unlike the snakehead infestation, the Asian carp invasion was not a result of a directly intentional release by a consumer, but of years of misguided policy toward the species.[24] An Arkansas farmer first imported bighead and silver carp to improve the water quality of his catfish ponds in 1972,[25] the same year that the Clean Water Act was enacted.[26] In the following

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[17] Anita Huslin, Snakeheads' Luck Put Pond in the Soup, *Washington Post*, Jul 12, 2002, at A1.
[18] *Id*.
[19] Courtenay, *supra* note 2, at 20.
[20] Huslin, *supra* note 17.
[21] *Id*.
[22] Thomas M. Orrell and Lee Weigt, The Northern Snakehead Channa argus (Anabantomorpha: Channidae), a Non-Indigenous Fish Species in the Potomac River, U.S.A., *Proceedings of the Biological Society of Washington* 118(2): 407-415 (2005).
[23] Huslin, *supra* note 17.
[24] Tina Lam, Myths, Dangers, U.S. Failures: The Truth About Asian Carp, (*Detroit Free Press*, Jul 20, 2011).
[25] U.S. Fish & Wildlife Service, An Evaluation of Sampling Techniques & Life History Information on Bighead Carp in the Missouri River, Below Gavins Point Dam, South Dakota & Nebraska U. S. Fish & Wildlife Service, Great Plains

years, the Arkansas Game and Fish Commission, the U.S. Environmental Protection Agency (EPA), and other agencies and aquaculturalists began stocking the fish to improve water quality in farming and wastewater treatment ponds.[27] Inevitably, some of those fish escaped due to flooding and inadequate barriers, and by 1981, both bighead and silver carp specimens were captured in the wild.[28]

B. Lesson Learned From Asian Carp Infestation to Prevent the Next Invasive Establishment

The importance of using the precautionary principle in regards to invasive species is illustrated by the actions taken by the government, which resulted in the escape of the Asian Carp, and its subsequent inaction to prevent further infestation.[29] However, this occurred at a different time in the collective understanding of the repercussions of invasive species,[30] and the precautionary principle has been established since those events.[31] Although it may be tempting to blame a single Arkansas aquaculturalist for the Asian carp problem, doing so may distract from the more complicated issue of misguided public policy and government's inability to adapt fast enough to effect real prevention.

With so much time between the first collections of bighead and silver carp in native ecosystems and federal listing of injurious species under the Lacey Act,[32] it is no wonder so many waters in the United States are infested with established populations of silver and bighead carp.[33] But this is not to say that the U.S. Fish and Wildlife Service (FWS) should issue a blanket prohibition on all live exotic species of fish. The aquarium products and fish industry, which constituted $1.09 billion in sales for 2007,[34] would be devastated. The FWS also needs to be careful not to issue blanket prohibitions on all types of certain fish, such as all "Asian carp." This would result in a complete ban on koi fish, which are common carp from Asia specially bred for their coloration,[35] and would have a similarly devastating effect on the industries that support koi hobbyists. So, government action must result from a careful calculation of which species are invasive, and which species still hold enough value to outweigh the risk of introduction into native ecosystems. At the same time, this calculation must be made quickly enough for the

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Fish & Wildlife Management Assistance Office, Pierre, South Dakota (2003).

[26] Clean Water Act, PL 92-500, 86 Stat. 816 (Oct 18, 1972).

[27] Lam, *supra* note 24; Greg A. Wanner, Robert A. Klumb, Length-Weight Relationships for Three Asian Carp Species in the Missouri River, U.S. Fish & Wildlife Service (USFW), Great Plains Fish & Wildlife Conservation Office, *Journal of Freshwater Ecology*, 24(3): 489-495 (Sep 2009).

[28] Lam, *supra* note 24; USFW, *supra* note 27, at 1.

[29] United Nations Conference on Environment & Development, Rio Declaration on Environment & Development (*UN Rio Declaration*), Principle 15 (1992).

[30] Lam, *supra* note 24.

[31] UN Rio Declaration, *supra* note 29.

[32] *See infra*, part V (A).

[33] Lam, Pierce, Milliken, Asian Carp: Where They Are, What You Need to Know (*Detroit Free Press*, Jul 20, 2011) (accessed May 8, 2014).

[34] U.S. Census Bureau; 2007 Economic Census, Table EC0744SLLS1, generated by John Yowell using American FactFinder (accessed Apr 24, 2013).

[35] Paul Miglionico, Eddie Edwins, Bill Passey, Ornamental Fish Policy Working Group, Australian Koi Association Inc., Koi Society of Australia Inc., Koi Society of Western Australia Inc., Mar 2006 (accessed May 8, 2014).

policy decision to have preventative effect before established populations render any such policy moot.

V. Actions Taken by the Federal Government

A. The Lacey Act

First enacted in 1900, the Lacey Act gives the FWS the authority to prohibit by statute or by regulation the importation of any plants or animals that are "injurious to human beings, to the interests of agriculture, horticulture, forestry, or to wildlife or the wildlife resources of the United States."[36] The statute lists certain species of injurious animals, and goes on to say "and such other species of wild mammals, wild birds, fish . . . which the Secretary of the Interior may prescribe by regulation to be injurious to human beings," et cetera.[37] So the FWS may list new species to the injurious list by regulation.

In October 2002, 21 years after bighead carp were found established in Kentucky waters[38] and approximately 28 years after silver carp were first found in Arkansas waters,[39] 25 members of Congress representing the Great Lakes region petitioned the FWS to add silver, bighead, and black carp to the list of injurious wildlife pursuant to the Lacey Act.[40] In July and September of 2003, the FWS issued separate notices of inquiry for silver and bighead carp, respectively.[41] One of the comments gathered as a result of the 2003 notice of inquiry for silver carp listing requested that a risk assessment be completed before listing the species.[42] The FWS abided, and completed biological synopses and risk assessments for the silver carp species before issuing a proposed rule to add all forms of silver carp to the list of injurious fishes under the Lacey Act in 2006.[43] At long last, the final rule was issued in 2007.[44] In the 2007 rule's response to comments, the FWS admits that listing silver carp as injurious "will not address the ecological impacts of silver carp already in the environment. This rulemaking is intended to prevent or delay the introduction of silver carp into waterbodies(sic) where they do not currently exist . . . ."[45] Here, the FWS acknowledges that listing species under the Lacey Act is not meant as a measure of mitigation, but rather to prevent further infestation. In doing so, the FWS's decision leads to a bigger question regarding the efficacy of a preventative measure proposed

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[36] 18 U.S.C. § 42.
[37] *Id*.
[38] U.S. Geological Survey, Specimen Information, ID 158649 (accessed May 8, 2014).
[39] Injurious Wildlife Species; Silver Carp (Hypophthalmichthys molitrix) and Largescale Silver Carp (Hypophthalmichthys harmandi), 71 Fed. Reg. 52,305, 52,307 (Sep 5, 2006) (proposed rule, to be codified at 50 CFR 16) ("In 1974 or 1975, silver carp were collected from Bayou Meto and the White River, Arkansas County, Arkansas").
[40] Review of Information Concerning Silver Carp (1Hypophthalmichthys molitrix), 68 Fed. Reg. 43,482 (Jul 23, 2003) (proposed rule, notice of inquiry); Review of Information Concerning Bighead Carp (1Hypophthalmichthys nobilis), 68 Fed. Reg. 54,409 (Sep 17, 2003) (notice of inquiry).
[41] *Id*.
[42] 72 Fed. Reg. at 37,459
[43] *Id*.; 71 Fed. Reg. at 52,305.
[44] 72 Fed. Reg. at 37,459.
[45] 72 Fed. Reg. at 37,460.

when the species in question was first observed in waters almost three decades prior to the rule.

It is unclear why Congress needed to pass the Asian Carp Prevention and Control Act[46] rather than simply allowing the FWS to issue a new regulation for bighead carp, which apparently did not happen until after the law was passed.[47] The final rule only acknowledges that "the listing process for this species was delayed."[48] In 2009, members of Congress issued a letter in addition to the 2002 petition, and yet no proposed rule was issued.[49] Finally, President Obama signed the Asian Carp Prevention and Control Act in December 2010, which amended the Lacey Act to add bighead carp to the injurious list.[50] In what appears to be a formality, the final rule was issued in March 2011, even though "the listing of bighead carp and the statutory prohibitions on importation into the United States and interstate transport went into effect on December 14, 2010."[51] Perhaps the law became more of a public relations issue once it gained national attention; or maybe this was a way to force the FWS's hand to list bighead carp.

Somewhat paradoxical to the bighead carp listing is the fact that all species of fish in the snakehead family were prohibited in 2002 without any legislative amendment,[52] and silver carp were added only by regulation in 2007.[53] It seems that the FWS might have faced resistance to listing the entire snakehead fish family, which included smaller species that were still used in the aquarium trade,[54] so it is a wonder why that rule was adopted, while the bighead carp listing required legislative intervention and a rule separate from the silver carp rule.

Regardless of why the bighead carp was not added to the injurious list until almost eight years after the original petition was filed, examining the process shows that the time it takes to get a species listed under the Lacey Act can take so long that many waters can become irrevocably infested by the time the species becomes listed. To be fair to the FWS, the determination of the invasiveness of Asian carp may have been delayed by the history of the species' use for legitimate purposes in the United States,[55] but even when only considering the time from the petition from Congress, the process is clearly too slow to have much preventative effect.

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[46] Asian Carp Prevention & Control Act, PL 111-307,124 Stat 3282 (Dec 14, 2010).
[47] Injurious Wildlife Species; Listing the Bighead Carp (Hypophthalmichthys nobilis) as Injurious Fish, 76 Fed. Reg. 15,857 (Mar 22, 2011) (to be codified at 50 CFR 16).
[48] *Id*.
[49] *Id*.
[50] *Id*.; PL 111-307, 124 Stat. 3282, *supra* note 46.
[51] Injurious Wildlife Species, *supra* note 47.
[52] Injurious Wildlife Species; Snakeheads (family Channidae), 67 Fed. Reg. 62,193 (Oct 4, 2002) (codified at 50 CFR 16).
[53] Injurious Wildlife Species, *supra* note 47.
[54] 67 Fed. Reg. at 62,193.
[55] Lam, *supra* note 24.

B. The Non-indigenous Aquatic Nuisance Prevention and Control Act (1990), Reauthorized & Amended by the National Invasive Species Act (1996)

The National Invasive Species Act (NISA) was enacted in 1996 to reauthorize and amend the Non-indigenous Aquatic Nuisance Prevention and Control Act (NANPCA), originally enacted in 1990.[56] The bill authorizes regulations in support of invasive species control with a focus on ballast water regulations.[57] The funds to support the bill were appropriated until 2002,[58] so the bill needs to be reauthorized.

