



CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

State of New Jersey
Highlands Water Protection and Planning Council
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JIM RILEE
Chairman

MARGARET NORDSTROM
Executive Director

MEETING AGENDA
Thursday, April 16, 2015 at 4pm

- CALL TO ORDER
- ROLL CALL
- OPEN PUBLIC MEETINGS ACT STATEMENT
- PLEDGE OF ALLEGIANCE
- APPROVAL OF MINUTES – March 19, 2015
- APPROVAL OF EXECUTIVE SESSION MINUTES – March 19, 2015
- CHAIRMAN'S REPORT (and Council Member Reports)
- EXECUTIVE DIRECTOR'S REPORT
- COMMITTEE REPORTS
 - **PERSONNEL COMMITTEE**
 - Report
 - **AUDIT COMMITTEE**
 - Report
 - CONSIDERATION OF RESOLUTION – Acceptance of Audit Report
 - **PLAN CONFORMANCE COMMITTEE**
 - Report & presentation
 - CONSIDERATION OF RESOLUTION – Petition for Plan Conformance, Township of Boonton, Morris County (*voting matter with public comment*)
 - **RMP UPDATE COMMITTEE**
 - Report
- **OTHER BUSINESS:**
 - CONSIDERATION OF RESOLUTION – Authority for Plan Conformance and Highlands Project Review (*voting matter with public comment*)
 - CONSIDERATION OF RESOLUTION – Election of Vice-Chair of the Highlands Council
 - CONSIDERATION OF RESOLUTION – Election of Treasurer of the Highlands Council

- CONSIDERATION OF RESOLUTION – Approval Of The Assignment Of The City Of Paterson’s Highlands Transfer Of Development Rights Receiving Zone Feasibility Grant To The County Of Passaic, State Of New Jersey (*voting matter with public comment*)
- EXECUTIVE SESSION
- PUBLIC COMMENTS (*to ensure ample time for all members of the public to comment, we will respectfully limit comments to three (3) minutes. Questions raised in this period may not be responded to at this time but, where feasible, will be followed up by the Council and its staff.*)
- ADJOURN

PUBLIC COMMENTS SUBMITTED AT HIGHLANDS
COUNCIL MEETING ON APRIL 16, 2015

RUTGERS

Edward J. Bloustein School
of Planning and Public Policy

Sustainability As Partner to Economic Regeneration: The Impact Assessment of the New Jersey State Plan



- **Economy**
- **Environment**
- **Infrastructure**
- **Community Life**
- **Intergovernmental
Coordination**

Prepared by:

Robert W. Burchell, PhD
William R. Dolphin, MA
Jon Erickson, PhD

CENTER FOR URBAN POLICY RESEARCH
Edward J. Bloustein School of Planning and Public Policy
Rutgers, The State University of New Jersey
33 Livingston Avenue
New Brunswick, New Jersey 08901-1982

Prepared for:

State Planning Commission
Office of Smart Growth

NEW JERSEY DEPARTMENT OF COMMUNITY AFFAIRS
101 South Broad Street
P.O. Box 204
Trenton, New Jersey



Fishing at Longport.
Jon Erickson

INTERGOVERNMENTAL COORDINATION ASSESSMENT

The State Plan is the result of a long negotiation process. County planning directors have credited State Plan procedures and processes with improving both the quantity and the quality of various types of governmental interaction. Planning directors report significant increases in the number of contacts between most governmental agencies and an improvement in the quality of contact between county and local agencies. The study team concludes that intergovernmental coordination is improved as a result of the State Plan endeavor.

COMMUNITY LIFE ASSESSMENT

Quality of life in New Jersey, to the extent that it can be measured, will improve in the future. Housing demand will be basically met by housing supply over the next twenty years. Both housing costs and income will rise very slowly into the future. Housing affordability under the State Plan will be better than under TREND conditions because of somewhat less expensive housing and a greater variety of housing choice in urban communities, in communities with more densely developed planning areas, and in communities with urban, regional, and/or town centers. In general, quality of life will improve in New Jersey under both TREND and PLAN over time. Households that move to redeveloping areas will, in the short term, experience a lower quality of life than they would have experienced in the rural fringe areas. This is due to conditions currently found in the redeveloping neighborhoods (housing deterioration, higher crime rates, lower graduation rates in schools, and so on). However, those conditions will gradually improve over time.

SUMMARY

No impact assessment can measure every variable, but overall, the assessment has carefully and consistently measured all relevant areas for which it has been charged, and the results are clear. The goals, policies, and strategies of the State Plan will produce noticeable improvements in the state's economy, environment, infrastructure, community life, and intergovernmental coordination.

①

I am Hank Klumpp, and I own 150 acres in the Highlands Preservation Area.

I'm still standing here, 11 years later, before a council that has had many, many members leave, without saying good-bye to me and new ones arriving and not saying Hello, how can I help you? Those of you who have been here for the long haul know that I ask the same questions every month with no answers. My number one question has been Where is the scientific study that put my property in the

(2)

Highlands Preservation Area. I finally have the answer, but not from this council. There was no scientific study. I believe you have always known that. You were given many documents outlining the evidence of scientific misconduct from Pat Moffitt which seems to be ignored and never addressed.

Doesn't the council have an on going duty to consider and comment on public input when the concerns are backed by supporting evidence?

3

Last month, I asked why this council isn't lobbying for funds. Senator Smith is standing before the Environment Committee meeting trying to pass bills for Green Acres, farmland preservation, Blue Acres, and historic preservation. What about compensation for the 859,358 acres that were taken under the Highlands Act? Smith promised full compensation. Where is it? We still have no compensation and no equity.

(4)

I know - after 11 years - that
you will not answer my questions.

Who on this Council is trying every
way possible to help harmed
landowners? Maybe a show
of hands?

Guess my 3 minutes for the
month are up!

Hank Klumpp

24 Longview Road
Lebanon, NJ 08833

Ken Dolsky, 21 Winfield Drive, Parsippany

I want to speak about the Pilgrim Pipeline and in particular about a letter printed in the Daily Record by George Bochis VP Development at PP on April 3, 2015.

In case you didn't read it, Mr. Bochis made three claims that deserve a response.

Claim 1: "The project would not be cutting through 'large swaths of environmentally sensitive land,' but would rather be sited almost entirely along existing rights of way where other pipelines and transmission lines are already in place. "

Answer: The use of existing rights of way does not make an environmentally sensitive area less sensitive. Yes, using the ROW may lessen or prevent fresh tree cutting (not clear at this time) but nothing else becomes less sensitive. On Saturday we hiked the Spectra gas line, path of the proposed PP from Mahwah to Skyline Drive, a total of 7 to 8 miles. We counted 14 streams that cross the ROW on their way down to Stag Brook, the Ramapo River, Lake Henry, Scarlet Oak Pond, MacMillan Reservoir, Dators Pond, Ramapo Lake and Bear Swamp Lake. Some were small and seasonal but all were flowing and by cutting across the ROW, were definitely in harms way if there is a leak. In fact practically the entire route we hiked is designated watershed management. I should not have to tell you that the Ramapos are home to many endangered species of plants and animal life. Using the existing ROW does nothing to ameliorate the risks to them, our drinking water, recreational areas in Ramapo Reservation, property value along polluted streams and the health of anyone unfortunate enough to breath oil fumes as they are toxic and carcinogenic.

Claim 2: "Like it or not, Bakken crude is already coming through the region via less safe modes of transportation. By any statistical analysis, pipelines are the safest form of petroleum transportation."

Answer: Mr. Bochis failed to present or reference any statistical analysis but we would like to present one to you in your package that shows very clearly that when you compare pipelines, barges and trains on a standard metric, in this case billion ton miles, pipelines leak 3 to 4 times more than barges and trains. This is a chart from a study done by the Congressional Research Service that appeared in a Forbes article comparing the different risks from different forms of oil transportation. The title was Pick Your Poison, the point being that no form is safe and clean.

So when you hear them say pipelines are the safest, remember this chart.

I should mention that PHMSA has stated that when it comes to death and property destruction that pipelines are safer than some other forms of transportation, but when it comes to spills only trucks are worse than pipelines.

Claim 3: "Pilgrim has never tried to 'intimidate' landowners. Had the *Daily Record* taken the time to read the letter in question, it would understand that Pilgrim requests access to property in order to conduct surveys to help better understand the potential route — hardly an 'outrageous stunt' and, as it happens, entirely consistent with New Jersey law."

Answer: I quote from the letter sent by one of Pilgrim's law firms, DeCotiis, to my neighbor: "*Pilgrim is a pipeline company established under New Jersey Law, and because of that status it has the power to condemn private property.*" I will pause here because not only is this a blatant lie that has been exposed but think about what it says. They have the power to condemn your home, just because. And they are not even a utility. It goes on, "*Part of the power to condemn is the ability to enter on private land to perform surveys and investigations.*" Translation - So, we're not kicking you out of your home but we are entering your property whether you like it or not, you have no rights. It ends, "*If you continue to decline to allow Pilgrim to enter your property, Pilgrim will have no choice but to ask a court to issue an order allowing it to enter the property for this purpose. Please let us hear from you about entry onto your property no later than October 31, 2014. If we are unable to obtain your agreement for initial inspections by that date, Pilgrim has instructed our law firm to apply to the Superior Court for an Order to allow entry for initial inspections. Thank you again in advance for your anticipated reconsideration and cooperation.*" (now that we've scared the crap out of you we hope you cooperate). This letter was dated October 17, so the homeowner had two weeks to decide to engage a lawyer and fight this or just give in. Fortunately, my neighbor and I knew they were bluffing and he just ignored it.

This is what Pilgrim considers to be entirely consistent with New Jersey law.

One last point. We want to make it clear that Pilgrim has said that their plan is to provide a better solution for oil that is currently being transported by barge from Albany to Linden, being refined and being transported back to Albany by barge. In a Star Ledger article (5/20/14)¹ Pilgrim execs were quoted as saying:

"The pipeline would in no way increase the amount of oil and refined products currently transported between Linden and Albany," Bochis said.

Paul Nathanson, a Pilgrim spokesman, pointed out, "The region can only consume so much of the product."

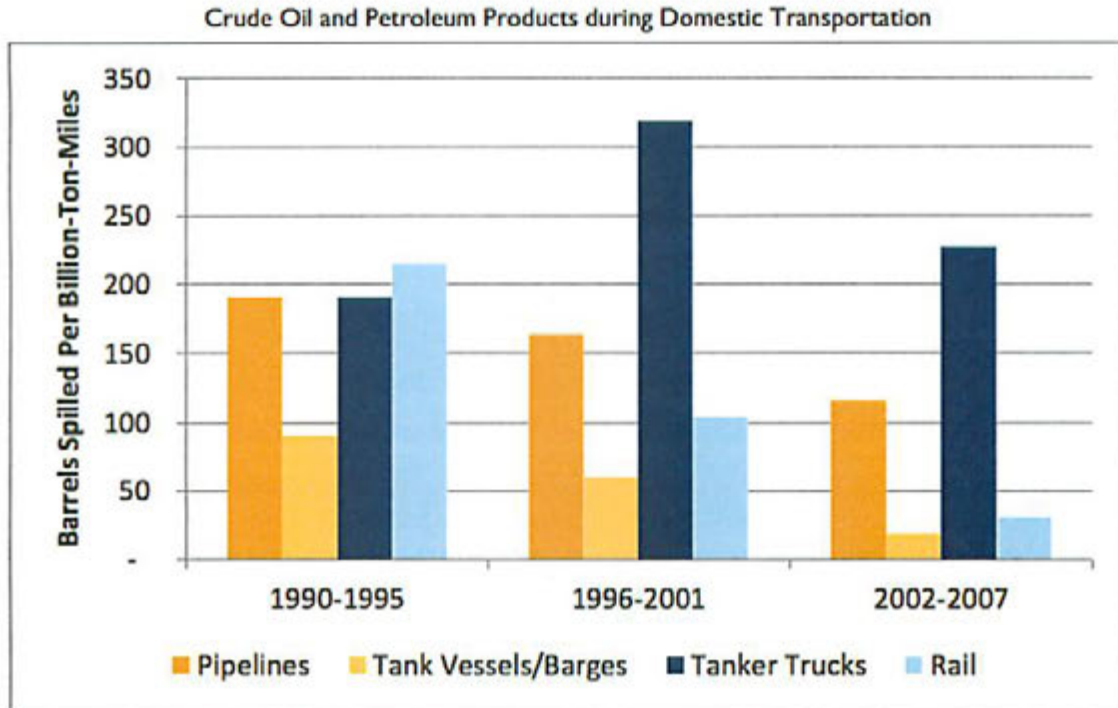
We assume this means that this project will not bring more oil and oil products to NJ or New York or surrounding states and it has nothing to do with energy independence. It is simply a financial venture for the owners of Pilgrim Pipeline.

¹http://www.nj.com/morris/index.ssf/2014/05/environmentalists_detail_opposition_to_proposed_pipeline_between_albany_and_linden.html

Pick Your Poison For Crude -- Pipeline, Rail, Truck Or Boat

<http://www.forbes.com/sites/jamesconca/>

4/26/2014 @ 10:35AM



Source: Prepared by CRS; oil spill volume data from Dagmar Etkin, *Analysis of U.S. Oil Spillage*, API Publication 356, August 2009; ton-mile data from Association of Oil Pipelines, *Report on Shifts in Petroleum Transportation: 1990-2009*, February 2012.

Notes: Pipelines include onshore and offshore pipelines. The time periods were chosen based on the available annual data for both spill volume and ton-miles. The values for each time period are averages of annual data for each six-year period.

Crude oil is moving around the world, around our country, around pristine wilderness, around our cities and towns. It's going to keep moving, will undoubtedly increase during our new energy boom, so what is the safest way to move it?

The short answer is: *truck worse than train worse than pipeline worse than boat* (Oilprice.com). But that's only for human death and property destruction. For the normalized amount of oil spilled, it's *truck worse than pipeline worse than rail worse than boat* (Congressional Research Service). Different yet again is for environmental impact (dominated by impact to aquatic habitat), where it's *boat worse than pipeline worse than truck worse than rail*.

So it depends upon what your definition is for *worse*. Is it death and destruction? Is it amount of oil released? Is it land area or water volume contaminated? Is it habitat destroyed? Is it CO2 emitted?

Table 44: Summary of water quality conditions at 21 NJDEP/USGS sites sampled in the Raritan River basin from 1991-97

[Green Cells = the 3 sites with most samples meeting the standard or 3 sites with lowest median values for each constituent (highest median DO and alkalinity values); Red Cells = the 3 sites with most samples not meeting standards or 3 sites with highest median values (lowest median DO and alkalinity values); Alkalinity, biochemical oxygen demand, total ammonia + organic nitrogen (TKN) and total organic carbon do not have a standard; Ratings for pH and hardness are based on percent of samples meeting or not meeting both a high and low standard; *, trout maintenance; ** trout production; # coastal plain waters have naturally low alkalinity]

Station Number	Nutrients					Inorganics						Other Constituents					
	Amm- onia + Organic Nitrogen	Amm- onia, Un- ionized	Nitrite plus Nitrate	Organic Carbon, Total	Phos- phorus, total	Alka- linity	Chloride	Dissol- ved solids, total	Hardness	Sodium	Sulfate	Bio- chemical Oxygen Demand	Dissol- ved Oxygen	Fecal coliform	pH	Suspend- ed solids, total	Water temper- ature
South Branch Raritan River Sub-basin																	
**01396280 – South Branch, Middle Valley																	
*01396535 – South Branch, High Bridge																	
**01396588 – Spruce Run																	
*01396660 – Mulhockaway Cr.																	
*01397000 – South Branch, Stanton																	
01397400 – South Branch, Three Bridges																	
01398000 – Neshanic River																	
North Branch Raritan River Sub-basin																	
**01398260 – North Branch, Chester																	
01399120 – North Branch, Burnt Mills																	
**01399500 – Lamington River, Pottersville																	
01399700 – Rockaway Creek																	
01399780 – Lamington River, Burnt Mills																	

Station Number	Nutrients					Inorganics						Other Constituents					
	Amm- onia + Organic Nitrogen	Amm- onia, Un- ionized	Nitrite plus Nitrate	Organic Carbon, Total	Phos- phorus, total	Alka- linity	Chloride	Dissol- ved solids, total	Hardness	Sodium	Sulfate	Bio- chemical Oxygen Demand	Dissol- ved Oxygen	Fecal coliform	pH	Suspend- ed solids, total	Water temper- ature
Millstone River Sub-basin																	
01400540 – Millstone River, Manalapan						#											
01400650 – Millstone River, Grovers Mill																	
01401000 – Stony Brook, Princeton																	
01401600 – Beden Brook																	
01402000 – Millstone River, Blackwells Mills																	
Raritan River Mainstem																	
01400500 – Raritan River, Manville																	
01403300 – Raritan River, Bound Brook																	
South River Sub-basin																	
01405302 – Matchaponix Br.						#											
01405340 – Manalapan Brook						#											

The Fenimore Water Committee was created to study the environmental impact of the Fenimore Landfill in Roxbury Township on the water downstream from the landfill including Ledgewood Brook and ground water. Ms. Carluccio, who has requested to be on the committee but was denied, would be an invaluable asset to study the affects of Fenimore on the water.

Ms. Carluccio is currently the Deputy Director of the Delaware Riverkeeper Network. Previously, she was the Executive Director of the Neshaminy Water Resources Authority. Her educational background includes a B.A. in Sociology from the University of North Carolina and courses at Rutgers University Cook College in Environmental Science. She worked in the social service field for 12 years, where she was responsible for administering large grants. She has served on a total of ten community, government and service group boards.

This petition has nothing to do with the three appointed members to the Fenimore Water Committee. We support and respect all of the members and look forward to them doing a thorough investigation of the impacts from the Fenimore Landfill. However, we feel that the addition of Ms. Carluccio would be a great asset to the committee.

Ms. Carluccio is a strong supporter of the environment and someone the people of Roxbury trust. Since the Fenimore project is a political hot potato filled with controversy, lack of transparency, and rules that were not followed, the residents of Roxbury ask that an Ms. Carluccio, who has a vast array of experience with water, be added to the committee.

Signatures

Name	Location	Date
Bob Schultz	Succasunna, NJ, United States	2015-04-01
Marguerite Gargiulo	Flanders, NJ, United States	2015-04-14
Brenda Isherwood	Rockaway, NJ, United States	2015-04-14
Diane Weinpel	Succasunna, NJ, United States	2015-04-14
Lisa Riggiola	Pompton Lakes, NJ, United States	2015-04-14
Clark Paddock	Yorktown Heights, NY, United States	2015-04-14
Judy Decker	Ledgewood, NJ, United States	2015-04-14
Karen Guerra	Ledgewood, NJ, United States	2015-04-14
Leonora Emery	Ledgewood, NJ, United States	2015-04-14
carl panetta	Budd Lake, NJ, United States	2015-04-14
kerry smith	Otego, NY, United States	2015-04-14
Maureen Castriotta	Landing, NJ, United States	2015-04-14
Doreen Fiebel	Succasunna, NJ, United States	2015-04-14
Phyllis Yue	Denville, NJ, United States	2015-04-14
Maureen Leuszler	Roxbury Township, NJ, United States	2015-04-14
Aaron Markworth	Flanders, NJ, United States	2015-04-14
Michelle Oliveira	Ledgewood, NJ, United States	2015-04-14
Renee Paddock	Ledgewood, NJ, United States	2015-04-14
Sharon Lemoncelli	Dover, NJ, United States	2015-04-14
Barbara Conover	Montclair, NJ, United States	2015-04-14
Brenda Parr	Ledgewood, NJ, United States	2015-04-14
elizabeth balogh	riegelsville, PA, United States	2015-04-14
Rob O'Connell	Budd Lake, NJ, United States	2015-04-14
Mary Rodriguez	Ledgewood, NJ, United States	2015-04-14
C.Bob Mederos	Legewood, NJ, United States	2015-04-14
Nancy Boyle	Butler, NJ, United States	2015-04-14
Samantha Smith	Succasunna, NJ, United States	2015-04-14
Laurel Whitney	Succasunna, NJ, United States	2015-04-14
jake kovalcik	Yorktown Heights, NY, United States	2015-04-14
Betty Ann Weaver--Shaver	Tunkhannock, PA, United States	2015-04-14

Name	Location	Date
Debbie O'Brien	Roxbury Township, NJ, United States	2015-04-14
Kathy Panetta	Ledgewood, NJ, United States	2015-04-14
Marion Emery	Ledgewood, NJ, United States	2015-04-14
Dr. Washington Irving McLelland, Ed.D	Edison, NJ, United States	2015-04-14
joann stark	Ledgewood, NJ, United States	2015-04-14
Diane Sudo	Ledgewood, NJ, United States	2015-04-14
JP Willson	Succasunna, NJ, United States	2015-04-14
Linda Keane	Ledgewood, NJ, United States	2015-04-14
Amy Tummino	Succasunna, NJ, United States	2015-04-14
Christine Stires	Flanders, NJ, United States	2015-04-14
Lyric LaCeile	Dallas, TX, United States	2015-04-14
Smara Voglesong	Medford, NJ, United States	2015-04-14
Brian Voglesong	Medford, NJ, United States	2015-04-14
cheryl deering	Dunkirk, NY, United States	2015-04-14
L Keurian	Ledgewood, NJ, United States	2015-04-14
Michael Lella	Kissimmee, FL, United States	2015-04-14
Jan Weaver Lawrence	Tunkhannock, PA, United States	2015-04-14
susan schnaidt	pompton lks, NJ, United States	2015-04-15
Debbie Watson	Yorktown Heights, NY, United States	2015-04-15
MARGARET JOHNSON	PHILLIPSBURG, NJ, United States	2015-04-15
Laura Lella	Lake Hopatcong, NJ, United States	2015-04-15
Donna Schaab	Succasunna, NJ, United States	2015-04-15
Brenda Acquisto	Budd Lake, NJ, United States	2015-04-15
Madeline solano	Ledgewood, NJ, United States	2015-04-15
Angela Johnson	Ledgewood, NJ, United States	2015-04-15
Angela Harrigan	Ledgewood, NJ, United States	2015-04-15
Rachel Young	carlstadt, NJ, United States	2015-04-15
Susan Meacham	Milford, NJ, United States	2015-04-15
Shannon Caccavella	Yorktown Heights, NY, United States	2015-04-15
Mike Lang	Ledgewood, NJ, United States	2015-04-15
jennifer olives	Landing, NJ, United States	2015-04-15

Name	Location	Date
Gordon Ashworth	Succasunna, NJ, United States	2015-04-15
Clyde McCutcheon	Flanders, NJ, United States	2015-04-15
Sally Jane Gellert	Woodcliff Lake, NJ, United States	2015-04-15
Scott Mount	Ledgewood, NJ, United States	2015-04-15
Gutowski Kimberly	Succasunna, NJ, United States	2015-04-15
Joyce Puluse	Landing, NJ, United States	2015-04-15
Donna Zimmer	Succasunna, NJ, United States	2015-04-15
John Leuszler	Ledgewood, NJ, United States	2015-04-15
Michele Stone	Ledgewood, NJ, United States	2015-04-15
Sharon D'Agostino	Succasunna, NJ, United States	2015-04-15
Jeff Stone	Ledgewood, NJ, United States	2015-04-15
JoEllen Falco	Succasunna, NJ, United States	2015-04-15
Evelyn Latella	Succasunna, NJ, United States	2015-04-15
Susan shsw	Mountain Lakes, NJ, United States	2015-04-16
Katie marino	Washington, NJ, United States	2015-04-16
Tony Grant	Newton, NJ, United States	2015-04-16
Joanne Longo	Succasunna, NJ, United States	2015-04-16
Rose Letizia	Ledgewood, NJ, United States	2015-04-16
Samantha mikus	Ledgewood, NJ, United States	2015-04-16
Jessica rispoli	Orlando, FL, United States	2015-04-16
Joann Stormo	Ledgewood, NJ, United States	2015-04-16
Gene Drake	Amherst, VA, United States	2015-04-16
Ann Marie Nutto	Hopatcong, NJ, United States	2015-04-16
Wendie Goetz	Newton, NJ, United States	2015-04-16
Phil Lane	Landing, NJ, United States	2015-04-16
Jennifer raggi	Ledgewood, NJ, United States	2015-04-16
Diane Ramage	Ledgewood, NJ, United States	2015-04-16
maria guglielmo	Succasunna, NJ, United States	2015-04-16
Jeff Pichat	Succasunna, NJ, United States	2015-04-16
lisa perez	nj, NJ, United States	2015-04-16
John Mastandrea	Succasunna, NJ, United States	2015-04-16
Sheryl Bogardus	Succasunna, NJ, United States	2015-04-16

Name	Location	Date
Richard Serpa	Landing, NJ, United States	2015-04-16
Henry Hascup	Flanders, NJ, United States	2015-04-16
Kenneth Messer	Ashland, KY, United States	2015-04-16
Susan Williams	Sparta, NJ, United States	2015-04-16
Linda Moakler	Warwick, NY, United States	2015-04-16
Kevin Osetec	Ledgewood, NJ, United States	2015-04-16
Kelly berman	Succasunna, NJ, United States	2015-04-16
Patricia Conlin	Ashland, KY, United States	2015-04-16
Dr. Kathleen Pereillo	Rockaway, NJ, United States	2015-04-16
Donna Rein	Yorktown Heights, NY, United States	2015-04-16
Lisa Melchers	Succasunna, NJ, United States	2015-04-16
David Ramage	Ledgewood, NJ, United States	2015-04-16
Andrea Scalfani	Succasunna, NJ, United States	2015-04-16
Maureen Jasiocki	Ledgewood, NJ, United States	2015-04-16
Laura Lappine	Wind Gap, PA, United States	2015-04-16
Greg Damell	Rockaway, NJ, United States	2015-04-16
Anna Tolerico	Succasunna, NJ, United States	2015-04-16
Janet lemma	Cape Coral, FL, United States	2015-04-16
robyn denicola	Flanders, NJ, United States	2015-04-16
Dan Masi	Roxbury Township, NJ, United States	2015-04-16
Richard Rein	Succasunna, NJ, United States	2015-04-16
Beth Glazer	Succasunna, NJ, United States	2015-04-16
Sara' Diskin	Landing, NJ, United States	2015-04-16
Joan Damell	Roxbury Township, NJ, United States	2015-04-16
Patti Sibel	Flanders, NJ, United States	2015-04-16
Pat Miller	Succasunna, NJ, United States	2015-04-16
Richard Cadogan	Ledgewood, NJ, United States	2015-04-16
Michelle Motzer	Ledgewood, NJ, United States	2015-04-16
Jeffrey Bouvier	Flanders, NJ, United States	2015-04-16
Larry Karipidis	Succasunna, NJ, United States	2015-04-16
phil riff	Hopatcong, NJ, United States	2015-04-16
Fern Roome	flanders, Jersey	2015-04-16

Name	Location	Date
D Yules	Ledgewood, NJ, United States	2015-04-16
BRYAN DEL VECCHIO	Ledgewood, NJ, United States	2015-04-16
Mike Hefferon	Flanders, NJ, United States	2015-04-16
Terry Pence	Flanders, NJ, United States	2015-04-16
Jessica Parrotta	Dover, NJ, United States	2015-04-16
Janice Steigler	Ledgewood, NJ, United States	2015-04-16
Arleen Swart	Keyport, NJ, United States	2015-04-16
Katrina Bolchune	Succasunna, NJ, United States	2015-04-16
Sean Prendergast	Succasunna, NJ, United States	2015-04-16
Willie List	Roxbury Township, NJ, United States	2015-04-16
Carmen Torres arias	Ledgewood, NJ, United States	2015-04-16
Jennifer Roushinko	Succasunna, NJ, United States	2015-04-16
Susie DeRiancho	Oak Ridge, NJ, United States	2015-04-16
Bill Morrocco	Hicksville, NY, United States	2015-04-16
Casey Ury	Landing, NJ, United States	2015-04-16
Julie LaFranco	Ledgewood, NJ, United States	2015-04-16
Deanna Caines	Ashland, KY, United States	2015-04-16
Brenda Hornsby	Catlettsburg, KY, United States	2015-04-16
Joyce peslak	Ledgewood, NJ, United States	2015-04-16
Kathy messina	Succasunna, NJ, United States	2015-04-16
Duans Corvalan	Succasunna, NJ, United States	2015-04-16
Greg Martin	Livingston, NJ, United States	2015-04-16
Vince Cattano	Landing, NJ, United States	2015-04-16
timothy farkas	Succasunna, NJ, United States	2015-04-16
Justin Everett	Succasunna, NJ, United States	2015-04-16
Anthony Fiore	Ledgewood, NJ, United States	2015-04-16
Barbara Herman	Ledgewood, NJ, United States	2015-04-16
glenn sivertsen	ledgewood, NJ, United States	2015-04-16
Jeff Schutz	Ledgewood, NJ, United States	2015-04-16
Charlene Leary Leary	Mine Hill Township, NJ, United States	2015-04-16
Kimberly Cioletti	Succasunna, NJ, United States	2015-04-16
Michael menendez	Landing, NJ, United States	2015-04-16

Name	Location	Date
lisa millus	Succasunna, NJ, United States	2015-04-16
Megan Bradley	Roxbury Township, NJ, United States	2015-04-16
kim Yamashita	Landing, NJ, United States	2015-04-16
Patricia fox	New York, NY, United States	2015-04-16
Addimando Sherry	Flanders, NJ, United States	2015-04-16
Debra Jones	Long Valley, NJ, United States	2015-04-16
Jim Stoltz	Budd Lake, NJ, United States	2015-04-16
andy puluse	Landing, NJ, United States	2015-04-16
john melicharek	Landing, NJ, United States	2015-04-16
Liz Chaplin	Landing, NJ, United States	2015-04-16
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Broncos Ditching Synthetic Field At Mile High, Using Kentucky Bluegrass Grown In Colorado

February 11, 2015 3:07 PM

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An image of the work being done on Wednesday from Copter4 (credit: CBS)

Related Tags:

[Charlotte Hounds](#), [Denver Broncos](#), [Denver Outlaws](#), [Fort Morgan](#), [Graff's Turf Farms](#), [Kentucky Bluegrass](#), [Millennium Sports Technologies](#), [Sports Authority Field at Mile High](#), [Sports Contracting Group](#), [Zach Myhra](#)

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DENVER (CBS4) – The Denver Broncos have begun a major renovation of the field at Sports Authority Field at Mile High this offseason.

According to the Broncos, the organization has partnered with Sports Contracting Group and Millennium Sports Technologies to upgrade the playing surface.

The field was removed on Monday and the new playing surface is expected to be in place by early April.

"Sports Authority Field at Mile High is committed to providing state-of-the-art amenities to fans and teams utilizing the stadium," Director of Facilities for Stadium Management

Company Zach Myhra said in a statement. "After completing extensive upgrades to the stadium in recent years, our focus now is providing the safest and best possible playing surface at Sports Authority Field at Mile High."



An image of the work being done on Wednesday from Copter4 (credit: CBS)

The new field will be made of 100 percent Kentucky bluegrass sod grown by Graff's Turf Farms in Fort Morgan. It's a switch from the synthetic blend surface that has been used at the stadium since it opened in 2001.

The Denver Outlaws will have the honor of being the first to play on the new field during their home opener against the Charlotte Hounds on May 3.







Exposure Research

The Use of Recycled Tire Materials on Playgrounds & Artificial Turf Fields



[Link to the news release for this study](#)

Background

Ground rubber — also called "tire crumb" or "crumb rubber" — is recovered from scrap tires or from the tire retreading process. It is used in road construction and in a number of athletic and recreational applications, including ground cover under playground equipment, running track material, and as a soil additive on sports and playing fields.

Crumb rubber is often used in synthetic turf fields as "infill" between turf fibers to provide stability, uniformity and resiliency to synthetic turf fields. Synthetic turf was developed in the mid-1960s and has since gained widespread popularity around the country. Synthetic turf was originally used in stadiums and on athletic fields for college and professional sports teams, but now is also used in municipal parks, golf courses, playgrounds, cruise ships, and airports. There is also a growing residential market.

Downloadable Document

[Download "A Scoping-Level Field Monitoring Study of Synthetic Turf Fields and Playgrounds" \(pdf, 123pp, 7.2MB\)](#)

According to the Synthetic Turf Council, synthetic turf has been installed in approximately 4,500 U.S. fields, tracks and playgrounds.

Public Concerns

Over the past several years, a number of public concerns have been raised over the use of tire crumb materials in turf fields and playgrounds. For example, parents in Colorado were concerned about children carrying home small particles of tire crumbs on their clothing. About this time, high levels of lead were detected on some synthetic turf fields in New Jersey.

EPA Research

In response to these concerns, the EPA developed an agency workgroup that initiated a limited-scale scoping study to test a study protocol and monitoring methods for generating environmental data associated with the use of recycled tire material on synthetic turf fields and playgrounds.

X As part of this evaluation, data were collected at a limited number of sites. The full study protocol was implemented at two synthetic turf fields and one playground. Additional samples were collected at four other synthetic turf fields and a second playground. Sampling sites were located in North Carolina, Georgia, Ohio, and Maryland.

+ 4 Athletic Fields + 1 Playground
2 Athletic Field
1 Playground
Total 6 Field
2 Playground

It is important to have accurate and reproducible methods for measuring environmental concentrations of the components of synthetic turf fields and playgrounds. The study protocols and the majority of the methods evaluated were found to be appropriate for characterizing concentrations of tire crumb components in the environment.

< Limited >

* Given the very limited nature of this study (i.e., limited number of components monitored, samples sites, and samples taken at each site) and the wide diversity of tire crumb material, it is not possible to extend the results beyond the four study sites or to reach any more comprehensive conclusions without the consideration of additional data.

3

Both the Consumer Product Safety Commission and the Centers for Disease Control and Prevention recommend that young children wash their hands frequently after playing outside and always before they eat. The EPA also recommends these practices.

Key Technical Findings from the EPA's Study

The key study findings are summarized below. In general, the study protocol is expected to reliably yield data for assessing environmental concentrations of selected tire crumb constituents and understanding potential routes of exposure.

1. The study protocol and many of the methods were found to be reliable and could be implemented in the field. Several limitations are noted as follows.

- Collecting integrated air samples provided a high burden in terms of time and equipment.
- Semivolatile organic compounds (SVOCs) were not measured.
- At any single site, there can be substantial variability in the tire crumb materials used and the concentrations of contaminants measured. More work is needed to determine where to collect samples and how many samples to collect to fully characterize a given site.
- It was difficult to obtain access and permission to sample at playgrounds and recreational fields. More work is needed to increase public and private owner participation if these studies are to be implemented.

2. Methods used to measure air concentrations of particulate matter (PM) and metals were found to be reliable.

3. Methods used to measure volatile organic compounds (VOCs) in air were found to be reliable.

4. Methods used to measure extractable metals from turf field blades, tire crumb materials, and turf field wipe samples were found to be reliable. However, the aggressive acid extraction procedure likely will overestimate the concentration of metals that are readily available for human uptake. Because understanding human uptake or absorption is a key component in understanding risk, methods to determine bioavailable metal concentrations are still needed.

Need more in-depth long-term studies

5. Given the limited nature of the study (limited number of constituents monitored, sample sites, and samples taken at each site) and the wide diversity of tire crumb material, it is not possible, without additional data, to extend the results beyond the four study sites to reach more comprehensive conclusions.

When considering future study designs and implementation, the research needs to carefully consider issues associated with identifying and gaining site access, and benefits of obtaining the data versus the resource burden, and the implementation of other methods for generating data to address specific research hypotheses. Future studies will need a carefully developed and implemented communications plan to promote the value of the research and gain access to the required facilities.

Additional information on the use of recycled tire materials

After a review of the literature, the EPA identified a number of compounds or materials that may be found in tires, although not all are contained in every tire:

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • acetone • aniline • arsenic • barium • benzene • benzothiazole • cadmium • chloroethane • chromium • cobalt • copper • halogenated flame retardants • isoprene • latex • lead | <ul style="list-style-type: none"> • manganese • mercury • methyl ethyl ketone • methyl isobutyl ketone • naphthalene • nickel • nylon • phenol • pigments • polycyclic aromatic hydrocarbons • polyester • rayon • styrene - butadiene • toluene • trichloroethylene |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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** Very Limited Studies*

Need more long-term studies

U.S. Department of Health and Human Services Secretary **Sylvia M. Burwell** released the **13th Report on Carcinogens** on October 2, 2014. ([Press Release](#)) ([Federal Register notice PDF HTML](#))

The Report on Carcinogens (RoC) is a congressionally mandated, science-based, public health document that the NTP prepared for the HHS Secretary.

The report identifies agents, substances, mixtures, and exposure circumstances that are *known or reasonably anticipated* to cause cancer in humans.

Official Citation: NTP (National Toxicology Program). 2014. *Report on Carcinogens, Thirteenth Edition*. Research Triangle Park, NC: U.S. Department of Health and Human Services, Public Health Service. <http://ntp.niehs.nih.gov/pubhealth/roc/roc13/>

Substances Listed in the Thirteenth Report on Carcinogens - Bold entries indicate new or changed listings in the Thirteenth Report on Carcinogens.

Known To Be Human Carcinogens

Aflatoxins
Alcoholic Beverage Consumption
4-Aminobiphenyl
Analgesic Mixtures Containing Phenacetin (see Phenacetin and Analgesic Mixtures Containing Phenacetin)
Aristolochic Acids
Arsenic and Inorganic Arsenic Compounds
Asbestos
Azathioprine
Benzene Benzidine (see Benzidine and Dyes Metabolized to Benzidine)
Beryllium and Beryllium Compounds
Bis(chloromethyl) Ether and Technical-Grade Chloromethyl Methyl Ether
1,3-Butadiene
1,4-Butanediol Dimethanesulfonate
Cadmium and Cadmium Compounds
Chlorambucil
1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea (see Nitrosourea Chemotherapeutic Agents)
Chromium Hexavalent Compounds
Coal Tars and Coal-Tar Pitches
Coke-Oven Emissions
Cyclophosphamide
Cyclosporin
A Diethylstilbestrol
Dyes Metabolized to Benzidine (Benzidine Dye Class) (see Benzidine and Dyes Metabolized to Benzidine)
Erionite Estrogens, Steroidal
Ethylene Oxide
Formaldehyde
Hepatitis B Virus
Hepatitis C Virus
Human Papillomaviruses: Some Genital-Mucosal Types
Melphalan
Methoxsalen with Ultraviolet A Therapy
Mineral Oils: Untreated and Mildly Treated
Mustard Gas
2-Naphthylamine
Neutrons (see Ionizing Radiation)
Nickel Compounds (see Nickel Compounds and Metallic Nickel)
Radon (see Ionizing Radiation)
Silica, Crystalline (Respirable Size)
Solar Radiation (see Ultraviolet Radiation Related Exposures)
Soots

Report on Carcinogens, Thirteenth Edition

Listing Status

Substances Listed in the Thirteenth Report on Carcinogens

Strong Inorganic Acid Mists Containing Sulfuric Acid
 Sunlamps or Sunbeds, Exposure to (see Ultraviolet Radiation Related Exposures)
 Tamoxifen
 2,3,7,8-Tetrachlorodibenzo-p-dioxin
 Thiotepa
 Thorium Dioxide (see Ionizing Radiation)
 Tobacco Smoke, Environmental (see Tobacco-Related Exposures)
 Tobacco Smoking (see Tobacco-Related Exposures)
 Tobacco, Smokeless (see Tobacco-Related Exposures)
o-Toluidine
 Ultraviolet Radiation, Broad-Spectrum (see Ultraviolet Radiation Related Exposures)
 Vinyl Chloride (see Vinyl Halides [selected])
 Wood Dust
 X-Radiation and Gamma Radiation (see Ionizing Radiation)

Reasonably Anticipated To Be Human Carcinogens

Acetaldehyde
 2-Acetylaminofluorene
 Acrylamide
 Acrylonitrile
 Adriamycin
 2-Aminoanthraquinone
 o-Aminoazotoluene
 1-Amino-2,4-dibromoanthraquinone
 2-Amino-3,4-dimethylimidazo[4,5-f]quinoline (see Heterocyclic Amines [Selected])
 2-Amino-3,8-dimethylimidazo[4,5-f]quinoxaline (see Heterocyclic Amines [Selected])
 1-Amino-2-methylantraquinone
 2-Amino-3-methylimidazo[4,5-f]quinoline (see Heterocyclic Amines [Selected])
 2-Amino-1-methyl-6-phenylimidazo[4,5-b]pyridine (see Heterocyclic Amines [Selected])
 Amitrole
 o-Anisidine and Its Hydrochloride
 Azacitidine
 Basic Red 9 Monohydrochloride
 Benz[a]anthracene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
 Benzo[b]fluoranthene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
 Benzo[j]fluoranthene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
 Benzo[k]fluoranthene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
 Benzo[a]pyrene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
 Benzotrichloride
 2,2-Bis(bromomethyl)-1,3-propanediol (Technical Grade)
 Bis(chloroethyl) Nitrosourea (see Nitrosourea Chemotherapeutic Agents)
 Bromodichloromethane
1-Bromopropane
 Butylated Hydroxyanisole
 Captafol
 Carbon Tetrachloride
 Ceramic Fibers (Respirable Size)
 Chloramphenicol
 Chlorendic Acid
 Chlorinated Paraffins (C12, 60% Chlorine)
 Chloroform
 1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea (see Nitrosourea Chemotherapeutic Agents)
 3-Chloro-2-methylpropene