Although most of the language addresses ballast water and the prevention of zebra mussel contamination, the act also created the Aquatic Nuisance Species Task Force (ANSTF), which is "an intergovernmental organization dedicated to preventing and controlling aquatic invasive species and implementing" NANPCA and NISA.[59] Responsibilities of the task force include working with "State and local entities to minimize the risk of . . . an introduction" of nuisance species, recommending regulations to prevent nuisance species introductions, and conducting ecological surveys to determine the vulnerabilities of various ecosystems against nuisance species.[60] The FWS already has to conduct research when implementing a rule that lists a new species to the injurious list under the Lacey Act. So it may be that the ANSTF could assist in the evaluation process and lift some of the burden from FWS in its evaluations. In its strategic plan for 2013-2017, the ANSTF explains that it "was created to facilitate cooperation and coordinate efforts between Federal, State, tribes, and local agencies, the private sector, and other North American interests."[61] The ANSTF is very important considering the multitude of organizations concerned with invasive species control.[62]

C. Habitattitude: A Nation-Wide Government & Industry Partnership for Educating the Public

In the final rule that listed snakeheads as injurious under the Lacey Act, the FWS responded to comments inquiring about an educational campaign "to explain the hazards of releasing exotic species into the environment and encourage the proper disposition of unwanted pets":[63]

> The Service is considering the development of a new campaign similar to Stop Aquatic Hitchhikers![64] that would target aquarium hobbyists. This campaign

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[56] National Invasive Species Act of 1996, PL 104-332, 110 Stat. 4073.
[57] 16 U.S.C. § 4711.
[58] 16 U.S.C. § 4741.
[59] Aquatic Nuisance Species Task Force, Strategic Plan (2013–2017) (accessed May 8, 2014).
[60] 16 U.S.C. § 4722.
[61] *Id*.
[62] On its website, the U.S. Department of Agriculture (USDA) lists 164 different professional and non-profit organizations "with an interest in the prevention, control, or eradication of invasive species." USDA, Invasive Species (accessed May 8, 2014).
[63] 67 Fed. Reg. at 62,193.
[64] *Id.* ("The Fish & Wildlife Service has initiated a national public awareness campaign known as Stop Aquatic Hitchhikers! This campaign targets aquatic recreation users to raise their awareness about the growing aquatic invasive species problem and to encourage them to become part of the solution in preventing the spread of harmful, nonnative species. While aquatic recreation users may not be responsible for bringing these species into

> would be conducted in conjunction with the Pet Industry Joint Advisory Council, the largest trade association in the United States representing the pet industry in Washington, DC, and it would focus on raising awareness about aquatic invasive species, and encouraging aquarium hobbyists to adopt preventive actions to avoid having unwanted aquarium fish and plant species become part of our environment. The campaign would be a multi-layered, voluntary effort, and would encourage aquarium species importers, wholesalers, retailers and consumers to focus on how the aquarium industry is a responsible economic sector that collectively values the environment and seeks to protect it while simultaneously enjoying the benefits of the aquarium hobby.[65]

In 2004, the new campaign was launched, entitled "Habitattitude," an ANSTF partnership between the Pet Industry Joint Advisory Council (PIJAC), FWS, and the National Oceanic and Atmospheric Administration (NOAA) National Sea Grant College Program.[66] This is precisely the type of nationwide program needed to tackle public education on invasive species, and shows how the ANSTF is effective in bringing interested parties together on the issue. It is a good example of how different organizations can come together and get funding to help support a common interest in suppressing invasive species infestation. PIJAC contributed over a million dollars to help start the program,[67] which makes good business sense because when a species is determined invasive and listed as injurious, PIJAC's members lose the ability to sell that product.[68] It follows then that additional funding may be sourced from the fishing industry and/or recreational fishing advocacy groups as well.

VI. State Penalty Systems and their Effect on Public Education

A state's penalty system can be an effective tool to educate the public on the dangers inherent in invasive species. Unfortunately, state penalty structures for releasing non-native fish species to native ecosystems vary greatly both in effect and terminology. Of thirty-five states surveyed, penalties range from twenty dollars in fines,[69] to one million dollars and five years' imprisonment, depending on mental culpability and intent.[70] With such varying degrees of penalties, it is no wonder that the general public does not have a grasp on the severity of the act of releasing non-native fish.

Part of what makes infestation prevention difficult is the multitude of ways states define problematic species. What may be harmful enough to be labeled as invasive in one state could

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the country, they may inadvertently transport them overland. The Service is working with State fish and wildlife agencies, conservation organizations, and the fishing and boating industries to address this issue"). The campaign has a supporting website.

[65] *Id*.

[66] Miles, Zhuikov, A New 'Habitattitude' Can Help Prevent the Spread of Aquatic Invasive Species, NOAA's Office of Oceanic & Atmospheric Research, Nov 15, 2004 (accessed Jun 19, 2014).

[67] Miles, *supra* note 66.

[68] 18 U.S.C § 42.

[69] WV Code § 20-2-64; WV Code § 20-2-31.

[70] MCL 324.41302, MCL324.41303, MCL 324.41305, and MCL 324.41309.

have enough beneficial effect to achieve acceptance in another state. If they share connected water bodies, one state that labeled the species as invasive could nevertheless suffer an infestation due to the inaction of a neighboring state. Systems include listing specific animals in state regulations,[71] labeled as "deleterious exotic wildlife,"[72] or "potentially dangerous."[73] This is problematic because what one state or region may determine to be of little risk could end up being very dangerous to a neighboring, connected ecosystem. Of course, fish species do not respect political boundaries. So, without a unified approach to which fish should be treated as invasive, preventing the next infestation can prove difficult without proper public education on the issue.

Prohibited activity among different state systems include: stocking or releasing any fish into state waters;[74] releasing any fish not native to state waters;[75] and possessing, introducing, or importing specifically listed nonnative species.[76] "Stock," "release," and "introduce" all can mean the same thing, which is to liberate a fish into state waters. But the inconsistency of terms may be confusing to the public. For example, looking at the Alabama code may lead one to believe that to "stock" a fish is different than to "release" a fish, because if they were supposed to mean the same thing, then including both terms would be surplusage.[77] But statutes in Delaware,[78] Indiana,[79] and Kentucky,[80] only restrict stocking fish. Thus, it would seem counterintuitive to the public if they could release a fish but not stock it into the same waters. Maine's statute clearly equates "stock" with "introduce" because the title is "Permit to stock inland waters," while the language only specifies that "a person may not introduce fish of any kind into any inland waters without a valid permit."[81] To confuse matters even more, Mississippi code clearly separates "stock" and "release" by prohibiting only the release of nonnative fish while broader restrictions are given to stocking any species whether it is native or not.[82] Also, North Carolina restricts "release . . . for the purpose of stocking."[83] In an increasingly mobile society, and especially considering the relation of fishing activities to tourism, these inconsistencies are confusing and may harm the intended effect of discouraging the release of fish into state waters.

Disparity among penalties is not restricted to comparisons of one region of the country to another. For example, Indiana and Michigan share a border and coastal access to Lake Michigan, and yet a person could release an invasive species into that water body from Indiana and only

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[71] Md Code Regs 08.02.19.04.
[72] Wash Rev Code 77.12.020.
[73] NJ Stat 23:4-63.3.
[74] Ala Admin Code 220-2-.129.
[75] Haw Rev Stat 187A-6.5.
[76] 58 Pa Code 71.6.
[77] Ala Admin Code 220-2-.129.
[78] 7 Del Admin Code 3308.
[79] Ind Code 14-22-9-8.
[80] Ky Rev Stat 150.180.
[81] Me Rev Stat tit 12, § 12510.
[82] Miss Code 49-7-80.
[83] NC Gen Stat 113-292.

incur a maximum fine of $500.[84] But if that same person committed that same action in Michigan, the penalty could include a felony conviction and a fine up to $1,000,000.[85] The variability of state programs for handling invasive species creates confusion in the public mind about the issue. However, states play a crucial role in evaluating their local ecosystems, and are on the front lines of prevention, enforcement, and identification of invasive species. The prevention of future invasive species infestation is nearly impossible without proper coordination between state programs and the federal government.

VII. Regional Commissions Serve as Liaisons Between States & the Federal Government

Since most of the regional fisheries commissions were started decades ago, their main focus has been on regulation of the fisheries in the traditional matters of licensing and catch limits. But these organizations are in a position to bridge disparate gaps that state laws have with neighboring jurisdictions. Since states within the commission jurisdictions agree to follow those authorities in varying degrees, a regional commission could enhance protection of an entire ecosystem in ways that would otherwise be quite difficult. Also, since the very purpose of these commissions is to provide expertise on a specific region, they are, in theory, better equipped to make decisions on species categorization than any single state that may put its own interest above the ecosystem as a whole. In other words, they are well-positioned to liaise between the various states under their jurisdiction and the federal government and organizations like the ANSTF.

A. The Potomac River Fisheries Commission

The Potomac River Fisheries Commission (PRFC) was created by the Maryland and Virginia Potomac River Compact of 1958.[86] It recognizes that citizens of both Maryland and Virginia have rights to fish the river,[87] and has jurisdiction over the part of the river from the Washington D.C. boundary to the Chesapeake Bay.[88] The PRFC has the power to make regulations and orders that Virginia and Maryland are bound to enforce.[89] The PRFC has issued an order prohibiting the possession of any live snakehead, as well as the release or return of any live snakehead to the Potomac River.[90] But this order became effective on June 20, 2010[91]— just over six years after the first reported snakehead catch from the Potomac River, located well within the PRFC's jurisdiction.[92]

Although PRFC regulations and orders affect enforcement of two states at once, a reciprocal problem arises if the Compact needs to be changed for any reason, because then both states

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[84] Ind Code 14-22-9-8; Ind Code 14-22-38-1; Ind Code 35-50-3-4.
[85] MCL 324.41302, MCL324.41303, MCL 324.41305, and MCL 324.41309.
[86] Va Code 28.2-1001; Md Code, Nat Res, § 4-306.
[87] *Id*. at Preamble.
[88] *Id.* at Article II.
[89] *Id.* at Article V, § 1.
[90] Potomac River Fisheries Commission, Fish Order #2010-06, Possession of Snakeheads, Jun 20, 2010 (accessed Jun 18, 2015).
[91] *Id*.
[92] U.S. Geological Survey, Nonindigenous Aquatic Species Specimen ID #158633, (accessed Jun 18, 2015).

have to enact that revision.[93] So it is critical that the statutes that create these commissions give enough flexibility in its power to make enforceable regulations.