Report on Carcinogens, Thirteenth Edition

Listing Status**Substances Listed in the Thirteenth Report on Carcinogens**

4-Chloro-o-phenylenediamine
 Chloroprene
 p-Chloro-o-toluidine and Its Hydrochloride
 Chlorozotocin (see Nitrosourea Chemotherapeutic Agents)
 Cisplatin
Cobalt
 Cobalt-Tungsten Carbide: Powders and Hard Metals
 p-Cresidine
Cumene
 Cupferron
 Dacarbazine
 Danthron
 2,4-Diaminoanisole Sulfate
 2,4-Diaminotoluene
 Diazoaminobenzene
 Dibenz[a,h]acridine (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
 Dibenz[a,j]acridine (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
 Dibenz[a,h]anthracene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
 7H-Dibenzo[c,g]carbazole (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
 Dibenzo[a,e]pyrene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
 Dibenzo[a,h]pyrene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
 Dibenzo[a,i]pyrene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
 Dibenzo[a,l]pyrene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
 1,2-Dibromo-3-chloropropane
 1,2-Dibromoethane
 2,3-Dibromo-1-propanol
 1,4-Dichlorobenzene
 3,3'-Dichlorobenzidine and Its Dihydrochloride
 Dichlorodiphenyltrichloroethane
1,2-Dichloroethane
 Dichloromethane
 1,3-Dichloropropene (Technical Grade)
 Diepoxybutane
 Diesel Exhaust Particulates
 Di(2-ethylhexyl) Phthalate
 Diethyl Sulfate
 Diglycidyl Resorcinol Ether
 3,3'-Dimethoxybenzidine (see 3,3'-Dimethoxybenzidine and Dyes Metabolized to 3,3'-Dimethoxybenzidine)
 4-Dimethylaminoazobenzene
 3,3'-Dimethylbenzidine (see 3,3'-Dimethylbenzidine and Dyes Metabolized to 3,3'-Dimethylbenzidine)
 Dimethylcarbamoyl Chloride
 1,1-Dimethylhydrazine
 Dimethyl Sulfate
 Dimethylvinyl Chloride
 1,6-Dinitropyrene (see Nitroarenes [Selected])
 1,8-Dinitropyrene (see Nitroarenes [Selected])
 1,4-Dioxane
 Disperse Blue 1
 Dyes Metabolized to 3,3'-Dimethoxybenzidine (3,3'-Dimethoxybenzidine Dye Class) (see 3,3'-Dimethoxybenzidine and Dyes Metabolized to 3,3'-Dimethoxybenzidine)
 Dyes Metabolized to 3,3'-Dimethylbenzidine (3,3'-Dimethylbenzidine Dye Class) (see 3,3'-Dimethylbenzidine and Dyes Metabolized to 3,3'-Dimethylbenzidine)
 Epichlorohydrin
 Ethylene Thiourea

Listing Status

Substances Listed in the Thirteenth Report on Carcinogens

Ethyl Methanesulfonate
Furan
Glass Wool Fibers (Inhalable), Certain
Glycidol
Hexachlorobenzene
Hexachloroethane
Hexamethylphosphoramide
Hydrazine and Hydrazine Sulfate
Hydrazobenzene
Indeno[1,2,3-cd]pyrene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
Iron Dextran Complex
Isoprene
Kepone
Lead and Lead Compounds
Lindane, Hexachlorocyclohexane (Technical Grade), and Other Hexachlorocyclohexane Isomers
2-Methylaziridine
5-Methylchrysene (see Polycyclic Aromatic Hydrocarbons: 15 Listings)
4,4'-Methylenebis(2-chloroaniline)
4,4'-Methylenebis(N,N-dimethyl)benzenamine
4,4'-Methylenedianiline and Its Dihydrochloride
Methyleugenol
Methyl Methanesulfonate
N-Methyl-N'-Nitro-N-Nitrosoguanidine (see N-Nitrosamines: 15 Listings)
Metronidazole
Michler's Ketone
Mirex
Naphthalene
Nickel, Metallic (see Nickel Compounds and Metallic Nickel)
Nitrilotriacetic Acid
o-Nitroanisole
Nitrobenzene
6-Nitrochrysene (see Nitroarenes [Selected])
Nitrofen
Nitrogen Mustard Hydrochloride
Nitromethane
2-Nitropropane
1-Nitropyrene (see Nitroarenes [Selected])
4-Nitropyrene (see Nitroarenes [Selected])
N-Nitrosodi-n-butylamine (see N-Nitrosamines: 15 Listings)
N-Nitrosodiethanolamine (see N-Nitrosamines: 15 Listings)
N-Nitrosodiethylamine (see N-Nitrosamines: 15 Listings)
N-Nitrosodimethylamine (see N-Nitrosamines: 15 Listings)
N-Nitrosodi-n-propylamine (see N-Nitrosamines: 15 Listings)
N-Nitroso-N-ethylurea (see N-Nitrosamines: 15 Listings)
4-(N-Nitrosomethylamino)-1-(3-pyridyl)-1-butanone (see N-Nitrosamines: 15 Listings)
N-Nitroso-N-methylurea (see N-Nitrosamines: 15 Listings)
N-Nitrosomethylvinylamine (see N-Nitrosamines: 15 Listings)
N-Nitrosomorpholine (see N-Nitrosamines: 15 Listings)
N-Nitrosornicotine (see N-Nitrosamines: 15 Listings)
N-Nitrosopiperidine (see N-Nitrosamines: 15 Listings)

Report on Carcinogens, Thirteenth Edition

Listing Status

Substances Listed in the Thirteenth Report on Carcinogens

N-Nitrosopyrrolidine (see N-Nitrosamines: 15 Listings)
N-Nitrososarcosine (see N-Nitrosamines: 15 Listings)
o-Nitrotoluene
Norethisterone
Ochratoxin A
4,4'-Oxydianiline
Oxymetholone
Pentachlorophenol and By-products of Its Synthesis
Phenacetin (see Phenacetin and Analgesic Mixtures Containing Phenacetin)
Phenazopyridine Hydrochloride
Phenolphthalein
Phenoxybenzamine Hydrochloride
Phenytoin and Phenytoin Sodium
Polybrominated Biphenyls
Polychlorinated Biphenyls
Procarbazine and Its Hydrochloride
Progesterone
1,3-Propane Sultone
 β -Propiolactone
Propylene Oxide
Propylthiouracil
Reserpine
Riddelliine
Safrole
Selenium Sulfide
Streptozotocin (see Nitrosourea Chemotherapeutic Agents)
Styrene Styrene-7,8-oxide
Sulfallate
Tetrachloroethylene
Tetrafluoroethylene
Tetranitromethane
Thioacetamide
4,4'-Thiodianiline
Thiourea
Toluene Diisocyanates
Toxaphene
Trichloroethylene
2,4,6-Trichlorophenol
1,2,3-Trichloropropane
Tris(2,3-dibromopropyl) Phosphate
Ultraviolet Radiation A (see Ultraviolet Radiation Related Exposures)
Ultraviolet Radiation B (see Ultraviolet Radiation Related Exposures)
Ultraviolet Radiation C (see Ultraviolet Radiation Related Exposures)
Urethane
Vinyl Bromide (see Vinyl Halides [Selected])
4-Vinyl-1-cyclohexene Diepoxide
Vinyl Fluoride (see Vinyl Halides [Selected])

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State of Minnesota
House of Representatives

EIGHTY-NINTH SESSION

H.F. No. 1601

03/09/2015 Authored by Clark, McNamara and Kahn

This bill was read for the first time and referred to the Committee on Health and Human Services Reform

as introduced - 89th Legislature (2015 - 2016) Posted on 03/10/2015

1.1 A bill for an act
1.2 relating to health; limiting the use of synthetic turf on certain athletic fields;
1.3 requiring the commissioner of health to study the impacts of the use of crumb
1.4 rubber; requiring reports; appropriating money; proposing coding for new law in
1.5 Minnesota Statutes, chapter 145.

1.6 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MINNESOTA:

1.7 Section 1. **[145.946] HEALTH ASSESSMENT OF SYNTHETIC TURF.**

1.8 Subdivision 1. **Definitions.** For purposes of this section, the following terms have
1.9 the meanings given.

1.10 (a) "Crumb rubber" means ground rubber derived from waste tires, which contain one 1.11 or
1.11 more of the following: acetone, arsenic, cadmium, chromium, lead, vanadium, or zinc. *

1.12 (b) "Synthetic turf" means any materials or compositions that include crumb rubber
1.13 used in the place of grass to surface parks, outdoor athletic playing fields, indoor athletic 1.14
1.14 facilities, or other venues. 1.15

1.16 Subd. 2. **Use of synthetic turf.** No person may install synthetic turf on an athletic
1.17 playing field within the boundaries of a public or private school or a public park until the
1.18 Department of Health, in consultation with the Pollution Control Agency, has prepared a
1.18 site-specific impact report on the health and environmental effects of the use or installation
1.19 of synthetic turf on that athletic playing field. } *

1.20 Subd. 3. **Health study; report.** The commissioner of health must study the health
1.21 impacts related to the use of crumb rubber within synthetic turf and review all available
1.22 data relating to the potential health risks and health effects of synthetic turf, with particular
1.23 attention to the crumb rubber content of the synthetic turf. In conducting this study, the
1.24 commissioner must examine the health and environmental impact of various pathways of
1.25 exposure including, but not limited to, small-fill particle inhalation, volatility, leaching
2.1 into groundwater, dermal absorption, and the persistence in the environment of the original
2.2 and degraded by-products of crumb rubber. By June 30, 2016, the commissioner of health
2.3 shall report the findings of the study to the chairs and ranking minority members of the
2.4 legislative committees with jurisdiction over health and environment policy. *

2.5 Sec. 2. **APPROPRIATION.**

2.6 S..... is appropriated in fiscal year 2016 from the general fund to the commissioner
2.7 of health to prepare impact reports and study the use of crumb rubber within synthetic turf.



BMC Sports Sci Med Rehabil. 2014; 6: 11.

Published online 2014 Mar 1. doi: [10.1186/2052-1847-6-11](https://doi.org/10.1186/2052-1847-6-11)

PMCID: PMC4108054

The perceptions of professional soccer players on the risk of injury from competition and training on natural grass and 3rd generation artificial turf

[Constantine CN Poulos](#),^{X1} [John Gallucci, Jr.](#),^{2,3} [William H Gage](#),¹ [Joseph Baker](#),¹ [Sebastian Buitrago](#),¹ and [Alison K Macpherson](#)¹

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Abstract

Go to:

Background

Participation in soccer poses an inherent risk of injury, that can arise from the interplay of many different factors. The incidence of injury due to soccer participation has been shown to range from 12 to 35.5 injuries/1000 hours of games and 1.5 to 7.6 injuries/1000 of practice for different leagues across the world, and varying levels of competition – mostly adult male professional players (e.g., lower tier professional division, top-tier professional division, international level competition) [1]. It is imperative to understand the risk factors leading to injury in soccer in order to initiate measures to reduce their occurrence and associated burden. Currently, two types of surfaces are sanctioned by FIFA and UEFA for soccer competition at the elite professional level: natural grass (NG) surfaces, and artificial turf surfaces (including both 3rd generation and 4th generation) otherwise referred to as “Football turf” (FT) [2]. The main reasons for the introduction of artificial turf were to lessen the impact of environmental conditions on surfaces, to decrease the high operating costs associated with NG, and to increase field usability [3-5].

Studies analyzing the injury risk associated with elite soccer competition and training on FT and NG have found comparable rates of injury on both surfaces [6-10]. In a recent study of elite male professional players the incidence of acute injuries were reported to be 3.5 v 3.5/1000 training hours, and 22.4 v 21.7/1000 match hours for FT and NG respectively [7]. Similar incidences were further

reported in an earlier study of elite male professional players (2.42 v 2.49/1000 training hours and 19.60 v 21.48/1000 match hours for FT and NG respectively) [6]. Notably missing in this body of literature are studies exploring professional soccer players' subjective experiences about competition and training on FT and NG. No study has focused on understanding professional soccer players' opinions about the influence of surface type on injury.

Movement patterns, ball skills, and the impressions of Swedish elite male and female soccer players were analyzed during competitive games on 2nd and 3rd generation artificial turf and NG by Andersson et al. [11]. No differences were observed in the movement or technical patterns of the players between the two surfaces, yet roughly two thirds of the male sample reported that games were more physically demanding on artificial turf compared to natural grass [11]. However, Nedelec and colleagues found that a sample of 13 professional players had no negative impressions of artificial turf during recovery (data were collected 10 minutes, 24 hours, and 48 hours after the test) following a 90-minute soccer-specific aerobic field test performed on NG and artificial turf [12]. Players did although report moderately higher soreness in the quadriceps immediately after the test, in the gluteals 24 hours after the test, and in the hamstrings 48 hours after the test in the artificial turf condition [12].

The aim of this study was to assess professional soccer players' perceptions regarding injuries, physical recovery, and the influence surface related factors such as field mechanical properties and maintenance can have on injury, and other complaints related to soccer participation on FT compared to NG. Doing so is important for assessing the completeness of the current surface-injury paradigm, and to put the findings of the current epidemiological literature into the context of professional players day-to-day experiences with these surfaces, thereby narrowing the gap between science and practice.

Go to:

Methods

Major League Soccer is the highest level of professional soccer in North America. It is comprised of 16 teams from the United States and 3 teams from Canada, which compete from March to December. Along with regular season competition, teams compete concurrently in friendly matches, domestic tournaments, and in one major international tournament (CONCACAF Champions League). Of the 18 teams competing in the MLS during the 2011 season, 6 teams were invited to participate in the study based upon the availability and willingness of these teams to participate in the study directives. Access to the teams was facilitated by the Medical

Coordinator for the MLS, who provided contact information, and support throughout the study period. Fulltime professional players who were signed to a first team contract were asked to complete a paper questionnaire. All participating players had to be able to read and speak English, and voluntarily consent to participation in the study. Players were instructed to recall their experiences on FT rather than earlier generation turf surfaces, and a description of FT was provided in the survey. In accordance with the UEFA model for epidemiological studies a member of the medical team was selected as the primary contact person [13]. The Head and/or Assistant Athletic Therapist's/Trainer's were responsible for administering the surveys. The study was reviewed and approved under the research ethics protocols by the Human Participants Review Subcommittee at York University, Toronto, Canada.

We could not find a validated questionnaire and had therefore developed our own. A graphic artist was hired to design the visual components of the survey, such as the color scheme, text selection and graphical layout. An extensive literature review was conducted to identify: 1) Salient issues in the current research on NG and FT (e.g., more ankle injuries occur on artificial turf, and player impressions that it is harder, and more fatiguing to play on artificial turf as opposed to grass). 2) Outcome variables that have been used in soccer injury research (e.g., contact vs. non-contact injuries, acute vs. chronic injuries, exposure time, age, and anatomical region of injury). Further questions were drawn from the National Football League Players Association (NFLPA) *Playing Surfaces Opinion Survey*, administered to all active NFL players in 2004 and 2008 [14,15]. The final questionnaire was a consolidation of the information from these sources, and included 18 closed-ended attitudinal questions, 2 of which had an open-ended component asking players "why" they chose their respective response, and 1 open-ended attitude question. All technical terms used in this survey were defined following the recommendations of the *Consensus Statement on Injury Definitions and Data Collection Procedures in Studies of Soccer Injuries* published under the auspices of the FIFA Medical Assessment and Research Center [16]. The questionnaire was pilot-tested with the York University Varsity Men's Soccer Team and minor changes were made before it was administered to the study sample. A copy of the questionnaire administered to the players can be found in Additional file 1 A electronically online.

Some questions in each survey were missing answers. In these cases the completed data were used in the analysis, and the missing data were excluded. Descriptive statistics including means, standard deviations and frequencies, were calculated using SPSS version 20.0 (IBM Corp., Armonk, NY). Open-ended responses were analyzed and interpreted by the primary research team and a Certified Athletic Therapist who works in a soccer setting. Table 1 includes the key phrases in the

players' comments that were used to stratify responses into the surface mechanical groupings.

Table 1

Key phrases for mechanical group comments

Go to:

Results

Out of a total of 18 teams in the league at the time of the study 6 teams completed the surveys (33%). Out of a total of 180 potential respondents across the six teams, 99 players (55%) completed the surveys. For the 13 questions analyzed 4% of the data were missing (49/1,396 potential responses). Table 2 provides data on the 99 players and the 6 teams.

Table 2

Player and team demographics

Physical experiences on football turf and natural grass

Most of the players responded that playing and practicing on FT resulted in greater muscle and joint soreness (97%, 96/99 and 96%, 95/98; 1 missing response respectively). Further, the majority of players (90%, 89/99) also felt that it took more time to recover after a game on FT when compared to NG. These findings were also reflected in the following terms, that players used to describe FT; "Greater Stress of Joints/Body", "Greater Muscle Tightness/Soreness", "Breaks down body", "Shock to Muscles/Joints". When asked which surface most impacted overuse injuries over the entire course of a season only 2 players (2%, 2/98; 1 missing response) felt that NG would lead to more chronic injuries, 9 players (9%, 9/98; 1 missing response) were unsure or had no opinion, and the remaining 87 players (89%, 87/98; 1 missing response) chose FT. There was a

Field Turf
Greater muscle soreness 97%
Greater joint soreness 96%
More time to recover 90%
most impacted overuse injuries during season 89%

difference between how players perceived contact and non-contact injuries. Seventy percent of the players (68/98; 1 missing response) agreed that the risk of sustaining a contact injury was the same regardless of the surface the training session or match was being conducted on. Conversely, eighty percent (78/98; 1 missing response) of the players felt the risk of sustaining a non-contact injury was elevated when training and competing on FT. Overall, 94% of the players (92/98; 1 missing response) chose FT as the surface most likely to increase the risk of sustaining an injury.

80% risk of Sustaining Non Contact Injury was elevated on Field Turf

Analysis of player comments

94% Field Turf Increase risk of Sustaining Injury

The two open-ended questions asked the players "why" they chose their respective response to the following closed-ended items: a) "On which surface does it take you more time to recover after a game?" b) "Overall on which surface do you feel the risk of sustaining an injury is higher?" For question (a) there were 17 missing responses (82/99), and for question (b) there were 26 missing responses (73/99). Three surface related risk factors (i.e., surface stiffness, surface friction, and metabolic cost) were identified by analyzing the key phrases in the players' responses (Table 3).

Table 3

Frequency and distribution of mechanical comments for open ended questions

List of original player comments

The original player comments below provide further insight into the viewpoint of FT for this group of players.

"All my 3 biggest injuries have happened on turf matches, hence why I believe natural grass is still much safer"

"Feet stick when wet, and the ball moves too fast and your joints are put under more stress because there is no give in turf surface"

"Personally coming off back-to-back ACL tears in my left Knee (both happened on turf) I feel mentally scared to play on turf. Even prior to the ACLs I was hesitant to play full out"

“Football Turf doesn’t give like grass. If a foot gets caught in, it is more dangerous because the turf can’t dig up to release the foot”.

“It’s just proven in my experience of playing that more injuries occur on turf. To avoid this the quality of the turf has to be very high”

“I have always played a little cautious on turf for fear of having a cleat stick in the turf”

“The first time I played on the new type of field turf, I broke my 5th metatarsal in a non-contact plant”

“Temperature on hot days zaps and dehydrates the body”, “Hot, wet weather is difficult to play in”

“Turf can feel like running on sand”, “Requires more physical effort”

Surface type, quality, and weather as a risk factor for injury

Players agreed that both the type and quality of a playing surface could impact the risk of sustaining an injury (92/99, 93% and 93/98; 1 missing response, 95% respectively). Thirty seven percent of the players (37/99) felt surface quality had the greatest influence on the risk of injury on FT, 36% (36/99) felt the risk of injury was greater on NG, and 21% (21/99) thought that surface quality was no more important in affecting the risk of injury on one surface over the other. The remainder of the players were either unsure or did not have an opinion (5%, 5/99). Sixty eight percent (67/99) of players agreed that climatic conditions can affect the risk of injury on both surfaces. From this group of respondents 48% (32/67) felt that weather affected the risk of injury more on FT, 33% (22/27) felt the risk was the same on both surfaces, 15% (10/67) felt the risk was greater on NG, and 4% (3/67) were not sure. According to the players who reported weather as having an affect on FT 72% (23/32) reported that wet weather had the most significant affect, 19% (6/32) reported hot weather, and 9% (3/32) reported cold weather.

Age, training surface, and surface history

Three descriptive variables were selected to analyze the players responses across the items: Age (Stratified into three groups: 18 – 22, 23 – 27, and 28+), Training Surface (Team 1 who trained on Football Turf was compared to Teams 2 – 6 who trained on grass), and Surface History (Those players who had a surface exposure of 50% or greater on Football Turf over the course of their careers were compared to those who had less than 50% exposure). A Chi Square test was performed and no significant differences were found between the three descriptive variables and the question responses.

Discussion

Our findings indicate that a selected group of professional players, representing a sample of professional soccer players in North America believe that there is an increased risk of injury, specifically non-contact injury, as a result of training and competing on FT compared to NG. Previous studies comparing the incidence of injury on FT and NG, found no differences in the risk of injury from training and competition on both surfaces [6-10,17,18]; however 94% of the players in this study felt that the risk of injury was greater on FT. Similarly, players strongly believed that they experienced greater muscle and joint soreness and longer recovery times after competition and training on FT. Three surface mechanical properties (i.e., surface stiffness, surface friction, and metabolic cost) were identified by the players as important factors in surface related injury. Furthermore players' reported that the magnitudes of the three surface variables were greater on FT, and that these differences were the primary reason why they perceived injury rates, muscle and joint soreness and recovery times to be higher on FT. Along with these three factors players further believed that surface quality and climatic conditions could influence the risk of injury on FT and NG.

A pre-established bias towards synthetic surfaces could possibly explain the divergence of players' perceptions. Player comments (see the 'List of original player comments' section) suggest that past personal injury experiences on FT can mar players' attitudes toward the surface, and even affect the way they play on FT in the future. Players could have solidified their perceptions of FT based on previous negative experiences on earlier generation turfs that were shown to increase the risk of injury [19]. However, it is unlikely that such experiences and opinions can fully explain why the majority of the players reported greater risk of injury on FT. Moreover players reported that surface type did not influence contact injuries. In an injury audit of 12 European Championships from 2006 to 2008 it was found that traumatic injuries due to player contact represented 54% of all injuries overall, and were more frequent among match injuries (63%) [20]. In order to understand how surface type might affect these injuries future comparative studies should report the occurrence, and mechanisms of both non-contact and contact injuries.

In the NFLPA Surface Opinion Survey conducted in 2004 and 2008 it was found that 96% and 91% of all NFL players reported feeling more soreness and fatigue on artificial in-filled surfaces as opposed to grass [14,15]. These results are similar to those found for the group of players in this study and it would be interesting to see

if these findings extend to the entire MLS; and further, to other professional soccer leagues in North America and internationally. The findings of this study suggest that the full effects of training and competing on FT have not been captured in the current literature. This might be related to the definition of injury (i.e., using the time-loss definition, which according to the consensus statement on injury only records an event as an injury if a player cannot take full part in future training or match play). This method is not sensitive enough to capture self-reported problems, such as players experiencing soreness, as they would still participate in sessions or games. This notion is supported by Walden et al., who in a study of injuries in Swedish Elite Football suggested that subjective somatic complaints without objective signs of injury might not be captured by certain injury definitions [21]. It is possible that these effects (i.e., greater muscle and joint soreness after games and training) could also explain why players perceive the risk of injury to be higher on FT. Future epidemiological studies using a time-loss definition should prospectively track players perceptions, specifically levels of muscle and joint soreness and recovery times, concurrently with injury incidence for players training and competing on both surfaces. Doing so will provide another level of comparison between NG and FT, and could potentially uncover novel information on the dynamics between soreness, recovery, and injury for professional players over a period of competition and training regardless of, or in light of surface type.

Surprisingly players identified without any prompt, the surface mechanical properties reported in the literature as risk factors modifying the risk of injury on both surfaces [10]. Greater surface stiffness seems to be the primary reason why players in this study reported the risk of injury to be higher on FT, as it was reported with the greatest frequency. It is speculated that the stiffness properties of a surface influence the frequency of injury and that harder surfaces can increase the impact forces on the body, which in turn might have an influence on some chronic overuse injuries [5]. Similar results have been reported in a study by Martinez et al., in which players reported that artificial turf had worse shock absorbency properties than NG [22]. Similarly, 57% of all NFL players in 2008 believed that new artificial infilled surfaces should be made softer, and 92% reported that they could distinguish the difference between a softer or firmer artificial surface [15]. The player comments also seem to support the postulation that high frictional forces between the foot and playing surface results in foot fixation and possibly injury [23]. Evidence of higher physiological activation on FT found in the literature can also put the players comments into context [24]. Similar findings were also reported by Andersson et al. who found that male elite players reported games on artificial turf as more physically demanding compared to natural grass [11]. Fatigue has been associated with an increase of injury in soccer players [10], and therefore the

reported perception of higher physiological activation on FT in this study, and others, could be a contributing mechanism to injury risk. Based on these findings more research needs to be undertaken to understand the player-surface relationship and how it possibly influences the risk of injury. In particular future studies should focus attention on how surface stiffness and injury risk are related on FT and NG, as it seems that independent groups of professional players (NFL American football players, soccer players) have the opinion that FT is “too hard”.

Although it is widely accepted that without proper maintenance the performance and physical characteristics of FT decline, it is unknown if a decline in surface quality can affect the risk of injury. The fact that players in this study reported surface quality as being important in affecting the risk of injury for both NG and FT suggests that there could be a link between these two variables. It follows that proper maintenance of FT and NG is important to players, and that perhaps the relationship between the risk of non-contact injury and the quality of FT should be explored in future studies.

Climate and weather conditions can have a significant influence on the playing conditions of NG, and this has been shown to impact sport related injury [25]. Considering this, it is perplexing that players in this study believed weather to have a greater influence in affecting injury on FT. Although FT retains a significant amount of heat in hot weather, wet weather was reported in the greatest frequency for affecting injury on FT. A possible explanation for this finding is that wet weather accelerates the movement of the ball, thereby the speed of play, more so on FT than NG forcing players to work harder and imposing increased strain on the body to compete in such an environment. This postulation is supported by the opinions of the expert group of players and coaches interviewed in a study by Martinez et al., who found ball roll to be more rapid on artificial surfaces [22]. Further evidence into how speed of play could affect the risk of injury on FT can be found in the original player comments section.

It has been suggested that familiarization with FT is important to consider when measuring players impressions of artificial and natural grounds [12]. In a study by Nedelec et al. the absence of negative perceptions of FT by a group of young male professional soccer players was explained to be in part due, to the familiarization of FT for this group of players [12]. In contrast, in the present study it was found that players who had a history of playing on FT and players who currently trained on FT expressed preferences for NG, and had negative impressions of FT. The divergence of our findings and those of Nedelec et al. could be due to the age of the players employed in each study (average age 17.7 v 24.5 years for the study by Nedelec et al. and the current study respectively). Although we did not observe any significant

differences in players' opinions across the 3 age cohorts, it may be possible that a difference exists in how younger and older professional players perceive FT and NG. Future studies should aim to elucidate how familiarization to FT and age may impact players perceptions of FT.

Practitioners working with male professional soccer players could use the findings of this study to help them manage their players after exposure to FT and to make appropriate decisions for future sessions knowing that players may possibly have longer recovery times and experience greater soreness. This could be especially true when dealing with players who have a history of muscular-tendon injury, past injuries to weight bearing joints, degenerative changes in weight bearing joints, or a history of recurring injury, although this conjecture is unsubstantiated and would need to be explored. Lastly another practical application could be in making appropriate decisions surrounding surface type exposure for various activities when returning a player back from injury in different steps of the rehabilitation process.

There are a number of limitations of this study, which should be noted. The sample size was small and therefore the results may not be representative of the opinions of all MLS players and the much broader, and more diverse, international professional male soccer population as a whole. Furthermore participants were not selected randomly, which could also affect the generalizability of the findings. Recall of information could have been inaccurate due to the study design, which was cross-sectional and retrospective. Players' responses could have been biased due to previous negative experiences on artificial surfaces, in addition to the cultural stigma surrounding artificial surfaces in soccer. Lastly, this study looked at professional male soccer players and therefore the results may not be characteristic of the opinions of sub-elite or amateur male players and elite, sub-elite or amateur female players. In a study by Zanetti it was found that Italian male amateur soccer players preferred playing on 3rd generation artificial turf rather than natural grounds [26], and Andersson et al. found elite female players reported a neutral position towards artificial grounds. Further research needs to be conducted on these populations [11].

Go to:

Conclusion

This study explored the perceptions of injury, physical recovery, as well as the effect of surface related variables on injury as a result of soccer participation on NG and FT for 99 professional soccer players competing in Major League Soccer during the 2011 season. Overall it was found that players perceived FT as the surface most likely to lead to injury, more specifically non-contact injury, was

associated with longer recovery times after games and training, as well as greater muscle and joint soreness.

Go to:

Competing interests

The authors declare that they have no competing interests.

Go to:

Authors' contributions

CCNP designed the study, developed the questionnaire, lead the data collection process, analyzed the data, and drafted the manuscript. JG Jr. provided access to the participating teams, aided in the data collection process, and aided in the editing of the manuscript. WHG provided insight into the questionnaire and study design, and aided in the drafting of the manuscript. JB aided in the drafting of the manuscript. SB aided in the questionnaire design, data analysis, and aided in the editing of the manuscript. AKM oversaw the study, providing insight into the study and questionnaire design, aiding in the data analysis, and drafting of the manuscript. All authors read and approved the final manuscript.

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Additional file 1:

Players' Surface Opinion Survey on Natural Grass and Artificial Turf: A Focus on Injury.

[Click here for file](#) ^(65K, pdf)

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Research Article

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Release of Polycyclic Aromatic Hydrocarbons and Heavy Metals from Rubber Crumb in Synthetic Turf Fields: Preliminary Hazard Assessment for Athletes

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Abstract

Synthetic turf, made with an infill of rubber crumb from used tyres or virgin rubber, is now common in many sporting facilities. It is known that it contains compounds such as polycyclic aromatic hydrocarbons (PAHs) and heavy metals. We evaluated in nine samples of rubber crumb the total content of some heavy metals (Zn, Cd, Pb, Cu, Cr, Ni, Fe) normally found in tyres by microwave mineralization and the levels of the 14 US EPA priority PAHs by Soxhlet extraction and HPLC analysis. The results showed high levels of PAHs and zinc in all rubber crumb samples compared to rubber granulate limits set by Italian National Amateur League (LND).

Following the precautionary principle, a risk assessment at 25°C was done, using the Average Daily Dose (ADD) assumed by athletes, expressed in terms of mass of contaminant per unit of body weight per day (mg/kg day), and the Lifetime Average Daily Dose (LADD) and then evaluating the Hazard Index (HI) and the Cumulative Excess Cancer Risk (Σ ECR). In the different rubber granulate samples the HI ranges from a minimum of 8.94×10^{-2} to a maximum of 1.16×10^3 , while the Σ ECR ranges from a minimum of 4.91×10^{-4} to a maximum of 1.10×10^4 .

Finally, the aim of this study was to estimate the "hazard" for athletes inhaling PAHs released at the high temperatures this synthetic turf may reach. Then a sequence of proofs was carried out at 60°C, a temperature that this rubber crumb can easily reach in sporting installations, to see whether PAH release occurs. The toxicity equivalent (TEQ) of evaporates from rubber crumb is not negligible and represents a major contribution to the total daily intake of PAHs by different routes.

Keywords: Synthetic turf; PAHs; Rubber crumb; Heavy metals; Hazard assessment

Abbreviations: ADD: Average Daily Dose; AT: Averaging Time; B[a]A: Benzo(a)anthracene; B[a]P: Benzo(a)pyrene; B[b]F: Benzo(b)fluoranthene; B[ghi]Per: Benzo(g,h,i)perylene; BaP: Benzo(a)pyrene equivalents; CDC: Centers for Disease Control and Prevention; C_a: Concentration in Air; C_f: Concentration in Field; Chry: Chrysene; DIN: Deutsches Institut für Normung / German Institute for Standardization; ECR: Excess Cancer Risk; Σ ECR: Cumulative Excess Cancer Risk; ED: Exposure Duration; EF: Exposure Frequency; EF₅₀: Daily Exposure Frequency; EPA: Environmental Protection Agency; Fl: Fluorene; Ft: Fluoranthene; HI: Hazard Index; HQ: Hazard Quotient; IA: Interested Area; IR: Inhalation Rate; LADD: Lifetime Average Daily Dose; PAH: Polycyclic Aromatic Hydrocarbons; PEF: Particulate Emission Factor; Pyr: Pyrene; RD: Reference Dose; SBRr: Styrene:Butadiene Recycled rubber; SF: Slope Factor; TEF: Toxic Equivalency Factors; TEQ: Toxic Equivalent Quantity.

Introduction

World population increase is accompanied by increasing consumption of resources. This makes recycling of materials extremely important to reduce waste. However, recycling itself is not enough, because it is necessary to understand if recycled materials have adverse effects on humans and environment, such as the case of used tyres, loaded of potentially toxic substances and recycled in synthetic turf. Today, synthetic turf is common in many sporting facilities. Created in the 1950s by the humanitarian Ford Foundation of New York and Chemstrand Corporation, it gained huge success in 1966 when used in the Astrodome stadium, Houston, Texas [1]. In the '70s and '80s, it was applied in many sports grounds in America and Canada, and was introduced into Europe in the mid-1980s. Softer new types of synthetic turf containing polyethylene were developed and introduced all over the world in the late 1990s [2]. Synthetic turfs differ in relation to their method of production and infill technique. Normally, the

layer of infill consists of rubber crumb, which in a typical application reaches a thickness of 3 cm, and is spread on a thin layer of sand [3]. The most common source of rubber crumb is recycled tyres (recycled styrene-butadiene rubber - SBRr); the diameter of the crumb can vary between 0.5 and 3 mm [4]. Hazardous substances in crumb rubber infill are primarily, volatile components (nitrosamines, xylenes), benzothiazoles, secondary amines, heavy metals (especially zinc) and polycyclic aromatic hydrocarbons (PAHs) [5]. In particular, the presence of zinc (Zn) is due to zinc oxide that is used as a vulcanization aid in the rubber production process and PAHs come from high-aromatic oil that is used as an additive in the production of tyres. In 2005, the Italian Ministry for the Environment allowed SBR crumb for synthetic grass courts in Italy [6], but there are still no European Union guidelines defining measures to protect the environment and human health in relation to SBRr in synthetic turf. The only standard to which manufacturers refer in producing SBRr crumb was published in 2002 by the German Institute for Standardization (DIN) establishing limits for certain heavy metals in soil, but with no reference to PAHs [7]. This standard was also chosen by the Italian National Amateur League (LND) in its "Regulations for the construction of latest generation artificial turf football fields", which defines soccer field parameters necessary for approval and use. Besides purely technical qualities, it

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also includes concentration limits for certain substances, including heavy metals and some high molecular weight PAHs (limits reflect those provided by Legislative Decree 152/2006 [8,9]. Sport grounds fitted with synthetic turf filled with crumb of recycled tyres may release dangerous particles in air, contaminate soil and groundwater with soluble contaminants leached by rain, and pose health hazards for residents and users due to inhalation of volatile substances [10]. Some coats for rubber granulates can effectively reduce emissions in the environment of these contaminants but they are not systematically used [11].

Though designed for sporting facilities, it is not uncommon to find synthetic grass in recreational parks and children's playgrounds. Synthetic turf may reach high temperatures: for example, on a day with an air temperature of 26°C in the early afternoon, synthetic surfaces may reach 60°C, making it difficult to play on them [2]. The U.S. Center for Disease Control and Prevention (CDC) has not yet assessed the risks associated with exposure to dust released by rubber crumb from playing fields. As a precautionary measure, it issued general recommendations for users to minimize any potential risk, such as wash aggressively hand and body after playing, do not eat and drink on the field and do not use clothes and shoes after the activity for normal life [12]. Some studies have focused on levels of heavy metals, such as Zn, or PAHs in tyre rubber, both in granulates and in leachate [3,13-15] evaluating also the ecotoxicological effects in different organisms and humans [14,16-19]. In response to concern about human exposure through direct contact or inhalation, the principal aims of this study were: 1) to quantify the PAHs and heavy metals contained in rubber crumb from recycled tyres, produced before 2010 [20], used in synthetic turf, to determine whether PAHs are released and at what concentrations, becoming bioavailable to synthetic turf users at high temperatures; 2) to estimate respiratory uptake by athletes training on these grounds.

Materials and Methods

Sample collection

Samples of nine different synthetic turfs from football fields in Tuscany and Lazio (Italy) were analyzed. Samples 1 to 5 were new and had not yet been spread on playing fields yet; samples 6 to 9 were obtained from fields that had been laid down for 1 to 8 years. The crumb of sample 5 was virgin rubber and not recycled tyres (Table 1). In the laboratory, the samples were kept at room temperature, in black bags, away from sunlight.

Heavy metals analysis

The samples were mineralized in a microwave oven (EPA Method 3052 modified in the Lab. (Bianchi, p.c.)). About 0.3 g of rubber crumb sample was placed in Teflon containers, spiked with 8 mL nitric acid (HNO₃) and 2 mL hydrogen peroxide (H₂O₂), then transferred to a microwave oven. The solutions thus obtained were cooled to a final volume of 50 mL and concentrations of lead (Pb), copper (Cu), nickel (Ni), zinc (Zn), chromium (Cr), cadmium (Cd) and iron (Fe) were evaluated. A blank was included in each series to check the purity of reagents and two tests of reference materials (ERM-EC680k and NIST-SRM2710) with concentrations certified by the Community Bureau of Reference were performed to check analytical accuracy. Cr, Cu, Ni, Pb and Cd concentrations were determined with PerkinElmer AAnalyst700 high-performance atomic absorption spectrometers with graphite furnace. Zn and Fe concentrations were determined with an Analytik Jena ContraAA700 acetylene flame atomic absorption

spectrophotometer. All metal concentrations were expressed as the mean of three replicates in µg/g on a dry weight basis.

PAH analysis

PAH extraction in rubber crumb: PAHs were extracted according to Griest and Caton [21,22] and Holoubek et al [22], with some modifications [23]. About 1.0 g of rubber crumb was extracted with a mixture of KOH 2M/methanol (1:4) in a Soxhlet apparatus for 4 h at 75°C. The mixture was extracted by shaking in separator funnels with 200 mL of cyclohexane. Liquid/liquid separation was performed to bring the PAH fraction into the supernatant. The liquid recovered was concentrated in a Rotavapor system, resuspended with 10 mL acetone/hexane (1:1) and purified in a chromatographic column packed with 3 cm of Florisil, about 60-100 US mesh, previously set at 120°C for 2 h. Elution was carried out with 90 mL acetone/hexane (1:1). The organic fraction was concentrated and suspended in 0.5 mL acetonitrile for HPLC analysis.

PAH Extraction in evaporates of rubber crumb: Since synthetic fields can reach 60°C when the air temperature is about 25°C, a method to evaluate release of PAHs at this temperature was used. Small flasks (25 mL) were filled with a quantity of rubber crumb up to 3 cm high, in order to simulate their thickness in a synthetic field. Then, the following steps were applied: 1) a closed trap packed with a bottom layer of cotton/fiberglass and a 3 cm layer of Florisil, previously activated at 120°C for 2 h, was placed on every flask; 2) the flask/trap system was kept at 60°C for about 5 h (assumed to be the average period at 25°C in a day) to capture the evaporates of rubber crumb; 3) liquid chromatography was then immediately performed using the trap as a column by pouring in 10 mL acetone/hexane (1:1) and then a further 90 mL of the same mixture; 4) the extract thus obtained was concentrated in a Rotavapor system and resuspended in 0.5 mL acetonitrile for HPLC analysis. This procedure (steps 1-4) was repeated three times to obtain three consecutive readings for each sample, thus determining whether or not the release of PAHs was continuous. The efficiency of the traps was validated with two different evaporation tests: first evaporation of the standard EPA 610 in acetonitrile (1/100) and, second evaporation, with the same amount of EPA 610 (1/100) mixed with a rubber crumb sample 3 cm high. HPLC analysis showed that the efficiency of the traps was about the 90%. In fact, in the first case, summing the amount of PAHs found in the evaporated to those found in the sample left in the flask, the value was almost like to the original amount of the standard EPA 610. In the other case of the standard mixed with the rubber crumb, there was a little matrix effect because the amount of PAHs found in the evaporated was lower (5-10%) than those found in the evaporated of the standard alone.

PAH analysis: PAHs were analyzed by an HPLC/fluorescence system. PAHs were separated using a reversed-phase column (Supelcosil LC-18, 25 cm × 4.6 mm i.d., 0.5 µm particle size, pore size 120Å) with an acetonitrile/water gradient from 60% to 100% acetonitrile for 20 min, then isocratically for 10 min. The flow rate was 1.5 mL/min. The mobile-phase was degassed with a helium stream. An external standard consisting of 16 PAHs from Supelco (EPA 610) was used. Fourteen PAHs were analyzed and the results expressed in ng/g. Recoveries were 80-98%. The detection limit, calculated at a signal-to-noise ratio of three, was 0.1 ng/g for all PAHs. Assay reproducibility was determined by five replicate analyses of a single sample: the coefficient of variation was 1-3%, depending on the compound. Blanks contained undetectable amounts of PAHs.

Study Goals
9 Fields
- 5 New
Holder
1-8 yrs

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Sample	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9
Years since installation	0	0	0	0	0	8	2	6	1

Table 1: Years of installation in sporting infrastructure of the rubber crumb samples analysed.

Results and Discussion

Heavy metal concentrations in rubber crumb

Table 2 shows the concentrations of heavy metals (cadmium, lead, chromium, nickel, copper, zinc and iron; mg/kg) in rubber crumb samples and the maximum admissible concentration set by the Italian National Amateur League [9]. These limits are identical to those of Dlgs. 152/2006 [8] for public parks and private and residential land.

Lead, chromium, nickel and copper were well below the limits in all samples. Three samples exceeded the limit for cadmium, two being new (samples 4 and 5) and the third already installed (sample 6). In the case of zinc, all samples recorded high concentrations: sample 1 showed the lowest concentration of zinc, exceeding the limit by a factor of more than 20; the worst case was sample 4, exceeding the limit by a factor of nearly 90. Concentrations were quite similar to those of the study of Bocca et al. [13], except for cadmium that was always below the limit in the cited study. Concentrations of iron were quite similar to each other, except for sample 2 that showed a particularly high peak.

Zinc values are in line with other studies concerned with it: Verschoor [3] not only assessed the quantity of zinc in the rubber infill, but also the amount released, showing that the aging of rubber has a high impact on the release of zinc, which the author estimated as an annual average of 50 mg/kg of rubber. The concentration of Zn found in leachate was 1.3 mg/L, which is above the limit imposed by the Dutch Soil Quality law [24,25].

Another study evaluated the bioavailability of certain metals and PAHs in human digestive fluids, assuming ingestion of crumb from synthetic fields [26]. Their results showed that Zn in particular exceeded the limits of the Department of Environmental Conservation (DEC) of New York State [27] for soil (2200 ppm), while the lead content in rubber crumb never exceeded these limits, but was very bioavailable in synthetic gastric fluid, thus representing a potential risk to athletes.

PAH levels in rubber crumb

It proved possible to identify and quantify the PAHs in all samples. All were priority PAHs according to USEPA [28] and some are known to be powerful carcinogens (Table 3) [29-32]. The total PAHs in tables and graphs are the sum of individual PAHs, while the carcinogenic PAHs are only those which are carcinogenic according to at least three classifications. Although benzo(a)pyrene (B[a]P) only accounted for 10-20% of the carcinogenic compounds, it is used by the European Commission Regulation 1881/2006 as an indicator of contamination by the 16 priority PAHs [33].

Table 4 shows the levels of single PAHs (ng/g) detected in samples 1 to 9. Samples 1 to 5 were obtained before they were spread on playing surfaces, whereas the samples 6 to 9 were collected directly from the fields and had been in place for 1 to 8 years. The two last rows of Table 4 show total PAH levels, obtained by summing all the PAHs quantified, and carcinogenic PAH levels, obtained by summing carcinogenic PAHs of Table 3.