B. The Atlantic States Marine Fisheries Commission

The Atlantic States Marine Fisheries Commission (ASMFC) was created by all of the Atlantic coastal states[94] in 1942, and chartered by the U.S. Congress in 1950.[95] The ASMFC issues recommendations through advisory panels, but the recommendations are not authoritative, and enforcement is left up to the states.[96] Although the ASMFC has issued a resolution on invasive catfish,[97] it is unclear what proactive actions, if any, the ASMFC has taken. However the ASMFC does have a Management and Science Committee that "carries out assignments at the specific request of the Commission, Executive Committee, or the [Interstate Fisheries Management Program] Policy Board, and generally provides advice to these bodies."[98] Among its duties are to "[e]valuate and provide advice on cross-species issues . . . including . . . invasive species."[99]

Although ASMFC serves as a good example of coordinating the efforts of many states' interests, its lack of enforcement authority limits its effectiveness. Still, it is in a unique position to initiate large education campaigns and collaborative research regarding interstate ecosystems.

C. The Great Lakes Fishery Commission

The Great Lakes Fishery Commission (GLFC) is a joint effort by the United States and Canada to manage the fisheries in the Great Lakes.[100] Within the statute is the provision that states within the GLFC's jurisdiction cannot make laws or regulations that conflict with the GLFC,[101] but there is no indication that any law or rule has been challenged on that basis. To its credit, the GLFC first alerted the U.S. and Canadian governments of the dangers of ballast water in 1988, but it took the U.S. Coast Guard five years after that first alert to issue ballast water regulations.[102] This is a good example of why the response to the threat of an invasive species needs to be expedited by the pertinent authority.

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[93] 2013 Va SB 1110 ("provisions of this act shall not become effective until (i) the State of Maryland enacts similar acts, (ii) the Governor of Maryland issues a proclamation declaring the provisions of the Maryland acts to be effective, and (iii) the Governor of Virginia issues a proclamation declaring the provisions of this act to be effective.")

[94] ASMFC Advisory Primer, A Guide to the Commission's Advisory Panel Process (accessed Jun 18, 2015). (Member states are Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, and Florida).

[95] Atlantic States Marine Fisheries Compact, PL 539; 56 Stat 267.

[96] ASMFC Advisory Primer, *supra* note 94, at 1.

[97] Atlantic States Marine Fisheries Commission, Resolution on Non-Native Invasive Catfish, Apr 2011 (accessed Jun 18, 2015).

[98] Atlantic States Marine Fisheries Commission, Interstate Fisheries Management Program Charter, May 2013 (accessed Jun 18, 2015).

[99] *Id*.

[100] 16 U.S.C. §§ 931-939.

[101] 16 U.S.C. § 939.

[102] Great Lakes Fishery Commission, Int'l Joint Commission, Aquatic Alien Invasive Species & the Great Lakes-St. Lawrence Ecosystem: Progress & Future Needs, Sep 2004 (accessed Jun 18, 2015).

D. The Gulf States Marine Fisheries Commission

The compact that established The Gulf States Marine Fisheries Commission (GSMFC) was signed by President Truman in 1949.[103] The purpose of this Commission is "to promote the better utilization of the fisheries . . . of the seaboard of the Gulf of Mexico, by the development of a joint program for the promotion and protection of such fisheries and the prevention of the (sic) physical waste of the fisheries from any cause."[104] The GSMFC is in partnership with the Gulf & South Atlantic Regional Panel on Aquatic Invasive Species, which "serves as an advisory body and reports to the" ANSTF.[105] Additionally, the panel has engaged in unique public education techniques, such as the "Traveling Trunk of Invasive Species," which is an educational kit that is lent to nonprofit or educational organizations to spread the word about some of the regional invasive species concerns.[106] This is the type of regional coordination that can and should be emulated among all regional commissions.

E. The Pacific States Marine Fisheries Commission

The Pacific States Marine Fisheries Commission (PSMFC) was established in 1947, and includes Idaho, Oregon, Alaska, Washington, and California.[107] The PSMFC established the Aquatic Invasive Species Program in 1999,[108] which used funding from the U.S. Fish and Wildlife Service and the Bonneville Power Administration to devise a response plan to keep zebra mussels out of the Columbia River basin.[109] Similar to the Habitattitude campaign,[110] this program is a good example of how regional commissions can bring different organizations together to get funding to support their common interest in suppressing invasive species infestation. It is estimated that invasive zebra and quagga mussels cause $1 billion of costs per year by clogging "water intake pipes, water filtration, and electric generating plants."[111] Therefore, it follows that power companies should consider invasive species suppression to make good business sense.

Regional fisheries commissions can be an excellent source of information about invasive species affecting ecosystems under their jurisdiction. States have multiple federal laws and groups with which to coordinate, and the reason for some of the delays in creating new rules could be a symptom of overlapping jurisdictions among multiple administrative bodies. The coordination of these efforts through the regional commissions is crucial in order to achieve rapid response to threats and public education initiatives. However, most of the commissions serve more as a cooperative organization for dissemination of information, rather than administrative bodies that can issue blanket regulations against the spread of invasive species. This somewhat limits

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[103] A compact to establish a joint commission among the Gulf states, PL 81-66; 63 Stat 70.
[104] *Id*.
[105] Gulf of Mexico Regional Panel on Aquatic Invasive Species, Standard Operating Procedures (accessed Jun 18, 2015).
[106] Gulf & South Atlantic Regional Panel on Aquatic Invasive Species, Traveling Trunk of Invasive Species [click "Traveling Trunk of Invasive Species"] (accessed Jun 18, 2015).
[107] A compact to establish a joint commission among the Pacific states, PL 232; 61 Stat 419.
[108] Pacific States Marine Fisheries Commission, Aquatic Invasive Species Prevention Program (accessed Jun 18, 2015).
[109] Columbia River Basin Team, *supra* note 15.
[110] See *supra*, part V, C.
[111] Pimentel, *supra* note 3.

the abilities of the commissions to communicative efforts rather than achieving regional enforcement against invasive species infestation.

VIII. The Toxic Substances Control Act as a Model for Legislative Fixes to Improve Public Education & Expeditious Action on the Federal Level

The National Invasive Species Act needs reauthorization,[112] which presents an opportunity to modify the existing invasive species control structure to greatly strengthen prevention. In consideration of the cost of invasive fish species alone,[113] it makes sense to appropriate funds to the ANSTF to continue its mission of public education, and to require participation from the regulated community. Additionally, due to the temporal urgency of measures to prevent or mitigate invasive species introductions, the Lacey Act should be strengthened to ensure a speedier process of injurious species listing.

The Toxic Substances Control Act (TSCA) addresses both of these issues in its regulatory scheme.[114] Like the Lacey Act, TSCA enables the government to regulate commerce of a product that has potential to harm the environment and human health.[115] The two laws differ though in that TSCA enables regulation without an outright ban on the product,[116] whereas listing a species as injurious under the Lacey Act will result in a total ban on importation and interstate transport of the species.[117] So although some of the calculations for what is regulable under the laws may be different, the main objective and legal mechanisms utilized are similar in nature.

A. Proposal for a Nation-Wide Flier System

Section 406 of TSCA instructs the Administrator of the EPA to publish a "lead hazard information pamphlet," and requires home renovation contractors to issue the pamphlet to customers before renovations take place.[118] This requirement takes a precautionary approach in that the pamphlet is required for specific housing because of the chance that lead paint may be in the home. It is not necessary to prove that the lead is actually present in the home being renovated.[119]

The requirement in TSCA for an informational pamphlet translates perfectly to the approach needed for commercial transactions regarding live fish—it is not necessary to prove that that particular species is invasive, or that there is a particularized risk with its destination or intended purpose. The chance of it being a problem means that a pamphlet should be distributed whenever a live fish is purchased from any retailer of any kind. Additionally,

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[112] See *supra*, part V, B.
[113] See *supra*, part II.
[114] 15 U.S.C. §§ 2601-2692.
[115] 15 U.S.C. § 2605.
[116] *Id*.
[117] 18 U.S.C. § 42.
[118] 15 U.S.C. § 2686.
[119] *Id*.

recalling the Habitattitude program,[120] much of the required infrastructure for the distribution of literature is already in place, the only difference is that the Habitattitude program is voluntary.[121] The reauthorization of NISA would be a simple and extremely effective way to take the example from TSCA and require retailer distribution of the already existing Habitattitude literature to warn consumers on the dangers of releasing the animals that they are purchasing.

B. Proposal for Reenactment of the National Invasive Species Act With a Citizen Petition & Deadlines for a Government Response

Section 21 of TSCA enables "any person" to petition the Administrator of the EPA to issue, amend, or repeal any rule under TSCA, meaning that if anyone thinks that the EPA should regulate a substance under TSCA, they can formally petition the agency to do so.[122] From the time the petition is filed, the EPA has 90 days to either initiate rulemaking proceedings, or to deny the petition.[123] After the 90 days have expired, if the agency has neglected to make a decision or denied the petition, the person who filed the petition may initiate a cause of action to compel the agency by court order.

Giving citizens the power to compel the FWS to list a species as injurious would help prevent the type of situation that happened in listing bighead and silver carp.[124] With this provision, it would not have to take an act of Congress to list a species. Although this provision may see resistance from the aquarium industry, it bears notice that the provision goes both ways[125]—if there is new scientific data to show that a species listed is not injurious, the industry can always petition the FWS to take that species off the list, as long as the species is listed by regulation rather than a legislative act. Also, with the ability to move things forward in a more expeditious manner, there will not be as much need for Congress to statutorily add any species, making the removal only possible by a legislative repeal of that law.

There are some minor differences that should be considered when building on this framework and amending the Lacey Act. As mentioned above, when a species is listed as injurious under the Lacey Act, all import and interstate transport of that species is banned,[126] as opposed to placing regulations on the handling of a substance without an outright ban.[127] This more exacting consequence should be met by a higher standard when courts decide the merits of a petition denial. Rather than using the "unreasonable risk" standard in TSCA,[128] the injurious species standard should use the calculation described by the National Invasive Species

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[120] See *supra*, part V, C.
[121] *Id*.
[122] 15 U.S.C. § 2620.
[123] *Id*.
[124] See *supra*, part IV, B.
[125] 15 U.S.C. § 2620.
[126] 18 U.S.C. § 42.
[127] 15 U.S.C. § 2605.
[128] 15 U.S.C. § 2620.

Council,[129] with one minor modification. Since a Lacey Act listing results in a national ban on the species, the species must be exotic to the United States rather than simply nonnative to a particular ecosystem. Additionally, to allay any confusion as to who has the ability to submit a petition for rulemaking, the language should read that "any person, party, firm, association, or corporation"[130] may petition the FWS to list a species.

IX. Conclusion

The act of releasing exotic invasive fish into United States waters is difficult to prevent in the traditional sense of law enforcement because of the nature of how introductions occur, so prevention must focus on public education and the ability of authorities to respond quickly to threats as they arise. Steps are being taken to achieve greater visibility of the issue, such as the Habitattitude campaign to educate the public and strong penalty structures on the state level. The ANSTF is making strides in corralling various organizations with missions to prevent infestation, and fisheries commissions may serve this purpose particular to their respective regions. But ultimately, more needs to be done. Using TSCA as a model to amend the Lacey Act can enhance preventative measures in requiring literature distribution at all points of sale for live fish species. Further, citizen petitions will move the process of listing invasive species forward so action can be taken in a more expeditious manner on the federal level.

[129] See *supra*, part II, A.

[130] Fla Stat § 379.4015.

Petcoke: How an Outdated & Inconsistent Regulatory Framework Defeats Environmental Justice in Detroit

Erica J. Shell[1]

I. Introduction

In the early spring of 2012, a black pile three stories high and as large as many of the surrounding buildings appeared along the shores of the Detroit River.[2] This pile was made up of petroleum coke, or "petcoke," a byproduct created by the process of transforming heavy tar sands oil into useable fuel. While petcoke is not traditionally burned in the United States, competitive markets exist for petcoke in the developing world. This pile's presence along the Detroit River stemmed directly from the recent construction of a tar sands processing facility at Marathon's Detroit refinery and Detroit's status as an important North American transportation and shipping hub. However, as black clouds formed and thick, black dust began to coat surrounding buildings, Detroit residents began asking where this uncontained pile of petcoke came from, who put it there, and whether its presence was lawful.

Despite the negative impacts on the surrounding community, Detroit's historically lax zoning and environmental policies placed minimal restrictions on the open storage of substances like petcoke. Since heavy tar sands processing on a national scale will increase with further development of tar sands deposits (and dramatically so if tar sands pipelines such as the Keystone XL gain approval), the risks posed by minimally-regulated petcoke storage will continue to magnify if regulatory structures do not come into alignment with contemporary energy policy. This article will examine these issues, with a focus on the policies that began during the heyday of Detroit's industrial activity and which continue to the present day, resulting in persistent environmental inequality for Detroit residents.

Part I explores the origins of environmental injustice in Detroit and the background of petcoke production generally. Part II addresses petcoke production in Detroit specifically and the environmental impacts created by petcoke production, storage, and transportation, using Detroit's petcoke pile as a lens through which existing local land use and environmental regulations may be examined. Part III examines existing federal and state environmental regulations and controls that potentially apply to petcoke production and storage. Part IV analyzes two sample jurisdictions whose regulatory frameworks offer more complete protection from petcoke's effects for communities, and whose approaches have a number of

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[2] Steve Thorpe, Asked & Answered: Nick Schroeck on Petroleum Coke, *Detroit Legal News* (Jun 20, 2013) (last visited Jun 10, 2015).

common themes that Michigan could replicate. Finally, this article suggests a number of regulatory improvements that Michigan should consider if it wants to continue processing heavy tar sands oil.

A. Environmental Injustice in America's Industrial Capital

Detroit, once known as the "arsenal of democracy," represents one of America's first industrial epicenters.[3] As early as the dawn of the twentieth century, Detroit represented "in the words of historian Oliver Zunz, a 'total industrial landscape,'" with homes, shops and factories coexisting in close proximity.[4] The City's industries depended on the proliferation of rail lines as well as Detroit River access, which provided easy transportation for industrial products too heavy to ship by rail.[5] Financial incentives, "[t]he introduction of new technology and decisions about plant size, expansion, and relocation affected the city's labor market and reshaped the economic geography of the Detroit region."[6]

Throughout the industrial age, Detroit's geography was shaped by the interlocking influences of industrial siting decisions and both racially and economically segregated housing.[7] Lower income and working class Detroiters more often lived in or near heavily industrial areas. Many blue-collar neighborhoods, "like Oakwood in southwest Detroit, were huddled in the shadow of Detroit's plants, offering their residents easy access to jobs" at an affordable price.[8] As early as the 1940s, "[f]inances were a major obstacle to equal housing" opportunities for African American residents.[9] Both a desire to locate close to the workplace and the confines of racial inequality tended to concentrate low-income people of color close to industrial zones, according to the theory of "economic captivity."[10]

The theory of "economic captivity" posits that low income and minority residents lack access to less-polluted, higher-income communities due to economic and social constraints.[11] Economic captives often inhabit poor quality housing in blighted or crime-ridden areas.[12] For example, in Detroit, "[o]f 545,000 housing units available . . . in 1947, only 47,000 were available to blacks."[13] Compounding the impact of housing shortages and racially restrictive real estate practices, "[p]ostwar highway and urban redevelopment projects" devastated "the most densely populated sections of black Detroit."[14] Moreover, white, upper-income Detroiters

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[3] Thomas Sugrue, Origins of the Urban Crisis: Race and Inequality in Postwar Detroit 19 (Princeton Univ Press 1996).
[4] *Id*. at 18.
[5] *Id*.
[6] *Id*.
[7] *Id*. at 11.
[8] *Id*. at 22.
[9] *Id.* at 34.
[10] *Id.* at 5-6.
[11] For more on these specific constraints, see George P. Smith II & Matthew Saunig, Reconceptualizing the Law of Nuisance Through a Theory of Economic Captivity, 75 Albany L Rev 57, 57-58 (2011/2012).
[12] *Id*. at 57-58.
[13] Sugrue, *supra* note 3, at 43.
[14] *Id*. at 47.

resisted construction of affordable and multi-unit housing for displaced African American residents, "even on marginal land that bordered commercial or industrial areas."[15]

Detroit's 1946 Master Plan called for public housing construction on four existing tracts in predominantly black neighborhoods and on four vacant sites, all of which "fronted major thoroughfares, two (which) were bounded by railroad tracks, and three (which) sat in largely industrial areas, on sites zoned for manufacturing."[16] A proposed public housing development for African American families in Oakwood reflected the Detroit Housing Commission (DHC)'s conclusion that a "working-class neighborhood, close to the Ford River Rouge Plant, the steel mills of the Downriver area, and Detroit's salt mines" would be less controversial.[17] White residents sought to constrain both industrial uses and minority residents far from their own communities. While the Oakwood proposal was ultimately rejected due to citizen upheaval, it reflected DHC's desire to site African Americans closest to undesirable land uses.[18]

University of Michigan Sociologist Paul Mohai has examined the nexus between race, poverty and industrial siting today, highlighting the impact of lower property values, the overlap of low-income residential areas with industrial zones, and the political disenfranchisement of minority communities.[19] Mohai's work shows that Detroit was historically known for zoning "flexibility,"[20] as opportunities for variances or even zoning changes (colloquially known as "spot zoning") were more readily available than elsewhere in Michigan.[21] Although awareness of and opposition to siting of hazardous/industrial facilities near residential areas increased throughout the 1970s, "the emergence of a coherent grassroots people of color movement (i.e., the environmental justice movement) does not appear to have occurred until the late 1980s and early 1990s, suggesting that minority and poor communities were initially politically vulnerable to waste facility sitings."[22]

Solutions to these issues have been slow to develop, as recognized by Tina Lam in 2010:

> Many states have environmental justice policies to avoid concentrating industry in poor and minority neighborhoods. Michigan only now is developing such a policy, which would allow residents of poor and minority neighborhoods already saddled with industrial plants to have input on permits for polluters.[23]

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[15] *Id*. at 51.
[16] *Id*. at 81.
[17] *Id*. at 77.
[18] *Id*. at 80.
[19] Robin Saha and Paul Mohai, Historical Context & Hazardous Waste Facility Siting: Understanding Temporal Patterns in Michigan, 53 Social Problems 618, 618-19 (Oxford Univ Press 2005) (available online from Environmental Studies Faculty Publications).
[20] *Id*. at 621 (*citing* Sugrue, *supra* note 3).
[21] *Id*.
[22] *Id*. at 623 (internal citations omitted).
[23] Lam, 48217: Life in Michigan's Most Polluted ZIP Code, *Detroit Free Press* (Jun 20, 2010).

The absence of enforcement provisions in most environmental justice pronouncements compounds these problems.[24] In the past, environmental justice advocates used Title VI to support a private cause of action based on disparate impacts of siting and permitting decisions.[25] Section 601 of Title VI states that "no person shall, 'on the ground of race, color or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity' covered by Title VI."[26] However, as a result of the United States Supreme Court's ruling in *Alexander v. Sandoval*, plaintiffs can no longer use Title VI to support a private right of action based on racially disparate impacts.[27] Instead, potential plaintiffs must establish intentional discriminatory conduct in the federally funded activity or program.[28] *Sandoval* severely limited the ability of poor and minority citizens in Detroit to challenge zoning and siting decisions in their community.

B. Petcoke—What is it & How Did it Get Here?

Detroit's racial and environmental tensions coalesced when a black, dusty pile of petcoke appeared in May of 2012.[29] Petcoke is a byproduct of processing heavy tar sands oil, or bitumen, into useable fuel.[30] Bitumen, which has a texture similar to cake batter, must be extensively processed before it can be used.[31] Existing refineries have begun extensive government-subsidized retrofitting to accommodate bitumen processing and petcoke production. First, refineries heat bitumen to temperatures up to 900 degrees Fahrenheit to stimulate a reaction whereby lighter, usable oil can be extracted.[32] This process, also known as petroleum coking, is extremely energy intensive.[33] During the coking process, about 30% of the original volume collects as a solid on the sides and bottom of the coking drum, which resembles a large stew pot.[34] This solid, petcoke, has a carbon content approaching 90% and retains many

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[24] *See e.g.* Federal Highway Administration Order 6640.23A, which expressly provides:

> [T]his directive is limited to improving the internal management of the FHWA and is not intended to, nor does it, create any rights, benefits, or trust responsibility, substantive or procedural, enforceable at law or equity, by a party against the FHWA, its officers, or any person. This directive should not be construed to create any right to judicial review involving the compliance or noncompliance with this directive by FHWA, its officers, or any other person.