Figure 1 compares levels of total PAHs and carcinogenic PAHs in rubber crumb from the various football fields. Very high levels of total PAHs were found in samples 2, 9 and 1. Lower levels were found in

samples 3, 6, 7 and 8, indicating a difference between new samples and those already installed in soccer fields. Indeed, the load of PAHs was appreciably lower in samples 6, 7 and 8 (installed 3 to 8 years ago) than in the other samples. This shows that once installed, these fields lose part of their toxic load in the time. This fact is important for assessing toxicological hazard to athletes, therefore they are chronically exposed to these compounds.

Comparing the relative percentages of all PAHs on total PAHs of the different samples (Figure 2A-C), we noted that the highest PAHs in all samples, except sample 5, were benzo(b)fluoranthene (B[b]F) (samples 1, 2, 6 and 9) or pyrene (Pyr) (samples 3, 4, 7 and 8) but always followed by B[b]F. The fingerprint of sample 5 (natural rubber crumb, not recycled tyres) showed a high concentration of fluorene (Fl), followed by Pyr, fluoranthene (Flt) and B[b]F, unlike the other footprints. Although absolute levels of PAHs were high in this sample (Table 4), the three most abundant PAHs (Fl, Pyr and Flt) are not regarded as particularly hazardous or carcinogenic to humans and therefore this type of natural rubber crumb can be considered less toxic.

Table 5 shows the levels of those PAHs (mg/kg) of which the maximum admissible concentration is established [8], detected in the rubber crumb samples analyzed for this study. The Decree reported threshold values of concentration for some PAHs in soils and even if the comparison with the present data was not direct it could give some indications. All samples exceeded the limit for B[b]F and benzo(g,h,i)perylene (B[ghi]Per); in the case of B[b]F, sample 2 exceeded the limit by a factor of about 30, and samples 1 and 9 by a factor of about 20. No crumb exceeded the limit for chrysene (Chry).

PAH levels in evaporates of rubber crumb

Table 6 shows the levels of benzo(a)anthracene (B[a]A), Chry, B[a]P and B[ghi]Per, among the most toxic high molecular weight PAHs detected in evaporates of nine rubber crumbs. We have taken only these PAHs because, when the evaporation test was repeated three times to obtain three consecutive readings for each sample, were the only PAHs which standard deviation (S.D.) was below the mean value in all nine samples. Among all samples, turf fields 9 and 1 released particularly high levels of all considered compounds. Evaporation tests showed that the releasing of four PAHs into the air by rubber crumb did not decrease with the time, suggesting chronic contamination in areas fitted with synthetic turf filled with rubber crumb.

It was also evaluated the mean times for total release of these four PAHs from the samples (Table 7). In theory, considering for each compound the total amount present in the rubber crumb samples and the amount found in the evaporated samples, we can estimate that for the new turf fields are necessary from a minimum of 811 times (sample 3) to a maximum of 4423 times (sample 2) to exhaust emissions of these compounds when the turf temperature reaches 60°C, then when the atmospheric temperature is 25°C. Regarding the used samples, in the same conditions of temperature, are required from a minimum of 346 times (sample 7) to a maximum of 655 times (sample 6). Assuming solar radiation keeps atmospheric temperature at 25°C for at least 5 h/day (heating experimental time in the Lab.) for 5 months of the year, there are 150 suitable days per year. Ignoring other sources of elimination, such as rainwater or washing that cause leaching and cooler days when the crumb still becomes warm, it would hypothetically take a minimum

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ZINC IN Digestive Fluids Exceeded DEC

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Citation: Marzili L, Coppola D, Bianchi N, Malfese S, Bianchi M (2015) Release of Polycyclic Aromatic Hydrocarbons and Heavy Metals from Rubber Crumb in Synthetic Turf Fields: Preliminary Hazard Assessment for Athletes. J Environ Anal Toxicol 5: 265. doi:10.4172/2161-0525.1000265

	Cd (mg/kg)	Pb (mg/kg)	Cr (mg/kg)	Ni (mg/kg)	Cu (mg/kg)	Zn (mg/kg)	Fe (mg/kg)
Sample 1	1.81	27.66	7.92	26.12	46.42	3474.00	489.60
Sample 2	1.77	17.51	17.52	9.86	39.96	3732.00	7256.00
Sample 3	0.47	13.97	4.12	4.11	5.59	6314.00	129.12
Sample 4	2.05	33.58	3.34	5.27	84.49	13202.00	657.40
Sample 5	2.68	11.23	2.84	8.95	9.50	6462.00	355.40
Sample 6	2.38	22.84	2.95	5.43	27.47	4866.00	1577.40
Sample 7	0.47	10.78	3.58	5.14	5.49	4188.00	643.00
Sample 8	1.51	28.44	1.91	3.90	14.43	6006.00	262.20
Sample 9	1.53	38.99	5.37	5.75	65.11	4194.00	348.80
Limit (LND, 2011)	2.00	100.00	150.00	120.00	120.00	160.00	N.D.

Table 2: Levels (mg/kg) of cadmium, lead, chromium, nickel, copper, zinc and iron in samples of rubber crumb. The triple horizontal line separates new crumb (samples 1-5) and crumb sampled from sporting installations (samples 6-9). Values in bold exceeded the limits set by the Italian National Amateur League reported in the last row.

Compound	Abbreviation	Structure (# of rings)	Formula	Molecular weight (g/mol)	Solubility (mg/L)	Melting point (°C)	Boiling point (°C)	Vapor tension (Pa) at 25°C	Coefficient octanol/water (log K _{ow})	Carcinogenicity IARC (2002)	Carcinogenicity NTP (2008)	Carcinogenicity IPCS (1986)	Carcinogenicity NRCC (1983)
Naphthalene (S)	Naph	2	C ₁₀ H ₈	128.17	31	81	217.9	10.4	3.40	2B		(?)	0
Acenaphthene (S)	Ace	3	C ₁₁ H ₈	154.21	3.6	65	279	2.9x10 ⁻⁴	3.92	3		(?)	0
Fluorene (S)	Fl	3	C ₁₂ H ₁₀	166.22	1.9	115-116	295	8.0x10 ⁻⁴	4.18	3		-	0
Phenanthrene (S)	Phen	3	C ₁₄ H ₁₀	178.23	1.1	100.5	340	1.6x10 ⁻⁴	4.60	3		(?)	0
Anthracene (S)	Ant	3	C ₁₄ H ₁₀	178.23	0.045	216.4	342	8.0x10 ⁻⁴	4.50	3		-	0
Fluoranthene (C)	Flt	4	C ₁₆ H ₁₂	202.26	0.26	108.5	375	1.2x10 ⁻⁴	5.22	3		-	0
Pyrene (C)	Pyr	4	C ₁₆ H ₁₀	202.26	0.132	150.4	393	6.0x10 ⁻⁴	5.18	3		(?)	0
Benzo(a)anthracene (C)	B(a)A	4	C ₁₈ H ₁₂	228.29	0.011	160.7	400	2.8x10 ⁻⁴	5.61	2B	Yes	+	+
Chrysene (C)	Chr	4	C ₁₈ H ₁₂	228.29	0.0015	253.8	448	8.4x10 ⁻⁴ (20°C)	6.91	2B	Yes	+	±
Benzo(b)fluoranthene (C)	B(b)F	5	C ₂₀ H ₁₄	252.32	0.0015	169.3	461	6.7x10 ⁻⁴ (20°C)	6.12	2B	Yes	+	±
Benzo(k)fluoranthene (C)	B(k)F	5	C ₂₀ H ₁₄	252.32	0.0008	215.7	480	1.3x10 ⁻⁴ (20°C)	6.84	2B	Yes	+	0
Benzo(a)pyrene (C)	B(a)P	5	C ₂₀ H ₁₂	252.32	0.0038	178.1	496	7.3x10 ⁻⁴	6.50	1	Yes	+	+
Dibenz(a,h)anthracene (C)	D(a,h)A	6	C ₂₂ H ₁₄	278.35	0.0005	266.6	524	6.3x10 ⁻⁴ (20°C)	6.60	1	Yes	+	+
Benzo(g,h,i)perylene (C)	B(g,h,i)Per	6	C ₂₂ H ₁₂	278.34	0.00026	278.3	545	1.4x10 ⁻⁴	7.10	3		(?)	0
Indeno(1,2,3-cd)pyrene (C)	I(1,2,3-cd)P	6	C ₂₂ H ₁₂	278.34	0.062	163.6	530	1.3x10 ⁻⁴ (20°C)	6.58	2B	Yes	+	+
										1 demonstrated carcinogenic 2A probable carcinogenicity 2B possible carcinogenicity 3 carcinogenicity not demonstrated	+ positive - negative ? uncertain () insufficient evidence	0 not carcinogenic ± uncertain carcinogenicity + carcinogenic	

Table 3: PAH compounds detected in rubber crumb samples. Abbreviations: S – petrogenic; C – pyrogenic. Grey shades indicate carcinogenicity, determined in at least three published studies, and degree of carcinogenicity.

	Sample 1 (ng/g)	Sample 2 (ng/g)	Sample 3 (ng/g)	Sample 4 (ng/g)	Sample 5 (ng/g)	Sample 6 (ng/g)	Sample 7 (ng/g)	Sample 8 (ng/g)	Sample 9 (ng/g)
Naphthalene	774.26	2039.61	360.19	804.53	424.87	248.14	407.59	223.32	1136.00
Acenaphthene	7267.50	10148.88	352.12	4200.63	416.15	405.31	1309.41	508.71	8321.31
Fluorene	10387.21	11025.47	426.81	1347.62	4944.42	1152.60	528.52	1665.02	7145.12
Phenanthrene	708.74	1180.10	146.90	1660.01	149.00	247.79	78.03	37.92	1013.68
Anthracene	80.30	138.12	38.25	282.62	44.56	76.39	7.64	34.59	182.28
Fluoranthene	2939.37	3740.04	872.96	1979.53	2243.22	710.43	993.99	817.50	3244.74
Pyrene	5670.11	6729.04	3683.32	5974.83	3600.41	1643.56	2144.43	1909.15	10280.99
Benzo(a)anthracene	1166.03	1612.68	92.28	440.21	267.10	115.46	41.37	5.38	369.40
Chrysene	2898.05	3422.21	823.00	1396.91	700.38	243.57	921.07	622.18	916.56
Benzo(b)fluoranthene	11103.33	15715.42	1149.65	4569.85	1663.07	1699.14	1248.07	1440.33	10185.76
Benzo(k)fluoranthene	679.65	1203.44	68.25	804.87	363.09	128.77	224.24	811.64	3616.88
Benzo(a)pyrene	256.10	464.58	119.81	229.96	165.92	265.10	60.28	51.72	662.56
Dibenz(a,h)anthracene	464.36	362.12	192.90	72.76	426.97	344.52	109.13	134.76	573.26
Benzo(g,h,i)perylene	902.89	449.76	395.63	416.69	565.24	543.82	239.69	344.62	475.49
Total PAHs	46307.33	66211.37	9122.66	23763.19	16634.40	8030.60	8311.46	9487.19	46143.49
Carcinogenic PAHs	16566.92	22780.35	2646.89	7314.68	3478.92	2694.56	2694.16	2668.02	16345.42

Table 4: Levels of PAHs (ng/g) detected in nine samples of rubber crumb. The triple vertical line separates new crumb (1-5) from crumb sampled directly from sporting facilities (6-9).

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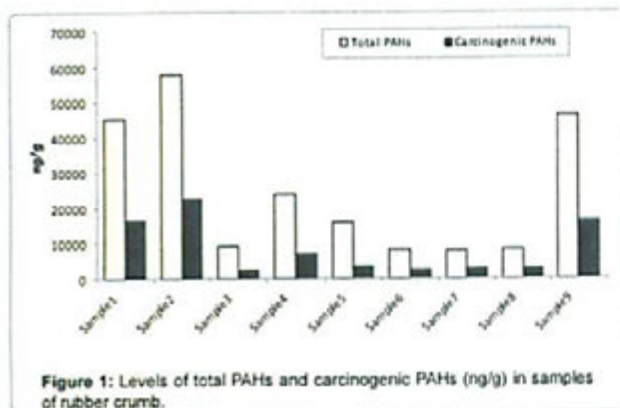


Figure 1: Levels of total PAHs and carcinogenic PAHs (ng/g) in samples of rubber crumb.

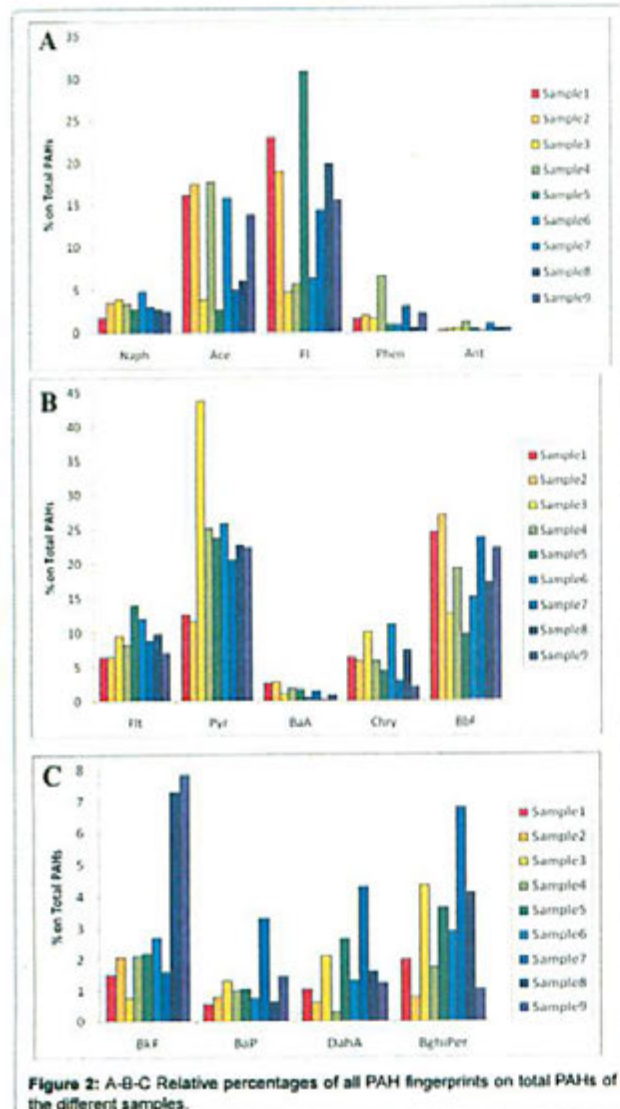


Figure 2: A-B-C Relative percentages of all PAH fingerprints on total PAHs of the different samples.

of 2 years (sample 7) to a maximum of about 29 years (sample 2) to reach theoretical zero concentration of PAHs.

Risk assessment for PAH inhalation from synthetic fields

The approach to assess human health risks through the inhalation route in the synthetic turf fields, plans to consider field surface as soil surface [24]. Then, if field surface does not reach a temperature of 25°C, the contaminant release in air can be associated to wind erosion and volatilization and the inhalation risk must consider also the contaminated dust resuspension. This site-specific inhalation risk evaluation that we have conducted on the rubber granulates of the nine synthetic fields, follows the recommendations of the Digs. 152/06 [8] and the indication of the technical procedure issued by APAT [34]. This evaluation procedure is applied separately on each pollutant and, at the end, all individual risk values obtained are summed. In order to proceed to this estimation, it is important to know the particulate emission factor (PEF) of outdoor matter of the survey site. We considered PEF equal to $PM_{10} \times 10^5$ kg/mg, where PM_{10} are the levels of total inhalable dusts (mg/m^3) potentially containing PAHs, assuming that all the particles present in the air as PM_{10} result from the volatilization of particles from the field, and not as an input from the wide variety of anthropogenic and crustal sources. Then, the following results are overestimated and they must be considered as extreme worst case screening. The precautionary principle is applied taking into account the highest average concentration of PM_{10} recorded in 2010 in Tuscany (since 8 turfs of 9 came from Tuscany) which is $PM_{10} = 0.0517$ mg/m^3 . Considering a punctiform source of contamination, it is possible to evaluate the contaminant concentration in air (C_A) given by $C_A = C_f \times PEF$, where C_f is contaminant concentration in field (mg/kg). In this way it is possible to calculate the Average Daily Dose (ADD), assumed by the athletes, expressed in terms of mass of contaminant per unit of body weight per day (mg/kg day). The ADD is calculated to evaluate toxic effects taking into consideration the C_A values, the inhalation rate (IR) of an athlete (3.6 m^3/h), the daily exposure frequency (EF_{day}) (2 h/d), the exposure frequency (EF) in a year (208 d/year), the exposure duration (ED) (20 years), the body weight (BW) (70 kg) and the averaging time (AT) (20 years \times 365 d/year):

$$ADD = (C_A \times IR \times EF_{day} \times EF \times ED) / (BW \times AT)$$

Furthermore, the Lifetime Average Daily Dose (LADD), used for the evaluation of carcinogenic effects, is calculated simply with the same parameters of ADD, except the Averaging Time (AT) that for carcinogenic effects considers 70 years (70 years \times 365 d/year).

Starting from ADD and LADD values, in the last step it is possible to calculate a Hazard Quotient (HQ) as an indicator of risks associated with health effects other than cancer, and Excess Cancer Risk (ECR) as the incremental probability of an exposed person developing cancer over

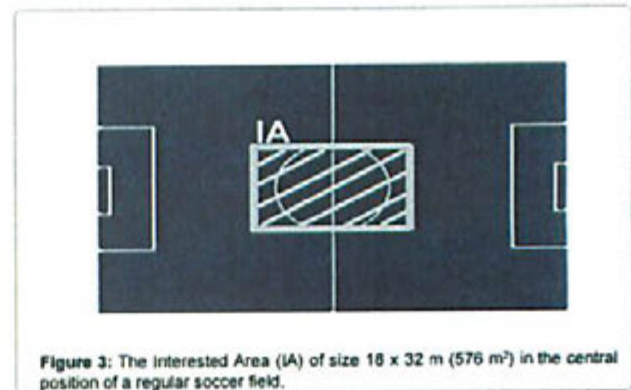


Figure 3: The interested Area (IA) of size 18 x 32 m (576 m²) in the central position of a regular soccer field.

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	Pyr (mg/kg)	B(a)A (mg/kg)	Chry (mg/kg)	B[b]F (mg/kg)	B(k)F (mg/kg)	B(a)P (mg/kg)	D(ah)A (mg/kg)	B(ghi)Per (mg/kg)
Sample 1	5.67	1.17	2.90	11.10	0.68	0.26	0.46	0.90
Sample 2	6.73	1.61	3.42	15.72	1.20	0.46	0.36	0.45
Sample 3	3.98	0.09	0.92	1.15	0.07	0.12	0.19	0.40
Sample 4	5.97	0.44	1.40	4.57	0.50	0.23	0.07	0.42
Sample 5	3.80	0.27	0.70	1.56	0.35	0.17	0.43	0.59
Sample 6	1.64	0.12	0.24	1.90	0.13	0.27	0.34	0.54
Sample 7	2.14	0.04	0.92	1.25	0.22	0.06	0.11	0.24
Sample 8	1.91	0.01	0.62	1.44	0.61	0.05	0.13	0.34
Sample 9	10.28	0.39	0.92	10.19	3.62	0.66	0.57	0.48
Limit (Dlgs 152/2006)	5.00	0.50	5.00	0.50	0.50	0.10	0.10	0.10

Table 5: Levels of PAHs (mg/kg) with maximum admissible concentration known detected in samples and the limits set by the Legislative Decree 152/2006. The triple horizontal line separates new crumb (samples 1-5) from crumb sampled from sporting installations (samples 6-9). Values in bold exceeded the limit.

	Benzo(a)anthracene (ng/g)		Chrysene (ng/g)		Benzo(a)pyrene (ng/g)		Benzo(g,h,i)perylene (ng/g)	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Sample 1	0.43	0.14	5.82	3.18	0.48	0.32	0.58	0.30
Sample 2	0.16	0.07	1.45	0.07	0.15	0.10	0.43	0.17
Sample 3	0.14	0.06	1.43	0.42	0.12	0.02	0.42	0.19
Sample 4	0.15	0.10	1.30	0.57	0.11	0.07	0.50	0.23
Sample 5	0.27	0.18	1.05	0.09	0.21	0.06	0.62	0.50
Sample 6	0.16	0.05	1.73	1.33	0.28	0.19	0.68	0.36
Sample 7	0.18	0.07	2.25	1.42	0.26	0.11	0.64	0.28
Sample 8	0.28	0.05	1.32	0.29	0.19	0.02	0.49	0.09
Sample 9	0.49	0.66	2.53	1.08	0.89	0.70	1.28	0.07

Table 6: Levels (ng/g) of benzo(a)anthracene, chrysene, benzo(a)pyrene and benzo(g,h,i)perylene in evaporates of rubber crumb samples at 60°C.