[25] *See e.g. South Camden Citizens in Action v. New Jersey Department of Environmental Protection*, 145 F. Supp. 2d 446 (D.N.J. 2001); *Chester Residents Concerned for Quality Living v. Seif*, 132 F3d 925, 929 (3d Cir 1997), *vacated as moot*, 119 S Ct 22 (1998).

[26] *Alexander v. Sandoval*, 532 U.S. 275, 278 (2001) (*quoting* 42 U.S.C. § 2000d).

[27] *Id*. at 292.

[28] *Id*.

[29] Anthony Paris, personal communication, Nov 26, 2013.

[30] Genevieve Walker, U.S. Department of State, Final Supplemental Environmental Impact Statement for the Keystone XL Project—Executive Summary, U.S. Department of State ES-6, ES-15 (Jan 2014).

[31] Jim Morris & Chris Hamby, American Refineries Getting Ready for Dirty Tar Sands Oil, Mother Jones 2 (Oct 31, 2012).

[32] Lorne Stockman, Petroleum Coke: The Coal Hiding in the Tar Sands, Oil Change International (Jan 2013), at 28.

[33] *Id.* at 29.

[34] *Id*.

of bitumen's impurities in even higher concentrations.[35] Next, the bitumen must be hydrogenated, which requires heating the liquid to upwards of 1,300 degrees Fahrenheit.[36]

Although the U.S. Environmental Protection Agency (EPA) began declining new permits for petcoke burning facilities in 2013, it does not prevent companies from producing, storing, and shipping petcoke for sale overseas.[37] India and China represent the primary markets for petcoke.[38] Between January 2011 and September 2012, the United States exported an estimated 8.6 million tons of petcoke to China, primarily for use in coal-fired power plants.[39] In 2012, competitive markets also existed in Japan, Mexico, and Turkey.[40] Producers sell petcoke at a deep discount from traditional coal due to subsidies and tax incentives that compensate for its higher production costs.[41] Petcoke's lower price makes it an attractive alternative to traditional coal.[42]

The Detroit petcoke pile was the result of a recent refinery expansion—Marathon's Detroit Heavy Oil Upgrade Project (DHOUP)—designed to facilitate processing of heavy tar sands oil from Alberta, Canada.[43] Similar refinery upgrades may become more common in the future if the proposed Keystone XL pipeline gains approval, since the pipeline (and others like it) would facilitate the development of heavy crude oil from western Canada, and refinery capacity for these heavy oil sands will be necessary throughout the United States.[44] The burden of shouldering the adverse impacts of this anticipated increase in petcoke production would likely fall most heavily on communities like Detroit, with the right mix of low property values, convenient industrial location, and only low-income residential neighborhoods in the vicinity.[45]

II. Background of Petcoke Production and Storage in Detroit

A. Marathon's Detroit Heavy Oil Upgrade Project

Marathon Petroleum projects that the $2.2 billion DHOUP project will result in $230 million in Detroit revenues through 2030, 135 full-time jobs, and 120,000 additional tonnage of production capacity in Marathon's Southwest Detroit refinery.[46] In 2012, Marathon installed two 120-foot long "coker drums" at its 100,000 barrel-per-day (bpd) Detroit site.[47] The project

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[35] *Id*. at 10.
[36] *Id*.
[37] Ian Austen, A Black Mound of Canadian Oil Waste is Rising Over Detroit, *NY Times* (May 17, 2013).
[38] Stockman, *supra* note 32, at 40.
[39] *Id*. (*quoting* U.S. Energy Info Admin, U.S. Exports to China of Petroleum Coke.
[40] Anthony Andrews & Richard K. Lattanzio, Petroleum Coke: Industry & Environmental Issues, (Congressional Research Service Oct 29, 2013), at 7.
[41] Stockman, *supra* note 32, at 32.
[42] *Id*. at 41.
[43] Marathon Petroleum Co., Michigan Refining Division, (last visited Jun 9, 2015).
[44] Walker, *supra* note 30, at ES-1.
[45] John D. Graham, *et al.*, Who Lives Near Coke Plants & Oil Refineries? An Exploration of the Environmental Inequity Hypothesis, 19 Risk Analysis 171 (1999), at 175-176.
[46] Morris & Hamby, *supra* note 31.
[47] International Brotherhood of Boilermakers, L-169 Installs Twin 550-Ton Coker Drums (May 13, 1999), at 1 (last accessed on Jun 9, 2015).

stemmed from a $175 million dollar, 20-year tax abatement awarded by the City of Detroit in 2007.[48] DHOUP enables Marathon to "thermally convert and upgrade heavy Canadian crude oil into higher quality products such as gasoline [and] diesel" thereby producing petcoke.[49] The project will increase daily oil production capacity by 18,000 bpd.[50] Bitumen processing will result in about 1,720 tons per day (tpd) of petcoke, resulting around 600,000 tons annually.[51]

This heavy crude processing offsets high environmental and economic costs with "the discounted price of low quality tar sands bitumen from Canada" and failure to account for heightened carbon dioxide emissions.[52] These factors create discontinuity between the price and true cost of heavy tar sands oil. One alternative would be to use "levelized cost of energy" (LCOE) to compare the true cost of various energy production processes, including maintenance, processing and externalized costs.[53] LCOE would account for subsidies ranging from tax incentives to environmental externalities that presently result in "underpriced energy, market distortions, and reduced competitiveness."[54] Marathon received a personal property tax exemption from the State of Michigan valued at $13.6 million based on their characterization of the cokers as "pollution control equipment."[55] Public Act 451 of 1994, Part 59[56] allows an exemption for equipment "installed or acquired for the *primary* purpose of controlling or disposing of air pollution."[57] This explicitly excludes "any equipment acquired or installed for the benefit of . . . a business."[58] To the extent that the equipment serves a mixed business and pollution control purpose:

> the value to be exempt from property taxation . . . shall be the cost of the facility entitled to exemption reduced by the gross annual commercial or productive value derived from any materials captured or recovered.[59]

Although the precise amount has not been released, petcoke represents an international export commodity with a market price.[60] Marathon characterizes petcoke as a commercial product on their website; however, the Michigan State Tax Commission (MSTC) declined to offset the

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[48] Morris & Hamby, *supra* note 31, at 4.
[49] *L-169*, *supra* note 47, at 2.
[50] Curt Guyette, Crude Awakening, *Detroit Metro Times* (Jul 14, 2010).
[51] Stockman, *supra* note 35, at 26.
[52] *Id*. at 31.
[53] Stanley Pruss, The Case for Clean Energy Technology Manufacturing: Ten Steps Business & Industry Must Take to Optimize Opportunities in the Emerging Clean Energy Economy, 18 Michigan Telecomm Tech L Rev 349 (2011), at 352 n 8.
[54] *Id*. at 362.
[55] Michigan Department of Treasury, Air Pollution Control Exemption (Part 59, PA 451 of 1994) Activity for 2013 (Feb 11, 2014), at 15.
[56] PA 451 of 1994, Part 59 (codified at MCL 324.5901 *et seq.*) applies to air pollution control equipment, a similar enactment PA 451 of 1994, Part 37 (codified at MCL 324.3701 *et seq.*) allows a similar tax exemption for water pollution control equipment.
[57] MDEQ, Tax Exemptions for Air Pollution Control 6 (Aug 2009) (emphasis added).
[58] *Id*. at 6.
[59] MDEQ, Frequently Asked Questions: Air Pollution Control Exemptions (Aug 31, 2009), at 4.
[60] Attempts to ascertain the amount of profit made on petcoke have been unsuccessful.

exemption for recoverable value.[61] Petcoke can be used for a variety of purposes ranging from traditional fuel applications to use in smelting and as electrodes.[62] Michigan's Pollution Control Exemption regulations do not provide any process by which MSTC independently confirms the values reported on applications or verifies the equipment's purpose.[63]

Marathon euphemistically notes that it stores petcoke throughout the United States, but the story ends when the petcoke is "loaded onto an ocean going vessel."[64] Marathon's pollution control exemption certificate does not reflect profits earned selling petcoke on the international market. The fact that Marathon has not taken the required adjustment means that they are, in effect, receiving a larger than deserved tax subsidy for continued bitumen processing.

This subsidy and others allow refineries to sell petcoke at a discounted price, undercutting traditional coal and increasing its attractiveness as a fuel source in environmentally lax developing nations. A 2013 Congressional Report estimated that "[r]ecently U.S. petcoke price[s] have ranged from 67% to 68% of coal prices."[65] Its discounted price allows petcoke producers, largely petroleum refineries, to outcompete traditional coal. Further, lower prices also "reduce the incentive to retire older, inefficient, coal-using production processes and discourage additional investment in the energy efficiency of new and existing coal using enterprises."[66] Petcoke production not only perpetuates reliance on heavy crude imports, but also supports continued global reliance on coal-powered industrial processes.

Southwest Detroit centers around the 48217 zip code, which includes Marathon's refinery, Severstal Steel, the EES Coke Battery (located on Zug Island), the coal-fired River Rouge power plant owned by DTE Energy, the Detroit Wastewater Treatment Plant, and heavy mobile source pollution from regional thoroughfares such as I-75, M-39 and I-94, earning the area the distinction of being "the most polluted areas in the state of Michigan."[67] Surrounding these sites, "a corridor that runs along I-75 extending east to the shoreline border was recently designated to nonattainment with the new 2010 standard" for sulphur dioxide, a listed

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[61] Michigan Department of Treasury, Air Pollution Control Exemption (Part 59, PA 451 of 1994) Activity for 2012 (Jan 17, 2013).
[62] Marathon Petroleum Corporation, Petroleum Coke (last visited Jun 9, 2015).
[63] See generally MDEQ, *supra* note 57. The City of River Rouge challenged 15 amended tax exemption certificates under Part 59 for air pollution control equipment, in part challenging "whether the STC followed proper procedures before issuing five other new or amended exemption certifications." *City of River Rouge v. EES Coke Battery Co., LLC*, Docket No. 314789 (Michigan Court of Appeals, Dec 9, 2014) (unpublished). The City's request for publication of the court's decision was denied by the Court of Appeals on March 16, 2015, and the City filed an application for leave to appeal on March 31, 2015.
[64] Marathon Petroleum, *supra* note 62.
[65] Andrews & Lattanzio, *supra* note 40, at 6.
[66] Thomas M. Power, The Greenhouse Gas Impact of Exporting Coal From the West Coast: An Economic Analysis, (Sightline Institute, Feb 2012).
[67] Keith Matheny, Sierra Club: Pollution Human Rights Abuse to Poor, Minorities in Metro Detroit, *Detroit Free Press* (Apr 4, 2013), (quoting Sierra Club activist, Rhonda Anderson).

pollutant under the National Ambient Air Quality Standards (NAAQS).[68] Existing environmental injustices, lax industrial zoning, and continued failure to enforce permits made Southwest Detroit a prime candidate for petcoke production.

Heavy crude oil processing in Detroit also poses environmental, traditional nuisance, economic and other incidental consequences for which applicable zoning controls and permitting procedures provide very little protection. For example, alongside the DHOUP, Marathon engaged in a massive homeowner buyout in the heavily-burdened Oakwood Heights neighborhood, ostensibly to create a buffer zone around the refinery.[69] Marathon made offers of at least $40,000 on 258 homes, with an average appraisal value of $16,000.[70] Although the offers exceeded market value, this amount may not compensate homeowners for the benefits of home ownership or enable them to purchase comparably sized homes in a less polluted community.

B. Environmental Impacts of Petcoke Production

Bitumen processing results in a variety of environmental externalities, primary and secondary impacts not accounted for in its artificially low market price.[71] In addition to the cost of refining, these externalities include nuisance and potential health hazards to nearby communities. Reports commissioned by the American Petroleum Institute indicate that petcoke is not carcinogenic, however, airborne exposure to petcoke can cause respiratory illnesses (bronchitis, asthma, and lung damage), skin and eye irritation, and even premature death.[72] Even a study filed with the EPA by the American Petroleum Institute (API) concluded that "[d]ue to the physical-chemical characteristics of coke," inhalation represented "the route of exposure with the greatest potential to demonstrate hazard."[73] Although comprehensive, independent studies have yet to be conducted, former Michigan Congressman, now Senator Gary Peters introduced federal legislation in the last Congress to conduct a complete health study of petcoke, while former Senator Carl Levin introduced a corresponding bill in the United States Senate.[74]

The storage of petcoke in outdoor, uncovered piles increases airborne exposure and causes a public nuisance known as fugitive dust.[75] Under Rule 336.1106(k) of Michigan's Air Pollution Control Rules, fugitive dust is defined as "particulate matter which can originate from indoor or outdoor industrial or commercial processes, activities, or operations and is emitted into the

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[68] MDEQ, Michigan NAAQS Attainment Status (Jan 24, 2014).
[69] Associated Press, Marathon Buys 2/3 of Homes Near $2.2B Oil Project in Detroit, Michigan Radio (Apr 7, 2013).
[70] *Id*.
[71] Organisation for Economic Co-operation & Development, Glossary of Statistical Terms—Environmental Externalities (Mar 4, 2003).
[72] MDEQ, Managing Fugitive Dust, § 3.0 (Mar 2014).
[73] API, Petroleum Coke Category Analysis & Hazard Characterization, at iii.
[74] 2013 H.R. 2298, 113 H.R. 2298—"Petcoke Transparency and Public Health Study Act," and 2013 S. 1388, 113 S. 1388. That proposed legislation died in Congress and it appears no such legislation has been proposed in the 114th Congress as of the time of this article's publication.
[75] Michigan Air Pollution Control Rules R 336.1106(k); *see* MDEQ, Dust & Fallout.

outer air through building openings and general exhaust ventilation."[76] General bulk material storage creates fugitive dust during material transfer, site maintenance and other incidental activities,[77] while improper loading and transportation of the material spreads fugitive dust beyond the immediate vicinity. Under Rule 336.1901, a person cannot cause or permit the emission of an air contaminant, alone or in relation with others, in quantities that cause "injurious effects to human health or safety . . . or property," or "unreasonable interference with the comfortable enjoyment of life and property."[78] Moreover, Rule 372 requires that sources implement control methods ranging from complete enclosure to spraying the surface with water or a dust-suppressant compound, as well as taking certain precautions during loading and unloading.[79]

The Michigan Department of Environmental Quality (MDEQ) informed the site operator, Detroit Bulk Storage (DBS), that it must submit an appropriate fugitive dust control plan on March 19, 2013—almost a full year after DBS began storing petcoke.[80] Meanwhile, local residents had reported fugitive dust on building exteriors and inside nearby homes and businesses.[81] According to MDEQ, "[c]onstant soiling can lead to adverse effects on property and land values in areas where fugitive dust generation is a known problem."[82] A video taken by a Windsor resident during a windy period on July 27, 2013, shows the impact of high wind before implementation of the fugitive dust plan.[83] Failure to timely implement a fugitive dust plan was only the most obvious detrimental impact of the petcoke storage pile.

C. Detroit's Pile as a Lens to View Regulatory Inadequacies

While most environmental externalities, such as global climate change, are invisible or widely dispersed, the pile of petcoke in Detroit brought together a number of environmental justice issues and raised their profile to center stage. Residents and the media could not avoid noticing the enormous black pile, "several blocks long and building stories high" when it appeared "along the Detroit River . . . stored in the open, and [not] approved through any permitting process."[84] The pile became a rallying point for Detroit's environmental justice community, and something of a national symbol of the unspoken consequences of increasing reliance on tar sands bitumen.

The uproar over the petcoke pile brought to light significant incompatibilities between the applicable permitting and regulatory procedures at the state and local levels, and the human health, environmental, and property-related issues pertaining to heavy crude oil and petcoke.

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[76] Managing Fugitive Dust, *supra* note 72, at 1.
[77] *Id*. at 2, table 1.
[78] Mich. Admin. Code R. 336.1901(a)–(b).
[79] Mich. Admin. Code R. 336.1372(2)(b).
[80] Letter from Andrew Hartz, District Coordinator, Southeast Michigan DEQ Office, to Noel Frye, Vice President, DBS at 1 (Mar 19, 2013) (on file with author).
[81] Paris, *supra* note 29.
[82] Managing Fugitive Dust, *supra* note 72, at 3.
[83] *See* 3860remerson video, Petcoke Cloud From Storm July 27 13.
[84] Sarah Cwiek, Growing Outrage & Calls for Action on Detroit Pet Coke Piles, Michigan Radio (May 29, 2013).

Although petcoke contains several compounds recognized as hazardous, regulatory authorities concluded that petcoke falls only within generalized outdoor bulk storage permits due to its status as a commodity.[85] This simultaneously allows its producers and the site operator to benefit from its non-commodity status (as an industrial byproduct) for tax purposes, and its commodity status for storage purposes, essentially enjoying the best of both worlds.

Storing petcoke on private property through a third-party storage agent also illuminated a significant regulatory loophole. Had the petcoke been stored on Marathon's premises, stricter regulations would have applied due to Marathon's status as a petroleum refinery, as well as its petroleum storage capacity.[86] Sources categorized as "major sources" must account for fugitive dust when quantifying their emissions for Clean Air Act (CAA) purposes.[87] Where an industrial source falls into one of the specially noted categories, "it must quantify its fugitive dust emissions and include them in its [potential to emit] (air pollutants) calculations."[88] This triggers a requirement that major sources of air pollutants include potential fugitive dust emissions in their Renewable Operating Permits (ROP), issued under Title V of the CAA's 1990 Amendments.[89] The pile's effects, however, would have been almost identical in both locations.

No uniform regulatory scheme governing petcoke production and storage exists in Michigan. Former State Representative Rashida Tlaib, who represented 48217, introduced legislation on June 11, 2013, that would have required petcoke piles to be enclosed.[90] Representative Tlaib's proposal, introduced after an independent study by the Ecology Center in Ann Arbor, would also have required storm water discharge permits to prevent runoff from reaching the Detroit River.[91] The Ecology Center study found that samples contained toxic metals including selenium and vanadium, which the Center considered to be "of concern in runoff and dust."[92] Other states have adopted progressive and unified regulatory regimes to deal with the issues presented by petcoke production and storage.

III. Michigan's Existing Regulatory Framework Fails to Address Petcoke's Impacts

Petcoke production stands to increase nationally in step with any increased use of and reliance on tar sands oil. Both the United States and the State of Michigan should consider the environmental externalities discussed herein, however, when contemplating future energy policies. If these types of adverse impacts continue unabated, more comprehensive regulations will be necessary to minimize the localized burden on historically disadvantaged communities like Southwest Detroit. For now, the patchwork of applicable environmental regulations in

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[85] *Id*.
[86] Managing Fugitive Dust, *supra* note 72, at 6.
[87] *Id*. at 5.
[88] *Id*.
[89] *Id*. at 4.
[90] Lam, *supra* note 23; United Steelworkers, USW Local 1299, Rashida H. Tlaib ("In June, I introduced House Bill 4820 that requires all pet coke to be safely covered and secured during storage and transportation").
[91] *Tlaib supra* note 90; *see* 2013 House Bill 4820.
[92] Ecology Center, Ecology Center Testis Samples From Pet-Coke Mountain Rising in Detroit (Jun 2013). See also House Democrats, Petroleum Coke Analysis.

Michigan suggests that some impacts may remain completely unaddressed; therefore, a more comprehensive approach could ensure that Michigan properly accounts for and minimizes all potential adverse impacts.

A. Applicable Federal Regulations

Each phase of the lifecycle of petcoke—from production, to transport, storage, and use—implicates a variety of environmental concerns. Production can result in air quality violations; transportation and storage can result in fugitive dust and water quality concerns; and use of petcoke as a fuel source may result in heightened emissions of concentrated industrial toxics and greenhouse gases.[93] Although some federal legislation has been proposed, states and localities most often regulate petcoke, primarily through local land use restrictions.[94] A unified regulatory approach, however, would ensure that all interested parties understand the applicable requirements at each phase of the lifecycle.

Since available research has deemed petcoke inert in most ambient conditions, it does not qualify for federal regulation under the Resource Conservation and Recovery Act (RCRA) or the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).[95] The EPA's final rule on petroleum refining process waste concluded that:

> [t]he coke product itself may best be characterized as a *co-product* of the coking operation, while the principal products are the light ends that are returned to the refining process. Thus, the Agency is affirming that the conventional coking operation is a production process . . . and petcoke is a *legitimate fuel product*.[96]

By classifying petcoke as a fuel product, the EPA explicitly excludes it from RCRA, which applies only to waste products.[97] Where a byproduct is later used again in the industrial process, it is not considered "discarded" and does not qualify as "solid waste."[98] In *American Mining Congress*, the court concluded that applying the "discarded material" inclusion to materials that were used later in the industrial process strained the ordinary understanding of waste product.[99] CERCLA does not apply because it specifically excludes "petroleum, including crude oil or any fraction thereof which [sic] is not otherwise specifically listed or designated as a hazardous substance."[100] Since, existing research has determined petcoke to be non-hazardous, federal regulations address petcoke only to the extent that its effects fall within effects-based statutes such as the Clean Air and Clean Water Acts.