	Mean Time (days at atmospheric T=25°C)	SD
Sample 1	1325	1047
Sample 2	4423	3990
Sample 3	811	185
Sample 4	1734	967
Sample 5	846	150
Sample 6	655	396
Sample 7	346	136
Sample 8	410	229
Sample 9	568	234

Table 7: Estimated mean time (days) and standard deviation (SD) for total release of B(a)A, Chry, B(a)P and B(ghi)Per (sum of the four PAHs) from rubber crumb samples. The triple horizontal line divides new crumb (samples 1-5) from crumb sampled from sporting installations (samples 6-9).

a lifetime using for each pollutant the inhalation pathway toxicological parameters that are Reference Dose (R_D) for HQ calculation (HQ = ADD/R_D) and Slope Factor (SF) for ECR calculation (ECR = LADD × SF) (Table 8A-B). The values of these parameters are included in the ISS/ISPESL 2009 database [35] (Table 8A-B). HQs for all PAHs are summed to provide an overall Hazard Index (HI). When HI ≤ 1 there are no concern for potential adverse systemic health effects in the exposed individuals. Summing the individual ECR for all PAHs, it provides the Cumulative Excess Cancer Risk (ΣECR), that is acceptable if < 10⁻⁶ [36]. In the different rubber granulates samples was found a HI range that varies between a minimum of 8.94×10⁻⁷ in sample 4 and a maximum of 1.16×10⁻⁶ in sample 1 (Table 8A). The ΣECR range goes from a minimum of 4.91×10⁻⁸ for sample 6 to a maximum of 1.10×10⁻⁸ for sample 1 again (Table 8B). All values were considered as acceptable. Menichini et al. [37] found an excess lifetime cancer risk of 1×10⁻⁶ for an athlete with an intense 30-years activity; then despite the different parameters considered for the athlete in this study, the results are very similar.

In reality, when the ambient temperature is 25°C and direct sunlight exposure is present on field, rubber granulates reach a mean

temperature of 60°C, where a chronic release of PAHs occur, as seen in section 3.3. According to the high evaporation which occurs in this condition and knowing that these fields are used anyway with such temperatures, despite it should be decreased by watering, we calculate an estimate of risk for outdoor fields at 60°C. Applying again the precautionary principle estimating the maximum risk, we consider only the central area of the field of size 18 × 32 m (576 m²), from now indicated as Interested Area (IA) (Figure 3), where the exchange of air at 2 m is irrelevant because it comes from surrounding perimeter and then it has the same toxicological characteristics. The air temperature at 2 m above the field is considered to have the same temperature as the granulates, according to the principle of the vertical temperature gradient. First, we calculated the quantity of crumb in a soccer field, averaging the specific weights (γ), which were similar, of the various samples analyzed (mean 0.518 g/mL). Considering IA paved with synthetic turf 3 cm thick, the quantity of crumb of specific weight 0.518 g/mL is 8951 kg. To estimate risk to human health from exposure to PAHs, we expressed the toxicity of the various PAHs with respect to B[a]P, in other words as Benzo(a)Pyrene Equivalent (BaP_{eq}). We calculated the Toxic Equivalent Quantity (TEQ) by multiplying the individual PAH levels in evaporates by their Toxic Equivalency Factor

Precautionary Principle

Heat Turf Field

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A	R/D	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9
		HQ	HQ	HQ	HQ	HQ	HQ	HQ	HQ	HQ
Pyr	3.00x10 ⁻⁰²	5.73x10 ⁻⁰⁷	6.80x10 ⁻⁰⁷	4.02x10 ⁻⁰⁷	6.04x10 ⁻⁰⁷	3.84x10 ⁻⁰⁷	1.66x10 ⁻⁰⁷	2.17x10 ⁻⁰⁷	1.93x10 ⁻⁰⁷	1.04x10 ⁻⁰⁶
B(a)A	2.85x10 ⁻⁰¹	1.24x10 ⁻⁰⁸	1.71x10 ⁻⁰⁸	9.81x10 ⁻¹⁰	4.68x10 ⁻⁰⁹	2.84x10 ⁻⁰⁹	1.23x10 ⁻⁰⁹	4.40x10 ⁻¹⁰	5.72x10 ⁻¹¹	4.14x10 ⁻⁰⁹
Chry	3.00x10 ⁻⁰²	2.90x10 ⁻⁰⁷	3.46x10 ⁻⁰⁷	9.32x10 ⁻⁰⁸	1.41x10 ⁻⁰⁷	7.07x10 ⁻⁰⁸	2.46x10 ⁻⁰⁸	9.30x10 ⁻⁰⁹	6.28x10 ⁻⁰⁹	9.26x10 ⁻⁰⁹
B(b)F	2.85x10 ⁻⁰¹	1.18x10 ⁻⁰⁷	1.67x10 ⁻⁰⁷	1.22x10 ⁻⁰⁸	4.86x10 ⁻⁰⁸	1.66x10 ⁻⁰⁸	2.02x10 ⁻⁰⁹	1.33x10 ⁻⁰⁹	2.02x10 ⁻⁰⁹	1.08x10 ⁻⁰⁷
B(k)F	2.85x10 ⁻⁰²	7.22x10 ⁻⁰⁸	1.28x10 ⁻⁰⁷	7.26x10 ⁻⁰⁹	5.37x10 ⁻⁰⁹	3.75x10 ⁻⁰⁹	1.35x10 ⁻⁰⁹	2.38x10 ⁻⁰⁹	6.50x10 ⁻⁰⁹	3.84x10 ⁻⁰⁷
B(a)P	3.14x10 ⁻⁰⁰	2.48x10 ⁻¹⁰	4.49x10 ⁻¹⁰	1.16x10 ⁻¹⁰	2.22x10 ⁻¹⁰	1.60x10 ⁻¹⁰	2.56x10 ⁻¹⁰	5.83x10 ⁻¹¹	5.00x10 ⁻¹¹	6.40x10 ⁻¹⁰
B(ghi)Per	3.00x10 ⁻⁰²	9.12x10 ⁻⁰⁸	4.54x10 ⁻⁰⁸	4.00x10 ⁻⁰⁸	4.23x10 ⁻⁰⁸	5.91x10 ⁻⁰⁸	5.49x10 ⁻⁰⁸	2.42x10 ⁻⁰⁸	3.48x10 ⁻⁰⁸	4.80x10 ⁻⁰⁸
HI		1.16x10 ⁻⁰⁶	1.38x10 ⁻⁰⁶	5.56x10 ⁻⁰⁷	8.94x10 ⁻⁰⁷	5.71x10 ⁻⁰⁷	2.81x10 ⁻⁰⁷	3.71x10 ⁻⁰⁷	3.71x10 ⁻⁰⁷	1.68x10 ⁻⁰⁶
B	SF	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9
B(a)A	6.00x10 ⁻⁰¹	6.06x10 ⁻¹⁰	8.35x10 ⁻¹⁰	4.79x10 ⁻¹¹	2.29x10 ⁻¹⁰	1.39x10 ⁻¹⁰	6.00x10 ⁻¹¹	2.15x10 ⁻¹¹	2.80x10 ⁻¹²	2.02x10 ⁻¹⁰
Chry	6.10x10 ⁻⁰³	1.53x10 ⁻¹¹	1.81x10 ⁻¹¹	4.87x10 ⁻¹²	7.38x10 ⁻¹²	3.70x10 ⁻¹²	1.29x10 ⁻¹²	4.86x10 ⁻¹²	3.29x10 ⁻¹²	4.84x10 ⁻¹²
B(b)F	6.00x10 ⁻⁰¹	5.77x10 ⁻⁰⁹	8.16x10 ⁻⁰⁹	5.97x10 ⁻¹⁰	2.37x10 ⁻⁰⁹	8.12x10 ⁻¹⁰	9.87x10 ⁻¹⁰	6.48x10 ⁻¹⁰	7.48x10 ⁻¹⁰	5.29x10 ⁻⁰⁹
B(k)F	3.10x10 ⁻⁰²	1.82x10 ⁻¹¹	3.23x10 ⁻¹¹	1.63x10 ⁻¹²	1.36x10 ⁻¹¹	9.48x10 ⁻¹²	3.40x10 ⁻¹²	6.02x10 ⁻¹²	1.64x10 ⁻¹¹	9.71x10 ⁻¹¹
B(a)P	7.32x10 ⁻⁰⁰	1.62x10 ⁻⁰⁹	2.94x10 ⁻⁰⁹	7.59x10 ⁻¹⁰	1.46x10 ⁻⁰⁹	1.05x10 ⁻⁰⁹	1.68x10 ⁻⁰⁹	3.82x10 ⁻¹⁰	3.28x10 ⁻¹⁰	4.20x10 ⁻⁰⁹
D(ah)A	7.30x10 ⁻⁰⁰	2.93x10 ⁻⁰⁹	2.29x10 ⁻⁰⁹	1.22x10 ⁻⁰⁹	4.60x10 ⁻¹⁰	2.70x10 ⁻⁰⁹	2.18x10 ⁻⁰⁹	6.90x10 ⁻¹⁰	8.52x10 ⁻¹⁰	3.52x10 ⁻⁰⁹
ΣECR		1.10x10 ⁻⁰⁶	1.43x10 ⁻⁰⁶	2.63x10 ⁻⁰⁷	4.54x10 ⁻⁰⁷	4.71x10 ⁻⁰⁷	4.91x10 ⁻⁰⁷	1.75x10 ⁻⁰⁶	1.95x10 ⁻⁰⁶	1.34x10 ⁻⁰⁶

Table 8. Hazard Quotient (HQ) and Excess Cancer Risk (ECR) values calculated using the Reference Dose (R,D) for HQ calculation (HQ = ADD/R,D) (Table 8A) and Slope Factor (SF) for ECR calculation (ECR = LADD x SF) (Table 8B). The values of the R,D and SF are included in the ISS/SPESL 2009 database (ISS/SPESL, 2009). HQs for all PAHs are summed to provide an overall Hazard Index (HI). When HI ≤ 1 there are no concern for potential adverse systemic health effects in the exposed individuals. Summing the individual ECR for all PAHs, it provides the Cumulative Excess Cancer Risk (ΣECR), that is acceptable if < 10⁻⁶ (USEPA, 2009) [39].

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8	Sample 9
TEQ (ng/g)	0.59	0.19	0.15	0.14	0.25	0.30	0.32	0.24	0.98

Table 9. Toxicity Equivalent (TEQ) in benzo(a)pyrene equivalents (BaP_{eq}) in evaporate of crumb samples.

(TEF). This data was only calculated for PAHs that showed limited variability in the three replicates of evaporates, as mentioned above. Thus, the TEQ is based on Chry (TEF=0.01), B(a)A (TEF=0.1), B(a)P (TEF=1) and B(ghi)Per (TEF=0.01) [38-40] making it underestimated, as many other compounds with known TEF were found in the evaporates. The TEQ for each sample (Table 9) was calculated using the following formula:

$$TEQ \text{ (ng/g)} = B[a]A \times 0.10 + Chry \times 0.01 + B[a]P \times 1.00 + B[ghi]Per \times 0.01$$

IA use 8951 kg of rubber crumb and we estimated the TEQ in µg referred to the crumb evaporates of the different fields at an average air temperature of 25°C (Table 10A). Estimating evaporation up to a height of 2 m, we have a volume of 1152 m³ (576 m² × 2m). Table 10B shows the results in µg/m³ obtained dividing the TEQ of evaporates of the rubber crumb samples (µg) by the estimated volume of air (m³) above the field. Knowing that an athlete inhalation rate is around 3.6 m³ per hour [41], the TEQ inspired by him in a standard two-hour workout was calculated on the basis of that assumption. In 2 h of training, the daily intake of BaP_{eq} of an athlete is showed in Table 10C. If a player trains for 2 h a day, three times a week, five times for professionals, plus the match, his estimated intake of PAHs as TEQ ranged from 31.2 µg/week (sample 4) to 219.2 µg/week (sample 9), for an average weekly exposure of 8 h (Table 10D). Dividing this by 7 days we obtain 4.46 - 31.3 µg/day of BaP_{eq} inhaled as daily mean dose, not considering other PAH inputs for the athletes (Table 10E). For a 70 kg athlete, we obtain an intake of 0.06 - 0.45 µg/kg bw of BaP_{eq} per day (Table 10F). Since the release of PAHs is continuous and constant throughout the life of the field (Table 6), a chronic exposure of 0.06 to 0.44 µg/kg bw per day BaP_{eq} for a 70 kg athlete should not be underestimated. In fact recent studies have shown that 0.57 - 5.00 ng/kg bw per day is a *virtually safe dose* of B[a]P in food, which implies a risk of 1x10⁻⁶ (one person in a million will develop cancer after chronic exposure). Considering that,

generally, carcinogenic PAHs are about 10-fold higher than the B[a]P alone, the carcinogenicity increases and a *virtually safe dose* of B[a]P, as an indicator of carcinogenic PAHs in food, would be in the range 0.06 - 0.50 ng/kg bw per day [42], theoretically 1000 times lower than the range of 0.06 to 0.45 µg/kg bw per day found in this study.

Conclusions

Rubber crumb derived from recycled tyres, like the tyres themselves, should be considered non-hazardous special waste. The literature and the present study show that crumb contains PAHs and heavy metals. Fine dust may become airborne and leachate may filter into the soil. The magnitude of human exposure depends on chemicals of concern concentration in field, exposure parameters describing human physiology (e.g. dermal contact, body weight) and population-specific parameters describing exposure behaviour (exposure frequency, duration). Randomly ingested crumb may release these compounds in the digestive tract. Most of all, evaporation at high temperatures may expose users of sports grounds, who are often children between 5 and 13 years of age, in a very sensitive phase of growth, to many of these toxic compounds.

The results of the present study demonstrate that PAHs are continuously released from rubber crumb through evaporation. Athletes frequenting grounds with synthetic turf are therefore exposed to chronic toxicity from PAHs. The main conclusion we can draw from this preliminary study, which will be validated by further field and laboratory research, is that although synthetic turf offers various advantages over natural grass, the quantity of toxic substances it releases when heated does not make it safe for public health. When we extrapolated the data obtained in laboratory, the toxicity equivalent (TEQ) of the different compounds evaporating from the crumb was far from negligible and would contribute substantially to an athlete's total daily PAH intake. In fact, all rubber crumb samples of this study exceeded the DfGs. 152/2006 [8] for B(b)F, B(ghi)Per and Zn, but all

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PAHs, except Chry, were over the threshold in almost one synthetic field. It must be underlined that this preliminary hazard assessment overestimates the PAH contribution of the field because the input from the wide variety of anthropogenic and crustal sources were not considered and then, this theoretical approach must be considered as an extreme worst case screening.

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Overview of the risks of synthetic turf fields

by David R. Brown Sc.D., Public Health Toxicologist

April 4, 2015

If one looks at the number of studies on synthetic turf fields that have attempted to estimate the risk to young students' and athletes' from the exposures to chemicals contained in the fields, you will see the problem.

The findings of each of the studies are based on a startling limited number (2 to 12) actual samples of crumb rubber (each weighing a no more than few ounces), on small number of fields most without with any testing of the crumb rubber (4 to 6 fields at most). There is no study that is comprehensive systematic assessment of the risk.

Instead, a natural experiment is being conducted in which thousands of children are being exposed on playing fields to rubber, 1) known to contain carcinogens and 2) documented to produce cancer in the workers in the tire manufacturing plants.

The results of this human health experiment is to determine whether there is enough exposure to carcinogens in the synthetic turf fields to cause cancer in the children who play on these fields.

Now that there is strong indication that cancer has appeared in one segment of the student groups that have played on synthetic turf, (soccer goalies in particular as well as others) the experiment is allowed to continue with health departments standing by until they can obtain positively statistical confirmation of the cancer hazard.

Crumb rubber infill contains a large number of chemicals known to be toxic to humans. These include chemicals associated with cancer, asthma, and other adverse health effects. There is no "safe" threshold level for exposure to carcinogens.

The only way to eliminate cancer risk from these chemicals is to eliminate exposure. No existing study disputes the inherent hazard of these chemicals; the studies simply draw varying conclusions regarding the total amount that these chemicals pose to children who are likely to be exposed when they play on the artificial turf fields.

The bottom line is that nobody knows exactly what the mix of chemicals is in any given field containing crumb rubber made from recycled tires. Tires themselves are manufactured with a wide variety of chemicals. Fields may contain tires from a variety of sources, and there is no source of information to identify exactly what chemicals, and in what quantity, are present in any given field. No entity providing the crumb rubber provides any quality control, identification of source, or analytical analysis of the contents of the rubber used.

Children are more susceptible than adults to a variety of environmental hazards, for several reasons. Children's organ systems are developing rapidly. A toxic exposure during a critical window of development can have life-long consequences. Children's detoxification mechanisms are also immature, so an exposure that might not have an important effect on an adult could have an important effect on a child. In addition, children have many years in which to develop disease.

* Cancer, in particular, is a disease with long latency: disease can develop many years after exposure. For this and other reasons, it is particularly important to avoid carcinogenic exposures during childhood.

* There has been no comprehensive assessment of the data on cancer among athletes exposed to crumb rubber from artificial turf exposures. However, the evidence collected to date indicates a basis for concern and an urgent need for closer scrutiny. Most notable is that the ratio of lymphomas and leukemia is the reverse of that expected in the general population for that age group. Such a reverse in the pattern of cancers present is considered a signal that an active chemical carcinogen is present. *

Given the high stakes, it is prudent to take action to protect children from this known hazard rather than wait for definitive evidence of harm.

- *Precautionary Principle* -

Thank you for your attention,

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NY Elected Officials Introduce Bipartisan Bill to Protect Children from Toxic Chemicals

Child Safe Products Act Would Require New York to Report, and Ultimately Ban, Toxic Chemicals in Children's Products

ALBANY, NY— Today, Sen. Phil Boyle (R-Bay Shore) and Assemblyman Steve Englebright (D-East Setauket) announced the introduction of a bill that would empower New York State to identify and phase out dangerous chemicals in products marketed to kids in New York.

If enacted, the bill [S.4102/A.5612], commonly known as the **Child Safe Products Act**, would first establish a list of high-concern chemicals, based on authoritative scientific evidence that the chemicals cause major health problems. Next, it would establish a list of priority chemicals used in children's products for disclosure. Children's product makers would be required after a year to report their use of priority chemicals in their merchandise, and then phase out their use three years later.

Unless the bill is passed, thousands of toxic children's products will remain on the shelves, tainted by chemicals like arsenic, mercury, cadmium, formaldehyde and cobalt.

The toxic chemicals in children's products have been linked to a host of serious medical problems including cancer, learning and developmental disabilities, reproductive problems, and asthma. Until the bill is enacted, New York children remain at risk.

Senator Phil Boyle, (R-Bay Shore), lead sponsor of S. 4102, said, "Protecting children from toxic chemicals is just common sense. Despite market advancements and announcements by major retailers, voluntary measures just don't get us there. It's up to us, as elected officials, to take action to protect our own residents. I thank my colleague Assemblyman Englebright for introducing the Child Safe Products Act, and I am committed to seeing it enacted in 2015."

“Children are not just small adults and their developing systems are more sensitive to and are at an increased risk of chemical exposure,” said **Assembly Environmental Conservation Committee Chair Steve Englebright (D-East Setauket)**. “Currently, New York prohibits the use of dangerous chemicals on a chemical-by-chemical basis. The President’s Cancer Panel reported that nearly 80,000 chemicals are used in the country today, many of which are unstudied and largely unregulated. We need to act now to protect our children’s health and the environment from unnecessary toxic chemicals found in products designed for them.”

The reintroduction of the bill has generated significant support from the public, including the JustGreen Partnership, a coalition of pediatricians, environmental groups, environmental justice leaders, learning disability advocates, parent organizations, healthy schools advocates, sustainable companies and other members of the community.

“Each year, diseases of environmental origin in New York’s children cost an estimated \$4.35 billion. These include learning and developmental disabilities, cancer, and asthma. Such diseases are preventable, by protecting children from the chemicals that cause them,” said **Dr. Philip Landrigan, MD, MSc., pediatrician and epidemiologist at Mt. Sinai School of Medicine**. “The Child Safe Products Act is an important part of this prevention process.”

“We must protect our children from exposure to dangerous chemicals in products meant for them. Many of these chemicals cause a reduction in a child’s brain function and behavior and can alter later reproduction,” said **Dr. David O. Carpenter, director of the Institute for Health & Environment at SUNY Albany**.

“Our brothers and sisters across the country are facing alarming rates of cancers, and we need the federal government and our decision-makers at the state level to take notice and help us come up with solutions,” said **Mike McManus, president, New York State Professional Fire Fighters Association**. “Chemicals should be proven safe before ending up in our homes and building materials, to protect the health of Fire Fighters and families,” McManus added.

“The New York State Breast Cancer Network urges the passage of the Child Safe Products Act. Several national researchers have found that exposure to tiny amounts of estrogen-mimicking chemicals during particular ‘windows of susceptibility’, such as the pre-natal, neo-natal and pre-adolescent periods, will place female babies and girls under 12-years old at risk for breast cancer in their adult lives.” said **Andi Gladstone, Executive Director of the New York State Breast Cancer Network.**

“We commend the actions of our elected officials, on the local, state and county level who have already done what is necessary to protect the health and safety of our children now and for future generations,” said **Francesca Sommer, Executive Director of the Learning Disabilities Association of New York State.** “We urge those who have not yet done so, to join us!”

“As moms, we may differ in our approaches to parenting, our career choices, or our politics, but we can all agree that toxic chemicals do not belong in our children’s toys and products,” said **Mitzi Rose, Moms for a Non-Toxic NY, Rochester chapter.**

“Independent business owners need the clarity that good regulations can provide,” said **Laura Ornstein, Coordinator of the New York State Sustainable Business Council.** “Better regulatory oversight of chemicals will level the playing field by improving transparency, limiting liability, and reducing exposures.”

“Pregnant women, infants and children are especially vulnerable to the health impacts of toxic chemical exposure”, states **Trisha Sheehan, Moms Clean Air Force Regional Field Manager.** “The Child Safe Products Act is a step in the right direction to protect the families of New York from toxic chemicals. Moms should be able to trust that the products we use in our homes will not harm our children. We want strong policies that will limit our families’ exposures to toxic chemicals.”

“Toxic chemicals have absolutely no place in the homes and schools of our children,” said **John Replogle, CEO of Seventh Generation,** the nation’s leading brand of non-toxic and renewable bio-based household, baby and personal care solutions. “Our mission is to nurture the health of future generations, and with the introduction, and hopefully the passing of CSPA, we can see our mission through on behalf of New York’s children.”

“Time is of the essence in getting this common sense legislation passed into law,” stated **Senate EnCon Committee Vice-Chair Tony Avella**. “Our children’s safety is of the utmost importance and it is our responsibility, as Legislators, to safeguard children’s toys across the state. That is why I immediately signed onto the Child Safe Products Act as a co-sponsor. I urge my colleagues in the State Senate to vote in favor of this vital bill.”

“We need a more comprehensive approach regulating chemicals used in the manufacture of children’s toys in New York. It’s our responsibility to ensure that our kids’ playthings do not pose serious health risks. The effects of these chemicals in small doses can be extremely dangerous to young developing children. Let’s pass the Child Safe Products Act this year,” said **Felix W. Ortiz, Assistant Speaker in the NYS Assembly**.

“New York’s parents deserve to know what is safe for their families, but right now they’re flying blind, said **Kathy Curtis, Executive Director of Clean and Healthy New York and co-leader of the JustGreen Partnership**. “Meanwhile, it’s legal and common practice to add toxic chemicals to infant’s and children’s products. To make the dream of safe products for all children a reality, the Legislature must pass this initiative and deliver it to the Governor,” Curtis added.

“Environmental Advocates of New York applauds Senator Boyle and Assemblyman Englebright for introducing the ‘Child-safe Products Act’,” said **Saima Anjam, Environmental Health Director**. “With the Legislature and the Governor in agreement on the need to protect our children from toxic chemicals, there is no excuse for this common sense legislation to not become law in 2015.”

“Toxic chemicals do not belong in our air or our water, and they certainly do not belong in the products children use every day,” said **Caitlin Pixley, Conservation Association of the Sierra Club Atlantic Chapter**. “New Yorkers deserve a toxic-free future and we look to the Legislature for leadership on this issue, through passage of the Child Safe Products Act.”

“In the communities that we work in, families do not have the time or the finances to bypass all of the toxic products on store shelves,” said **Cecil Corbin-Mark, Deputy Director of WE ACT For Environmental Justice and Co-Leader of the JustGreen Partnership**. “With this bill, parents from Harlem to the west side of Buffalo can rest assured that the State of New York is on the job helping to protect their children from dangerous chemicals.”

“The alarming findings of recent reports in Albany, Westchester, and Long Island have confirmed that action is needed to protect the health of New York’s families,” said Marcia Bystryn, President of the New York League of Conservation Voters. *“Toxic chemicals have no place in children’s toys, and they should not be on store shelves for sale.* Parents deserve the right to know what dangers are lurking in the products they bring home so they can make informed decisions about their families’ health.”

In addition to the state legislative campaign, counties across New York are also taking action and introducing local legislation called the Toxic-Free Toys Act. Today and tomorrow, Westchester and Suffolk counties will hold public hearings on the issue. In 2015, 28 states are expected to advance policies to protect the public from toxic chemicals. **Eleven other states are considering policies similar to New York’s Child Safe Products Act.**

Learn more about state actions at: <http://www.saferstates.org/news/2015map/>

TUESDAY, NOVEMBER 8, 2011

NJSA 2C:2-2 Culpability

NJSA 2C:2-2 Culpability

2C:2-2. Culpability

General requirements of culpability

a. **Minimum** requirements of culpability. Except as provided in subsection c.(3) of this section, a person is not guilty of an offense unless he acted purposely, knowingly, recklessly or negligently, as the law may require, with respect to each material element of the offense.

b. **Kinds** of culpability defined.

(1) **Purposely.** A person acts purposely with respect to the nature of his conduct or a result thereof if it is his conscious object to engage in conduct of that nature or to cause such a result. A person acts purposely with respect to attendant circumstances if he is aware of the existence of such circumstances or he believes or hopes that they exist. "With purpose," "designed," "with design" or equivalent terms have the same meaning.

(2) **Knowingly.** A person acts knowingly with respect to the nature of his conduct or the attendant circumstances if he is aware that his conduct is of that nature, or that such circumstances exist, or he is aware of a high probability of their existence. A person acts knowingly with respect to a result of his conduct if he is aware that it is practically certain that his conduct will cause such a result. "Knowing," "with knowledge" or equivalent terms have the same meaning.

(3) **Recklessly.** A person acts recklessly with respect to a material element of an offense when he consciously disregards a substantial and unjustifiable risk that the material element exists or will result from his conduct. The risk must be of such a nature and degree that, considering the nature and purpose of the actor's conduct and the circumstances known to him, its disregard involves a gross deviation from the standard of conduct that a reasonable person would observe in the actor's situation. "Recklessness," "with recklessness" or equivalent terms have the same meaning.

(4) **Negligently.** A person acts negligently with respect to a material element of an offense when he should be aware of a substantial and unjustifiable risk that the material element exists or will result from his conduct. The risk must be of such a nature and degree that the actor's failure to perceive it, considering the nature and purpose of his conduct and the circumstances known to him, involves a gross deviation from the standard of care that a reasonable person would observe in the actor's situation. "Negligently" or "negligence" when used in this code, shall refer to the standard set forth in this section and not to the standards applied in civil cases.

c. **Construction** of statutes with respect to culpability requirements.

(1) **Prescribed** culpability requirement applies to all material elements. When the law defining an offense prescribes the kind of culpability that is sufficient for the commission of an offense, without distinguishing among the material elements thereof, such provision shall apply to all the

material elements of the offense, unless a contrary purpose plainly appears.

(2) **Substitutes** for kinds of culpability. When the law provides that a particular kind of culpability suffices to establish an element of an offense such element is also established if a person acts with higher kind of culpability.

(3) **Construction of statutes not stating culpability requirement.** Although no culpable mental state is expressly designated in a statute defining an offense, a culpable mental state may nevertheless be required for the commission of such offense, or with respect to some or all of the material elements thereof, if the proscribed conduct necessarily involves such culpable mental state. A statute defining a crime, unless clearly indicating a legislative intent to impose strict liability, should be construed as defining a crime with the culpability defined in paragraph b.(2) of this section. This provision applies to offenses defined both within and outside of this code.

d. **Culpability as to illegality of conduct.** Neither knowledge nor recklessness nor negligence as to whether conduct constitutes an offense or as to the existence, meaning or application of the law determining the elements of an offense is an element of such offense, unless the definition of the offense or the code so provides.

e. **Culpability as determinant of grade of offense.** When the grade or degree of an offense depends on whether the offense is committed purposely, knowingly, recklessly or criminally negligently, its grade or degree shall be the lowest for which the determinative kind of culpability is established with respect to any material element of the offense.

L.1978, c. 95, s. 2C:2-2, eff. Sept. 1, 1979. Amended by L.1981, c. 290, s. 4, eff. Sept. 24, 1981.

2C:2-3. **Causal relationship between conduct and result; divergence between result designed, contemplated or risked and actual result**

a. **Conduct is the cause of a result when:**

(1) It is an antecedent but for which the result in question would not have occurred; and

(2) The relationship between the conduct and result satisfies any additional causal requirements imposed by the code or by the law defining the offense.

b. When the **offense requires that the defendant purposely or knowingly cause a particular result**, the actual result must be within the design or contemplation, as the case may be, of the actor, or, if not, the actual result must involve the same kind of injury or harm as that designed or contemplated and not be too remote, accidental in its occurrence, or dependent on another's volitional act to have a just bearing on the actor's liability or on the gravity of his offense.

c. When the **offense requires that the defendant recklessly or criminally negligently cause a particular result**, the actual result must be within the risk of which the actor is aware or, in the case of criminal negligence, of which he should be aware, or, if not, the actual result must involve the same kind of injury or harm as the probable result and must not be too remote, accidental in its occurrence, or dependent on another's volitional act to have a just bearing on the actor's liability or

on the gravity of his offense.

d. A defendant shall **not be relieved of responsibility** for causing a result if the only difference between what actually occurred and what was designed, contemplated or risked is that a different person or property was injured or affected or that a less serious or less extensive injury or harm occurred.

e. When **causing a particular result is a material element of an offense for which absolute liability is imposed by law**, the element is not established unless the actual result is a probable consequence of the actor's conduct.

State of New Jersey
Highlands Water Protection and Planning Council
100 North Road (Route 513)
Chester, New Jersey 07930-2322 (908) 879-6737
(908) 879-4205 (fax)
www.highlands.state.nj.us

Draft
Page 3 Revision
Exemption #6

Highlands Water Protection and Planning Act

Municipalities MUST Adhere to Highlands' Enhanced standard's R A T Not Schools!!

Exemptions and Waivers

The Highlands Act creates seventeen exemptions that allow property owners to develop their properties without applying the enhanced environmental standards adopted by the New Jersey Department of Environmental Protection in the Preservation Area. In addition, the rules adopted by DEP include provisions for four waivers that allow some degree of deviation from the enhanced environmental standards.

Exemptions

1. **Construction of a single family dwelling for own use or family use:** The construction of a single family dwelling, for an individual's own use or the use of an immediate family member, on a lot owned by the individual on the date of enactment of this act or on a lot for which the individual has on or before May 17, 2004 entered into a binding contract of sale to purchase that lot;
2. **Construction of a single family dwelling on existing lot:** The construction of a single family dwelling on a lot in existence on the date of enactment of this act, provided that the construction does not result in the ultimate disturbance of one acre or more of land or a cumulative increase in impervious surface by one-quarter acre or more;
3. **Developments with prior Municipal and DEP Approvals:** A major Highlands development that received on or before March 29, 2004:
 - (a) one of the following approvals pursuant to the "Municipal Land Use Law," P.L.1975, c. 291 (C.40:55D-1 et seq.):
 - (i) preliminary or final site plan approval;
 - (ii) final municipal building or construction permit;
 - (iii) minor subdivision approval where no subsequent site plan approval is required;
 - (iv) final subdivision approval where no subsequent site plan approval is required; or
 - (v) preliminary subdivision approval where no subsequent site plan approval is required; and

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Page 2

(b) at least one of the following permits from the Department of Environmental Protection, if applicable to the proposed major Highlands development:

(i) a permit or certification pursuant to the "Water Supply Management Act," P.L.1981, c. 262 (C.58:1A-1 et seq.);

(ii) a water extension permit or other approval or authorization pursuant to the "Safe Drinking Water Act," P.L.1977, c. 224 (C.58:12A-1 et seq.);

(iii) a certification or other approval or authorization issued pursuant to the "The Realty New Jersey is an Equal Opportunity Employer

Improvement Sewerage and Facilities Act (1954)," P.L.1954, c. 199 (C.58:11-23 et seq.); or

(iv) a treatment works approval pursuant to the "Water Pollution Control Act," P.L.1977, c. 74 (C.58:10A-1 et seq.); or

(c) one of the following permits from the Department of Environmental Protection, if applicable to the proposed major Highlands development, and if the proposed major Highlands development does not require one of the permits listed in sub-subparagraphs (i) through (iv) of subparagraph (b) of this paragraph:

(i) a permit or other approval or authorization issued pursuant to the "Freshwater Wetlands Protection Act," P.L.1987, c. 156 (C.13:9B-1 et seq.); or

(ii) a permit or other approval or authorization issued pursuant to the "Flood Hazard Area Control Act," P.L.1962, c. 19 (C.58:16A-50 et seq.).

The exemption provided in this paragraph shall apply only to the land area and the scope of the major Highlands development addressed by the qualifying approvals pursuant to subparagraphs (a) and (b), or (c) if applicable, of this paragraph, shall expire if any of those qualifying approvals expire, and shall expire if construction beyond site preparation does not commence within three years after the date of enactment of this act;

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4. **Reconstruction of buildings or structures within 125% of the footprint:** The reconstruction of any building or structure for any reason within 125% of the footprint of the lawfully existing impervious surfaces on the site, provided that the reconstruction does not increase the lawfully existing impervious surface by one-quarter acre or more. This exemption shall not apply to the reconstruction of any agricultural or horticultural building or structure for a non-agricultural or non-horticultural use;

5. **Improvement to a single family dwelling:** Any improvement to a single family dwelling in existence on the date of enactment of this act, including but not limited to an addition, garage, shed, driveway, porch, deck, patio, swimming pool, or septic system;

6. **Places of worship, schools, or a hospitals:** Any improvement, for non-residential purposes, to a place of worship owned by a nonprofit entity, society or association, or association organized primarily for religious purposes, or a public or private school, or a hospital, in existence on the date of enactment of this act, including but not limited to new structures, an addition to an existing building or structure, a site improvement, or a sanitary facility; No Exemption for installation of SYNTHETIC TURF containing any COMPONENT OF CRUMB RUBBER FILL which CRUMB RUBBER is the result of processing of waste tires, which contain numerous components, some which are known to be hazardous to people and the environment. The hazardous components include, arsenic, cadmium, chromium, lead, vanadium, zinc, acetone, benzene, mercury, carbon black, 1,3 butadiene, phthalates, polycyclic aromatic hydrocarbons (PAHs), benzothiazole, butylated hydroxyanisole, n-hexadecane, 4-(t-octyl)phenol, .

7. **Woodland and Forest management plans:** An activity conducted in accordance with an approved woodland management plan pursuant to section 3 of P.L.1964, c. 48 (C.54:4-23.3) or the normal harvesting of forest products in accordance with a forest management plan approved by the State Forester;

8. **Trails on public or private lands:** The construction or extension of trails with non- impervious surfaces on publicly owned lands or on privately owned lands where a conservation or recreational use easement has been established;

9. **Repair of transportation or infrastructure systems:** The routine maintenance and operations, rehabilitation, preservation, reconstruction, or repair of transportation or infrastructure systems by a State entity or local government unit, provided that the activity is consistent with the goals and purposes of this act and does not result in the construction of any new through-capacity travel lanes;

10. **Transportation safety projects:** The construction of transportation safety projects and bicycle and pedestrian facilities by a State entity or local government unit, provided that the activity does not result in the construction of any new through-capacity travel lanes.

No EPA Studies on the Long-Term Effects of Tire-Crumb on the Environment Apathy - Safety

Now

RESOLUTION 2015-5
NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL
ACCEPTANCE OF AUDIT REPORT

WHEREAS, the Highlands Water Protection and Planning Act (Highlands Act) has created a public body corporate and politic with corporate succession known as the Highlands Water Protection and Planning Council (Highlands Council); and

WHEREAS, Section 6.g of the Highlands Act authorizes the Highlands Council to conduct its business as needed to effectuate the purposes of the enabling legislation; and

WHEREAS, in order to properly perform independent audits as required by State law, the Highlands Council established the Highlands Council's Audit and Evaluation Committees by Resolution 2006-06 on January 19, 2006; and

WHEREAS, the Highlands Council's Evaluation Committee approved a Request for Proposal (RFP) to provide auditing services on January 19, 2012; and

WHEREAS, after the review and recommendations of the Evaluation Committee and the Audit Committee, the Highlands Council approved Resolution 2012-16 on May 17, 2012 authorizing the Executive Director to enter a contract for auditing services with Mercadien , P.C. (Mercadien); and

WHEREAS, Mercadien completed and prepared the final report on the Highlands Council's financial statement and recommended actions for Fiscal Year 2014 and presented it to the Audit Committee of the Highlands Council; and

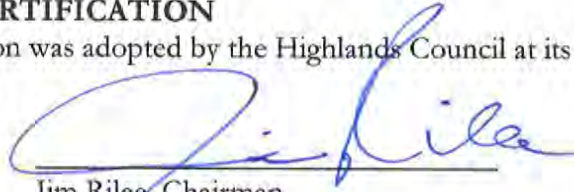
WHEREAS, the Highlands Council Audit Committee reviewed the final report and the annual management letter with Mercadien and recommended that the Highlands Council accept the final report.

NOW, THEREFORE, BE IT RESOLVED that the Highlands Council hereby:

- 1) accepts Mercadien's final audit report for Fiscal Year 2014; and
- 2) directs the Audit Committee to continue to oversee the proper implementation of the audit requirements in accordance with State law.

CERTIFICATION

I hereby certify that the foregoing Resolution was adopted by the Highlands Council at its regular meeting held on the 16th day of April 2015.



Jim Rilee, Chairman

RESOLUTION 2015-5
NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL
ACCEPTANCE OF AUDIT REPORT

Vote on the Approval of The Resolution	Motion	Second	Yes	No	Abstain	Absent
Councilmember Alstede			✓			
Councilmember Carluccio			✓			
Councilmember Dougherty						✓
Councilmember Dressler						✓
Councilmember Francis			✓			
Councilmember Holtaway						✓
Councilmember James						✓
Councilmember Richko			✓			
Councilmember Sebetich						✓
Councilmember Tfank			✓			
Councilmember Visioli		✓	✓			
Councilmember Vohden			✓			
Councilmember Walton	✓		✓			
Chairman Rilee			✓			

RESOLUTION 2015-6
NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL
APPROVAL OF THE PETITION FOR PLAN CONFORMANCE FOR
THE TOWNSHIP OF BOONTON, MORRIS COUNTY

WHEREAS, the New Jersey Highlands Region (Highlands Region) is an area of over 859,358 acres that consists of 88 municipalities in parts of seven counties – Bergen, Hunterdon, Morris, Passaic, Somerset, Sussex and Warren; and

WHEREAS, the New Jersey Legislature found that the Highlands Region is an essential source of drinking water, providing clean and plentiful drinking water for one-half of the population of the State of New Jersey, and also contains other exceptional natural resources such as clean air, contiguous forest lands, agricultural lands, wetlands, pristine watersheds, and habitat for fauna and flora, as well as sites of historic significance and recreational opportunities; and

WHEREAS, the Legislature found that the Highlands Region also provides a desirable quality of life and place where people live and work, that it is important to ensure the economic viability of Highlands communities and that residential, commercial, and industrial development, redevelopment, and economic growth in certain appropriate areas of the Highlands are also in the best interests of all the citizens of the State, providing innumerable social, cultural, and economic benefits and opportunities; and

WHEREAS, the Legislature found that the Highlands Region contains agricultural lands in active production and that these lands are important resources of the State that should be preserved, that the agricultural industry in the Region is a vital component of the economy, welfare, and cultural landscape of the Garden State and that maintenance of agricultural production and a positive agricultural business climate should be encouraged to the maximum extent possible; and

WHEREAS, the Legislature found that the pace of development in the Highlands Region has dramatically increased, that the Region, because of its proximity to rapidly expanding suburban areas, is at serious risk of being fragmented and consumed by unplanned development and that the existing land use and environmental regulation system cannot protect the water and natural resources of the Highlands against the environmental impacts of sprawl development; and

WHEREAS, deeming protection of the Highlands Region an issue of State level importance, the Legislature enacted the Highlands Water Protection and Planning Act, N.J.S.A. 13:20-1 et seq. (Highlands Act), to establish a regional approach to land use planning for the Highlands Region to replace the uncoordinated land use decisions of 88 municipalities, seven counties and a myriad of private landowners; and

WHEREAS, the Highlands Act delineates two areas in the Highlands Region: a Preservation Area, containing approximately 415,000 acres, and a Planning Area, containing approximately 445,000 acres; and

WHEREAS, the Legislature created a public body corporate and politic with corporate succession known as the Highlands Water Protection and Planning Council (Highlands Council) to advance a new regional approach to land use planning and to prepare a Regional Master Plan to protect and enhance the significant values of the Highlands resources throughout the entire Highlands Region; and

WHEREAS, the Preservation Area is an area with exceptional natural resource value that should be subject to stringent water and natural resource protection standards, policies, planning and regulation; and

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WHEREAS, the Planning Area is the area outside of the Preservation Area that should likewise be part of a comprehensive planning approach that serves to protect the water and other significant resources of the entire Highlands Region while also accommodating appropriate patterns of development, redevelopment and economic growth; and

WHEREAS, the Legislature found that such a new regional approach to land use planning shall be complemented by increased standards more protective of the environment established by the New Jersey Department of Environmental Protection (NJDEP) for development in the Preservation Area of the Highlands; and

WHEREAS, the Legislature found that this comprehensive approach should be guided, in heart, mind, and spirit, by an abiding and generously given commitment to protecting the incomparable water resources and natural beauty of the New Jersey Highlands so as to preserve them intact, in trust, forever for the pleasure, enjoyment, and use of future generations while also providing every conceivable opportunity for appropriate economic growth and development to advance the quality of life of the residents of the Highlands Region and the entire State; and

WHEREAS, Sections 8 and 10 of the Highlands Act mandate that the Highlands Council prepare and adopt the Regional Master Plan with the goal of protecting and enhancing the significant values of the resources in the Highlands Region; and

WHEREAS, Section 10 of the Highlands Act establishes goals for the Regional Master Plan for both the Preservation Area and Planning Area, including to protect, restore, and enhance the quality and quantity of the waters of the Highlands, to preserve environmentally sensitive lands, to preserve lands needed for recreation and conservation, to promote brownfield remediation and redevelopment, to preserve farmland, historic sites and other historic resources, to preserve outdoor recreation opportunities, to promote water resource conservation, and to promote compatible agricultural, horticultural, recreational, and cultural uses and opportunities; and