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[93] Andrews & Lattanzio, *supra* note 40, at 1.
[94] *Id.*, at Summary.
[95] *Id*.
[96] EPA, *Final rule: hazardous waste management system; identification and listing of hazardous waste; petroleum refining process wastes; land disposal restrictions for newly identified wastes; and CERCLA hazardous substance designation and reportable quantities*, 63 Fed. Reg. 42110, 42121 (Aug 6, 1998) (emphasis added).
[97] *American Mining Congress v. United States EPA*, 824 F.2d 1177, 1192 (D.C. Cir. 1987) (citing RCRA § 1004(5)).
[98] *Id*.
[99] *Id*. *See also API v. EPA*, 216 F.3d 50 (U.S. App. D.C. Cir. 2000).
[100] The definition of the term "hazardous substance" in Section 101 (14) of CERCLA is codified at 42 U.S.C. 9601(14).

1. Air Quality

The Clean Air Act "calls for states and EPA to solve multiple air pollution problems through programs based on the latest science and technology information" as applied to both stationary and mobile sources.[101] The EPA identifies various air pollutants based on potential impacts to human health and the environment and then formulates National Ambient Air Quality Standards under Title I.[102] Listed pollutants currently include sulfur dioxide, particulate matter, nitrogen dioxide, carbon monoxide, ozone, and lead.[103] Such technology-based standards do not, however, take into account environmental justice issues or proximity to other pollution sources, to the extent they do not interfere with permit attainment.[104]

States implement the NAAQS through State Implementation Plans, which require each state to designate areas as attainment, nonattainment, or unclassifiable for each listed pollutant.[105] If an area is in attainment or unclassifiable for any listed pollutant, potential stationary sources must apply for a permit under the "Prevention of Significant Deterioration" program.[106] These permits require installation of "best available control technology" without reference to human or environmental outcomes.[107] Consequently, although the CAA identifies pollutants based on potential harm to human health, existing technology standards have little ongoing relationship with health impacts. Coverage gaps exist because the CAA not only excludes a multitude of pollutants but also relies on state implementation.

Although the EPA has not yet begun to formally regulate carbon dioxide, greenhouse gas regulations are an imminent component of ongoing air quality efforts.[108] Promulgation of a carbon dioxide emission cap or similar control would greatly impact the cost of petcoke production and fossil fuels. Petcoke's very high carbon content causes it to generate more greenhouse gases per unit of heat than many varieties of conventional coal.[109] Coal's higher hydrogen content means that its emissions include a higher proportion of water vapor than petcoke.[110] Petcoke can also negatively impact attainment of particulate matter standards due to fugitive dust.

2. Water Quality

Petcoke storage can interfere with achievement of water quality standards when storage sites are close to storm sewer systems or waterways. If a storage site qualifies as a point source discharger under the Clean Water Act (CWA), it may be regulated through permits issued under

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[101] EPA, Air Pollution & the Clean Air Act (EPA, Aug 15, 2013).
[102] EPA, National Ambient Air Quality Standards (NAAQS) (EPA, Dec 14, 2012).
[103] Clean Air Handbook 125 (J Domike & A Zacaroli eds, 2d ed 2011).
[104] See Clean Air Act of 1990, 42 U.S.C. § 7409 (2008).
[105] 42 U.S.C. § 7410 (2008).
[106] 42 U.S.C. §§ 7470-7492.
[107] 42 U.S.C. § 7475(a)(4).
[108] EPA, Carbon Pollution Standards: Regulatory Actions (Sep 30, 2013).
[109] Andrews & Lattanzio, *supra* note 40, at 10.
[110] *Id*.

provisions of the National Pollutant Discharge Elimination System (NPDES).[111] In *Rapanos v. United States*, the United States Supreme Court indicated that the CWA:

> defines 'point source' as 'any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure (or) container . . . from which pollutants are or may be discharged.'[112]

Many states administer NPDES independently, following the EPA's approval of State Implementation Plans under section 402 of the CWA.[113] In fact, the EPA encourages states to take responsibility, with the result that "the vast majority of industrial and other facilities obtain NPDES permit coverage for storm water discharge through" state permits.[114] Although "[p]etroleum refining facilities are one of several categories . . . specifically covered under the CWA storm water regulatory program," petcoke storage on independently owned parcels avoids these requirements.[115] So although Detroit's petcoke pile posed a threat to water quality due to its proximity to the Detroit River and the possibility for storm water runoff during rain events, the enforcement of water quality standards, while ostensibly determined by the EPA, relies on implementation at the state level.[116]

B. Michigan Law

While charged with enforcement of the Clean Air Act, the DEQ "interprets its authority as limited to a narrow analysis of its permitting standards."[117] The Department "believes that it cannot legally deny a permit (1) because of the failure to conduct an environmental justice analysis, or (2) if an analysis that was voluntarily completed demonstrates there will be environmental justice problems for the surrounding communities."[118] Failure to address environmental injustice at this level has resulted in heavily concentrated negative environmental impacts in Detroit.

In 2010, the University of Michigan collected Toxic Release Inventory (TRI) data from 2006 and used air modeling to determine a "toxic burden score" for Michigan zip codes.[119] The average score for zip codes statewide was 56, however, Southwest Detroit's 48217—a community

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[111] *Rapanos v. United States*, 547 U.S. 715, 735 (2006).
[112] *Id*. at 735 (*citing* 33 U.S.C. § 1362(14)).
[113] See 33 U.S.C. § 1251 *et seq.*
[114] Andrews & Lattanzio, *supra* note 40, at 14.
[115] *Id*.
[116] A number of public documents submitted to and reviewed by the DEQ with respect to the DBS petcoke pile, including the proposed stormwater management plan, can be found at the following link: Detroit Bulk Storage, Inc., Permit to Install Application No. 189-13.
[117] Annise K. Maguire, Permitting Under the Clean Air Act: How Current Standards Impose Obstacles to Achieving Environmental Justice, 14 Mich J Race & L 255, 268 (2009).
[118] *Id*., citing telephone interview with Bryce Feighner, Chemical Process Unit Supervisor, MDEQ, in Lansing, MI (Mar 31, 2008) (date of interview approximated).
[119] Tina Lam & Kristi Tanner-White, Database: Toxic ZIP Code Rankings (*Detroit Free Press*, Jun 20, 2010).

inhabited primarily by people of color—had a toxic burden score of 2,576.[120] The addition of petcoke production at both Marathon's refinery and Detroit Edison's EES Coke Battery in this zip code would clearly magnify the cumulative burden on this community. Other threats on the horizon include proposed freeway expansion projects on both I-75 and I-94, and a new Detroit River International Crossing with an associated truck plaza and logistics development.[121]

Fugitive dust also factors into Michigan's CAA implementation, due to its impact on attainment of CAA standards for particulate matter.[122] The improper storage of Detroit's petcoke pile caused the residents living in the vicinity of the pile to experience heightened particulate matter pollution.[123] Petcoke dust prevented residents from opening apartment windows and disrupted local businesses such as Green Dot Stables, a thriving bar and restaurant.[124] Although petcoke is generally considered inert, "[c]ases of repeated-dose and chronic inhalation of fugitive dust . . . do appear associated with respiratory inflammation."[125] When petcoke is burned, impacts include "the release of common pollutants, hazardous substances, and high levels of the greenhouse gas, carbon dioxide."[126] The combined impacts of existing particulate pollution and fugitive dust from petcoke represent a substantial threat to residents. Community concerns about fugitive dust and storm water runoff most commonly develop in states that lack "sufficient mitigation and abatement."[127] Therefore, as a result of the foregoing, if Michigan intends to continue expanding petcoke processing and storage capacity in a manner that addresses public health and environmental concerns, it should develop a regulatory scheme for all stages of the petcoke lifecycle.

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[120] *Id*.

[121] *See generally* Michigan Department of Transportation (MDOT), I-75 Modernization Project; MDOT, Projects & Programs: Overview; Detroit River International Crossing/New International Trade Crossing, Partnership Border Study.

[122] Andrews & Lattanzio, *supra* note 40, at 14-15.

[123] Paris, *supra* note 27. As of the date of this article, the EPA reports that the area bounded by Michigan Avenue and Grand River to the north, the Detroit River to the east, I-94 to the west and the Rouge River south of Zug Island to the south ranks in the 96th percentile statewide for PM 2.5 pollution levels, and 97th percentile for traffic proximity. The same area ranks in the 89th percentile statewide for minority population and 92nd percentile for low-income residents. To access the report visit www2.epa.gov/ejscreen, click Launch EJSCREEN, select Report on Area, and follow the borders described above (last visited Jun 10, 2015).

[124] *Id*.

[125] Andrews & Lattanzio, *supra* note 40, at summary. Environmental toxicity studies referenced by the EPA analysis include Wildlife International, Ltd., Petcoke: A 96-Hour Static-Renewal Acute Toxicity Test with the Fathead Minnow (Pimephales promelas), Final Report, Project No. 472A-1134, 2006; Wildlife International, Ltd., Petcoke: A 48-Hour Static-Renewal Acute Immobilisation Test with the Cladocern (Daphnia magna), Final Report, Project No. 472A-112, 2006; Wildlife International, Ltd., Petcoke: A 96-Hour Toxicity Test with the Freshwater Alga (Selenastrum capricornutum), Final Report, Project No. 472A-114, 2006; Wildlife International, Ltd., Petcoke: A 21-Day Toxicity Test to Determine the Effects of the Test Substance on Seedling Emergence and Growth of Terrestrial Plants, Final Report, Project No. 472-102, 2006; Wildlife International, Ltd., Petcoke: A 14-Day Acute Toxicity Test with the Earthworm (Eisenia fetida), Final Report, Project No. 472-101, 2006.

[126] Andrews & Lattanzio, *supra* note 40, at summary.

[127] *Id*. at 16.

The petcoke pile was initially situated on a property located at 115 Rosa Parks Boulevard in Detroit.[128] Although the property was zoned industrial, it abuts the southernmost portion of Detroit's Riverwalk, an area targeted for recreational development.[129] This juxtaposition between planned uses and zoning characterizations resulted in a use of property that, while within the parameters of the zoning district, was out of character with the rest of the neighborhood. DBS later sought to locate the petcoke pile on its bulk storage property in River Rouge, a nearby downriver community heavily burdened by some of the same industrial uses,[130] but also with numerous bars, restaurants, apartments and single-family homes.[131] For example, DBS' storage property lies within one a mile of Belanger Park, a riverside park commonly used for birthday parties, family reunions, fishing and boating.[132] MDEQ announced their intent to deny DBS' permit to install at this location, based on the failure to propose any improved storage methods.[133] Although DBS has since removed the pile, Detroit's culture of permissive zoning has not been corrected.

IV. Other State and Local Regulatory Practices

Most states do not specifically regulate petcoke, but rather, like Michigan, control its effects through existing statutes.[134] Several states, including California, have implemented comprehensive regulations tailored to petcoke storage and transportation.[135] The City of Chicago, after experiencing almost the same impacts as Detroit, has considered a number of proposed regulatory regimes ranging from an outright ban to comprehensive storage and transport requirements similar to those in California.

A. California

California represents a key destination for crude oil imports and petcoke destined for sale in China and India. In 2013, a survey by the U.S. Library of Congress concluded that California was the only state to directly manage environmental impacts at each stage in petcoke's lifecycle.[136] California's regulations include Health and Safety Code Section 40459, which mandates enclosed storage prior to shipment.[137] California further requires petcoke to be loaded and transported "using safety procedures, specialized equipment, and a chemical surfactant" to control air pollution,[138] and also requires transporters to cover the material to "prevent materials from blowing, spilling, or otherwise escaping from the vehicle."[139] Since these requirements appear in the vehicle code, law enforcement may pull over and issue citations to

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[128] City of Detroit, Board of Zoning Appeals Meeting Docket, 60-13 (Feb 11, 2014).
[129] Board of Zoning Appeals Meeting, Detroit, Feb 11, 2014.
[130] Detroit Bulk Storage, Permit to Install Application (Dec 17, 2013); *see generally* MDEQ, Detroit Bulk Storage, Inc. Permit to Install Application No. 189-13.
[131] These uses were observed by the author on a March 2013 visit to the proposed River Rouge site.
[132] City of River Rouge, Parks & Recreation: Belanger Park (last visited Jun 10, 2015).
[133] MDEQ, Notice of Air Pollution Comment Period & Public Hearing.
[134] *Id*. at 11.
[135] *Id*.
[136] Andrews & Lattanzio, *supra* note 40, at 11 n 23.
[137] California Health & Safety Code § 40459 (last visited Jun 10, 2015).
[138] California Vehicle Code § 23114(e)(3) (last viewed Jun 10, 2015).
[139] *Id*.

violators, facilitating enforcement. By setting some basic, uniform standards for transport, California ensures uniform transport behavior throughout the State.

California also recognizes that more heavily industrial and transport-centered areas may need flexibility to set stricter requirements. Due to California's involvement in international petcoke shipment, local air quality management districts (AQMDs) with large ports have a separate set of handling requirements, determined independently by each AQMD.[140] These commonly include limits or prohibitions on open storage.[141] California's Water Code § 13263.3(d) requires a party to submit a pollution prevention plan if the site is located within a certain proximity of state waterways.[142] California's decision to differentiate between large port AQMDs and others allows flexibility to meet environmental goals in heavily burdened areas. The City of Detroit would likely qualify as an AQMD with significant trade activity and industrial products storage.

B. City of Chicago

In the spring of 2014, the City of Chicago began taking a number of steps to improve its stance on petcoke storage and production. Chicago's regulatory inadequacies came to light in 2013, when a large petcoke pile was discovered in the City. Although Chicago attempted to control its effects through existing regulations, Mayor Rahm Emanuel determined that specifically tailored requirements would be the best way to prevent future petcoke-related problems. According to Alderman Pope, who then represented the affected community, Chicago's proposed regulations represent some of the "most aggressive and comprehensive in the nation."[143] Proposed health department regulations require a fugitive dust plan for every site, installation of particulate matter monitors, and detailed record keeping.[144] Piles larger than 10,000 tons would be required to have (a) a full enclosure with (b) a permitted air pollution control system, (c) an impermeable base layer beneath the pile, and (d) either overlapping flaps or sliding doors to prevent fugitive dust when vehicles enter or leave the facility.[145] Moreover, Chicago's proposed regulations establish uniform minimum setback requirements for various land uses on surrounding properties (ranging from 100 feet from public ways to 660 feet from childcare facilities, schools, hospitals and outdoor recreation areas),[146] and also identify best practices for pile height, waterway protection, and wind barriers.[147] These proposed regulations further extend restrictions on transport, loading, and unloading of petcoke from/onto trains, barges, and trucks.[148] One of the benefits of regulating transportation and storage together is that it

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[140] American Fuel & Petrochemical Manufacturers, State Petroleum Coke Storage & Handling Facility Regulations, Examples of Three State-Specific Regulations (last viewed Jun 10, 2015).
[141] *Id*.
[142] *Id*.
[143] Kari Lydersen, In Chicago, Neighbors Say Petcoke Rules Full of Loopholes (*Midwest Energy News*, Jan 14, 2014).
[144] City of Chicago Department of Public Health, Art. II Air Pollution Control Proposed Rules & Regulations, For the Handling & Storage of Bulk Material Piles Dec 19, 2013). See also Managing Fugitive Dust, *supra* note 72, at § 3.0(3)
[145] *Id.* at § 3.0(4).
[146] *Id*. at § 3.0(5).
[147] *Id*.
[148] *Id*. at §§ 3.0(7)-(9).

ensures consistent controls and minimizes regulatory coverage gaps. All of the City's rules and regulations (existing and proposed) can be viewed on the City of Chicago's website.[149]

On March 13, 2014, the Chicago Department of Public Health (CDPH) passed comprehensive regulations in accord with most of Alderman Pope's proposals.[150] One key difference is that all piles, regardless of size, must be enclosed.[151] Regulated parties must complete construction of enclosure facilities within two years and submit monthly progress reports in the interim.[152] On March 5, 2013, Chicago introduced new zoning restrictions that "prohibit the establishment of new petcoke and coal facilities or the expansion of existing facilities."[153] Illinois Attorney General Lisa Madigan notes, "the City's regulations complement what we are seeking to do at the state level."[154] By clearly listing and identifying all applicable regulations that apply to petcoke transportation and storage, Chicago facilitates understanding and compliance.[155] This is in marked contrast to the situation in Detroit, as it became clear at a Detroit Zoning Board of Appeals Meeting held on February 11, 2014 that both the zoning board and the facility operator were unclear on what regulations applied.[156] The Chicago approach, however, streamlines enforcement by requiring standardized submissions by the regulated entities and centralizing information.

C. Moving Forward

The facts and circumstances surrounding Detroit's petcoke pile illuminated the ways in which industrial siting practices can perpetuate racial and economic differentials. At the same time, United States energy policy has reached a critical juncture in the debate over the future use of, and possible continued dependence on, fossil fuels. If companies based in Detroit are going to seek to continue producing petcoke, the City should enact regulatory controls to protect its residents from the localized impacts of that production.[157]

Regulatory structures for bulk materials storage like those developed in California and Chicago share a number of common features that would benefit Detroit. Since Detroit and Michigan share many of the features that make California a prime destination for heavy crude oil processing, these regulations are likely to transfer fairly well. First, both Chicago and California have well organized and easy to locate regulations. Due to the wide range of potential impacts, a well-organized regulatory structure is key to preventing regulatory omissions and facilitating transparent oversight of the activity. Ideally, such regulations can be indexed in one central

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[149] See City of Chicago, Environmental Rules & Regulations (last visited Jun 10, 2015).
[150] City of Chicago, Mayor Emanuel Announces Crack Down on Pet Coke Dust by Requiring Facilities to Fully Enclose Harmful Materials (Mar 13, 2014).
[151] *Id*.
[152] *Id*.
[153] *Id*.
[154] *Id*.
[155] See City of Chicago, *supra* note 149.
[156] Dave Battagello, Company Seeking to Put 10-Storey Piles on Riverfront—But Claims no Petcoke (*Windsor Star*, Feb 11, 2014).
[157] Broader impacts, such as increased greenhouse gas emissions and economic distortion of the global energy market, rely more on national policy decisions currently in progress.

location online and clearly labeled with whether they apply to general bulk storage, petroleum product storage, or both.

The controversy surrounding Detroit's petcoke pile reflected confusion not only on the part of DBS, but also amongst government staff and members of the general public, as shown during Zoning Board of Appeals meetings and public discourse. Improper storage of petcoke clearly poses water quality, air quality, common law nuisance, fugitive dust and public health impacts, all of which can and should be fully understood and addressed in a thoughtful and consistent manner. A more straightforward framework in Detroit would allow the companies engaged in bulk storage to more readily identify the steps necessary to achieve full compliance, while government agencies could also rely on this database in determining whether present conditions violate the regulations. Although certain specific impacts may require enforcement by different municipal agencies, consistency amongst the regulations will prevent regulatory gaps and loopholes; ultimately, the most successful strategy would unite a variety of targeted approaches to address all potential impacts.

V. Conclusion

Siting industrial and noxious uses in close proximity to Detroit's low-income and minority communities recalls an unfortunate tradition of environmental racism dating back to land-use decisions made over two hundred years. Detroit's experience with bulk storage of petcoke in close proximity to residential areas exposed a number of zoning and regulatory inadequacies that deprived many residents of a clean, healthful, and enjoyable neighborhood, and which will continue to do so if those inadequate policies are not carefully amended and revised.

Ongoing reliance on fossil fuels, especially those—like heavy tar sands oil—that require intensive processing, to meet our national energy needs is in conflict with a sustainable energy policy over the long term, and threatens global climate stability. Moreover, without a more organized regulatory approach at the local level for the shipment, processing, storage, and treatment of heavy tar sands oil and its byproducts, the negative impacts felt most heavily by the communities surrounding these activities will both multiply and magnify if national reliance on heavy crude imports increases. The regulatory efforts in this field undertaken in California and Chicago suggest that a unified framework to address the impacts related to the processing, storage, treatment and shipping of bulk storage of items such as petcoke should be implemented in order to provide regulatory certainty as well as to facilitate government oversight and the protection of vulnerable residential communities. Thoughtful policy revisions in Detroit could not only support the right of all citizens to a "safe, nurturing and productive" environment, regardless of race or income, but also begin to ensure that Detroit's environmental policies are in accord with a larger, positive vision for the City's future.