WHEREAS, the Highlands Act establishes development goals in the Preservation Area, to prohibit or limit, to the maximum extent possible, construction or development which is incompatible with the Preservation Area; and

WHEREAS, the Highlands Act establishes development goals in the Planning Area, to encourage, consistent with the State Development and Redevelopment Plan and smart growth strategies and principles, appropriate patterns of compatible residential, commercial, and industrial development, redevelopment, and economic growth, in or adjacent to areas already utilized for such purposes, and to discourage piecemeal, scattered, and inappropriate development, in order to accommodate local and regional growth and economic development in an orderly way while protecting the Highlands environment from individual and cumulative adverse impacts; and

WHEREAS, Sections 11 and 12 of the Highlands Act specifically require that the Regional Master Plan be comprised of (a) a Resource Assessment that seeks to determine the amount and type of human development and activity that can be sustained by the Highlands Region's ecosystem while maintaining the Region's overall ecological values; (b) a Financial Component that details the costs of implementing the Regional Master Plan, and details the sources of revenue for covering those costs; (c) a Local Participation Component that provides for the maximum feasible local

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government and public input; (d) a Coordination and Consistency Component that details the ways in which local, State, and federal programs and policies may be best coordinated to promote the goals, purposes, policies, and provisions of the Regional Master Plan; (e) a Transportation Component that provides a plan for transportation system preservation; (f) a Smart Growth Component that assesses opportunities for appropriate development, redevelopment, economic growth and a transfer of development rights program, and includes a Land Use Capability Map; (g) a Land Use Capability Map for the Preservation Area and a comprehensive statement of policies for the development and use of land in the Preservation Area; and (h) a statement of policies, including a preservation zone element that identifies zones within the Preservation Area where development shall not occur in order to protect water resources and environmentally sensitive lands and which shall be permanently preserved through use of a variety of tools, including but not limited to land acquisition and the transfer of development rights and minimum standards governing municipal and county master planning and development regulations; and

WHEREAS, after a careful analysis of the best available scientific and planning data and consultation with State, federal and local agencies pursuant to the Highlands Act, the Highlands Council adopted Resolution 2008-27 approving the Regional Master Plan on July 17, 2008 and, pursuant to the Highlands Act requirement for gubernatorial review, the Regional Master Plan thereafter became effective on September 8, 2008; and

WHEREAS, the Highlands Act creates a bifurcated system for municipal conformance with the Regional Master Plan – mandatory Plan Conformance for any portion of a municipality located wholly or partially in the Preservation Area and voluntary Plan Conformance for the municipalities with lands wholly in the Planning Area or for any portion of a municipality lying within the Planning Area; and

WHEREAS, Section 14 of the Highlands Act expressly requires mandatory Plan Conformance where municipalities, located wholly or partially in the Preservation Area, must revise and conform their local master plan and development regulations, as they relate to development and use of land in the Preservation Area, with the goals, requirements and provisions of the Regional Master Plan within 15 months of adoption thereof, or December 8, 2009; and

WHEREAS, Section 15 of the Highlands Act provides for voluntary Plan Conformance where any municipality located wholly or partially in the Planning Area may voluntarily revise and conform their local master plans and development regulations, as they relate to the development and use of land in the Planning Area, with the goals, requirements and provisions of the Regional Master Plan at any time; and

WHEREAS, pursuant to Sections 14 and 15 of the Highlands Act, the Highlands Council shall approve, reject, or approve with conditions the revised plan and development regulations, as it deems appropriate, after public hearing, within 60 days after the date of submission thereof; and

WHEREAS, the Highlands Act provides that an approval of a Petition for Plan Conformance entitles the conforming municipality with specific benefits including: planning grants, technical assistance, state aid, priority for projects, tax stabilization funds, a strong presumption of validity and extraordinary deference in the event of legal challenge, and legal representation; and

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WHEREAS, the Highlands Council approval of Resolution 2008-27 adopting the Regional Master Plan included the adoption of the Highlands Plan Conformance Guidelines that outlines the procedures, schedule, planning assistance, and benefits available for the submission of a Petition for Plan Conformance; and

WHEREAS, the Plan Conformance Guidelines provides a process for Basic Plan Conformance requiring the submission of plans and regulations that are immediately necessary to ensure protection of the Highlands resources and resource areas with more complex tasks to be completed in accordance with an Implementation Plan and Schedule as a condition of Plan Conformance; and

WHEREAS, Section 18 of the Highlands Act obligates the Highlands Council to establish a grant funding program to reimburse municipalities for reasonable expenses associated with Plan Conformance; and

WHEREAS, on December 18, 2008, the Highlands Council approved Resolution 2008-73 to provide grant funding for the Highlands municipalities to cover the reasonable expenses associated with revisions to master plans, development regulations or other regulations to conform them to the Regional Master Plan; and

WHEREAS, under Resolution 2008-73, the Highlands Council authorized the Executive Director to develop and implement a process for the solicitation and distribution of the Plan Conformance Grants in a total amount not to exceed \$7.5 million and up to \$100,000 allocation for each individual municipality for Basic Plan Conformance; and

WHEREAS, the Bylaws of the Highlands Council authorizes the Executive Director, as chief administrative officer, to approve contracts and issue payments up to \$25,000; and

WHEREAS, as directed, the Executive Director developed the Plan Conformance Grant Program, a program that splits Plan Conformance into the following seven steps or modules for administering the authorized grant funding: (1) and (2) Highlands municipal build-out analysis and report; (3) housing element and fair share plan; (4) Highlands environmental resource inventory; (5) master plan Highlands element; (6) Highlands Area land use ordinance; and (7) municipal Petition for Plan Conformance; and

WHEREAS, Boonton Township is located entirely within the Highlands Region, and contains approximately 493 acres in the Preservation Area and 4,934 acres in the Planning Area; and

WHEREAS, on December 8, 2009, Boonton Township submitted a Petition for Plan Conformance including a resolution for all lands lying in the Preservation Area,

WHEREAS, on September 4, 2014, the Executive Director deemed the Petition for Plan Conformance administratively complete, and on September 12, 2014, posted the Petition documents on the Highlands Council website and thereafter commenced staff review of the Petition for consistency with the Regional Master Plan; and

WHEREAS, on March 4, 2015, the Executive Director provided Boonton Township with a Draft Consistency Review and Recommendations Report, which provides the staff's assessment of the

RESOLUTION 2015-6
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Petition for Plan Conformance, the level of conformance with the Regional Master Plan, and recommendations for any further actions necessary for Plan Conformance; and

WHEREAS, the Executive Director provided Boonton Township with a deliberative municipal response period allowing Boonton Township to review and respond to the Draft Consistency Review and Recommendations Report; and

WHEREAS, on March 16, 2015, the Executive Director completed the Final Draft Consistency Review and Recommendations Report, and posted a Public Notice, the Final Draft Consistency Review and Recommendations Report, and the complete Petition documents on the Highlands Council website for a public review and comment period with written comments due on or before March 31, 2015; and

WHEREAS, the Highlands Implementation Plan and Schedule includes a detailed accounting of the existing Plan Conformance Grants and the allocation of additional grant funding in order to address the Highlands Act requirements for Plan Conformance funding; and

WHEREAS, on April 10, 2015, the Executive Director posted the Final Consistency Review and Recommendations Report and Highlands Implementation Plan and Schedule on the Highlands Council website which addressed issues raised during the public comment period; and

WHEREAS, on April 16, 2015, the Highlands Council held a public hearing on Boonton Township's Petition for Plan Conformance and provided an opportunity for public comment; and

WHEREAS, the Highlands Council accepts the recommendation of the Executive Director as stated in the Final Consistency Review and Recommendations Report; and

WHEREAS, according to the Highlands Act and the Plan Conformance Guidelines, Boonton Township's compliance with an approved Final Consistency Review and Recommendations Report, the Highlands Implementation Plan and Schedule, the Highlands Plan Conformance Guidelines and the Highlands Act shall maintain Boonton Township's status as conforming to the Regional Master Plan and all statutory benefits associated with Plan Conformance; and

WHEREAS, the Plan Conformance Guidelines recognize that conformance in the Planning Area is voluntary under the Highlands Act and provide that the period of an approval of a Petition for Plan Conformance shall be for a period of no more than six (6) years, or until six (6) months after the completion of a reexamination by Boonton Township of its master plan and development regulations as required by the Municipal Land Use Law, or until one (1) year after the Highlands Council adopts its six-year reexamination of the Regional Master Plan, whichever time period is the shorter; the six (6) month and one (1) year periods provided herein allowing time for the submittal and processing of petitions for a re-examination of Plan Conformance before the Highlands Council; and

WHEREAS, the Plan Conformance Guidelines provide that no amendment to any master plan or development regulations applicable to the development and use of land in Boonton Township shall be effective until Boonton Township has submitted such amendment to the Highlands Council and such amendment has been found by the Council to be in conformance with the Regional Master

RESOLUTION 2015-6
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Plan, or the Executive Director has notified Boonton Township that such amendment does not affect the Highlands Council's prior finding of Plan Conformance; and

WHEREAS, the Plan Conformance Guidelines provide that following the receipt of any amendment to Boonton Township's master plan or development regulations, the Executive Director is required to determine whether or not the amendment raises a substantive issue with respect to the conformance of the municipal master plan or development regulations with the Regional Master Plan, and

WHEREAS, the Plan Conformance Guidelines provide that if the Executive Director determines no such substantive issue is raised with respect to an amendment, the Executive Director shall certify such fact and notify the Clerk of Boonton Township and the Highlands Council, and shall provide notice on the Highlands Council website, and such amendment shall thereupon take effect in accordance with its terms and applicable law; and

WHEREAS, the Plan Conformance Guidelines provide that if the Executive Director determines that an amendment raises a substantive issue with respect to the conformance of the municipal master plan or development regulations to the Regional Master Plan, the amended municipal master plan or development regulations shall be reviewed in accordance with the Plan Conformance Guidelines; and

WHEREAS, pursuant to N.J.S.A. 13:20-5.j, no action authorized by the Highlands Council shall have force or effect until ten (10) days, Saturdays, Sundays and public holidays excepted, after a copy of the minutes of the meeting of the Council has been delivered to the Governor for review, unless prior to expiration of the review period the Governor shall approve same, in which case the action shall become effective upon such approval.

NOW, THEREFORE, BE IT RESOLVED that the Highlands Council hereby approves Boonton Township's Petition for Plan Conformance with conditions as set forth in the Final Consistency Review and Recommendations Report and the Highlands Implementation Plan and Schedule; and

BE IT FURTHER RESOLVED, that the Highlands Council hereby approves the Township of Boonton's Highlands Implementation Plan and Schedule including the reallocation of the existing Plan Conformance Grant and the allocation of additional grant funding to pay for the reasonable expenses incurred to complete the Plan Conformance conditions; and

BE IT FURTHER RESOLVED, that the Executive Director is authorized to make any amendments and publicly release the Final Consistency Review and Recommendations Report, Highlands Implementation Plan and Schedule, and amend the Plan Conformance Grant Agreement consistent with direction from the Highlands Council, to properly effectuate the intent of the Council and thereafter execute the Report and Schedule on behalf of the Council; and

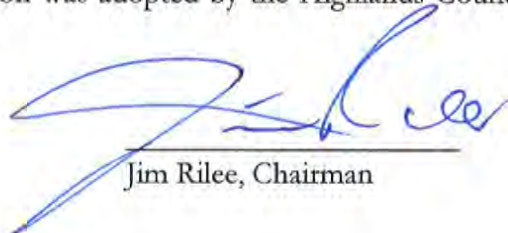
BE IT FURTHER RESOLVED, that Boonton Township is hereby entitled to the statutory benefits associated with Plan Conformance as detailed in the Highlands Act, the Regional Master Plan and the Plan Conformance Guidelines, so long as Boonton Township remains in conformance with the Regional Master Plan and to the extent such funds are made available by the State; and

RESOLUTION 2015-6
NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL
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BE IT FURTHER RESOLVED, the Executive Director is authorized, consistent with direction from the Council, to oversee and monitor Boonton Township's compliance with this Resolution and to take any and all action necessary in coordination with the Highlands Council.

CERTIFICATION

I hereby certify that the foregoing Resolution was adopted by the Highlands Council at its regular meeting held on the 16th day of April, 2015.



 Jim Rilee, Chairman

**Vote on the Approval of
 The Resolution**

	Motion	Second	Yes	No	Abstain	Absent
Councilmember Alstede	_____	_____	✓	_____	_____	_____
Councilmember Carluccio	_____	_____	_____	✓	_____	_____
Councilmember Dougherty	_____	_____	_____	_____	_____	✓
Councilmember Dressler	_____	_____	_____	_____	_____	✓
Councilmember Francis	_____	_____	✓	_____	_____	_____
Councilmember Holtaway	_____	_____	_____	_____	_____	✓
Councilmember James	_____	_____	_____	_____	_____	✓
Councilmember Richko	✓	_____	✓	_____	_____	_____
Councilmember Sebetich	_____	_____	_____	_____	_____	✓
Councilmember Tfrank	_____	_____	✓	_____	_____	_____
Councilmember Visioli	_____	✓	✓	_____	_____	_____
Councilmember Vohden	_____	_____	✓	_____	_____	_____
Councilmember Walton	_____	_____	✓	_____	_____	_____
Chairman Rilee	_____	_____	✓	_____	_____	_____

RESOLUTION 2015-7
NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL
AUTHORITY FOR HIGHLANDS PLAN CONFORMANCE AND
HIGHLANDS PROJECT REVIEW

WHEREAS, the Highlands Water Protection and Planning Act (Highlands Act) has created a public body corporate and politic with corporate succession known as the Highlands Water Protection and Planning Council (Highlands Council); and

WHEREAS, the Highlands Act created the Highlands Council as a regional planning and protection entity, to develop, adopt and periodically revise a Regional Master Plan, with a primary goal of protecting and enhancing the significant values of the resources of the Highlands Region; and

WHEREAS, the Highlands Council adopted the Regional Master Plan (RMP) on July 17, 2008 and, as a result of Executive Order 114 (2008), the RMP has an effective date of September 8, 2008; and

WHEREAS, Section 14 of the Highlands Act requires that within nine to 15 months after the effective date of the Regional Master Plan, each municipality located wholly or partially in the Preservation Area shall submit revisions to the municipal master plan, development regulations and other regulations, as applicable to the development and use of land in the Preservation Area, as may be necessary to conform them with the goals, requirements and provisions of the RMP (Plan Conformance); and

WHEREAS, Section 15 of the Highlands Act states that for any municipality located wholly in the Planning Area or for the portion of a municipality lying within the Planning Area, the municipality may, by ordinance, petition the Highlands Council of its intention to revise its master plan, development regulations and other regulations, as applicable to the development and use of land in the Planning Area, to conform them with the goals, requirements and provisions of the RMP; and

WHEREAS, the Highlands Council adopted and distributed to the Highlands municipalities and counties Plan Conformance Guidelines outlining the process and procedures for petitioning the Highlands Council for Plan Conformance; and

WHEREAS, Section 13 of the Highlands Act requires the Highlands Council to create a regional transfer of development rights (TDR) program for the Highlands Region which includes a program for voluntary TDR receiving zones for any municipality within the seven Highlands Counties and sending zones for the preservation of lands to protect Highlands resources; and

WHEREAS, Section 11.a.4 of the Highlands Act requires a coordination and consistency component which details the ways in which local, State, and federal programs and policies may best be coordinated to promote the goals, purposes, policies, and provisions of the RMP; and

WHEREAS, Section 11.h and 9 of the Highlands Act requires the identification of areas appropriate for redevelopment and the setting of appropriate density standards for redevelopment; any area identified for possible redevelopment shall be either a brownfield site designated by the Department of Environmental Protection or a site at which at least 70% of the area thereof is covered with impervious surface (Highlands Redevelopment Areas); and

RESOLUTION 2015-7
NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL
AUTHORITY FOR HIGHLANDS PLAN CONFORMANCE AND
HIGHLANDS PROJECT REVIEW

WHEREAS, Section 30 of the Highlands Act includes seventeen exemptions from the provisions of the Act, the RMP, any rules or regulations adopted by NJDEP pursuant to the Act, or any amendments to a master plan, development regulations, or other regulations adopted by a local government unit to specifically conform them with the RMP; and

WHEREAS, Sections 38 through 82 of the Highlands Act amends numerous statutes of State agencies to specifically require coordinated action to implement the RMP and requires consultation between the Highlands Council and State agencies to ensure that the RMP is considered prior to State agency action; and

WHEREAS, Sections 16 and 17 of the Highlands Act respectively authorize the Highlands Council to review capital or other project proposed to be undertaken by any State entity or local government unit and to review a final local government unit approval, rejection, or approval with conditions; and

WHEREAS, the Highlands Council desires to establish a process to implement the Highlands Act and the RMP in an orderly fashion through Plan Conformance and Highlands Project Review and to ensure that the Highlands Council retains authority to review and approve certain matters and to delegate authority to the Executive Director to review and approve others matters such that delegated matters constitute final agency action subject to the Council's authority to reconsider any final agency action; and

WHEREAS, pursuant to N.J.S.A. 13:20-5.j, no action authorized by the Highlands Council shall have force or effect until ten (10) days, Saturdays, Sundays and public holidays excepted, after a copy of the minutes of the meeting of the Council has been delivered to the Governor for review, unless prior to expiration of the review period the Governor shall approve same, in which case the action shall become effective upon such approval.

NOW, THEREFORE, BE IT RESOLVED by the Highlands Council shall hereby take the following actions to implement the Highlands Regional Master Plan:

1. For municipal and county Plan Conformance, review and issue final determinations on all Petitions for Plan Conformance including, but not limited to, any related conditions, grant allocations, resource management plans, Map Adjustments and Highlands Center designations in accordance with the Regional Master Plan and the Plan Conformance Guidelines;
2. For the Highlands TDR Program, designate voluntary TDR Receiving Zones based upon municipal petitions and review and, where direct Council action is recommended by the Executive Director, issue HDC Allocation Determinations and execute any related documents and deeds of easement;
3. For Highlands Redevelopment Area Designations, designate areas appropriate for redevelopment;
4. For federal, State, and regional agency coordination, review and issue determinations on all requests for consultation, coordination, recommendation or consistency determinations where direct Council action is recommended by the Executive Director;

RESOLUTION 2015-7
NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL
AUTHORITY FOR HIGHLANDS PLAN CONFORMANCE AND
HIGHLANDS PROJECT REVIEW

5. For Highlands Act exemption determinations, review and issue exemption determinations where direct Council action is recommended by the Executive Director; and
6. For the adoption of any master plan, development regulation, or other regulation by a local government unit not in Plan Conformance, development applications submitted to and approved by local government units, the call-up of local government unit approvals, and capital and other projects of State entities and local government units, review and issue comments or determinations on these matters on a case-by-case basis where the Highlands Council determines that Council action is required.

THEREFORE, BE IT FURTHER RESOLVED by the Highlands Council that the Executive Director is hereby delegated the authority to take the following final agency actions on behalf of the Council:

1. For municipal and county Plan Conformance, provide recommendations and take actions pursuant to the Plan Conformance Guidelines or Council Resolution and review and issue determinations on all requests for an RMP Update to verify updated, relevant factual information;
2. For the Highlands TDR Program, review and issue HDC Allocation Determinations and execute any related documents and deeds of easement;
3. For federal, State, and regional agency coordination, review and issue determinations on all requests for consultation, coordination, recommendation or consistency determinations;
4. For Highlands Act exemption determinations, review and issue exemption determinations;
5. For the adoption of any master plan, development regulation, or other regulation by a local government unit not in Plan Conformance, development applications submitted to and approved by local government units, the call-up of local government unit approvals, and capital and other projects of State entities and local government units, review and issue comments or determinations on these matters unless Council review is required by the Council;
6. For all of the above, the Executive Director may make a recommendation, based upon the potential impact on Highlands resources, that final agency action be taken by the Highlands Council; and
7. For all of the above, the Executive Director shall provide reports to the Highlands Council of all actions and determinations on a regular basis.

RESOLUTION 2015-7
NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL
AUTHORITY FOR HIGHLANDS PLAN CONFORMANCE AND
HIGHLANDS PROJECT REVIEW

THEREFORE, BE IT FURTHER RESOLVED that any and all actions taken by the Executive Director pursuant to Resolution 2014-30 from October 16, 2014 through the effective date of this Resolution be and hereby are ratified by the Highlands Council; and

THEREFORE, BE IT FURTHER RESOLVED that the Highlands Council shall reassess this Resolution on or before the October, 2015 Council Meeting and every six months thereafter, or may, at any time, determine that a reassessment should take place; and

THEREFORE, BE IT FURTHER RESOLVED that this Resolution shall remain in full force and effect unless and until a future resolution is adopted by the Council and becomes effective.

CERTIFICATION

I hereby certify that the foregoing Resolution was adopted by the Highlands Council at its meeting held on the 16TH day of April, 2015.



 Jim Rilee, Chairman

**Vote on the Approval of
 The Resolution**

	Motion	Second	Yes	No	Abstain	Absent
Councilmember Alstede	_____	_____	✓	_____	_____	_____
Councilmember Carluccio	_____	_____	_____	✓	_____	_____
Councilmember Dougherty	_____	_____	_____	_____	_____	✓
Councilmember Dressler	_____	_____	_____	_____	_____	✓
Councilmember Francis	_____	_____	✓	_____	_____	_____
Councilmember Holtaway	_____	_____	_____	_____	_____	✓
Councilmember James	_____	_____	_____	_____	_____	✓
Councilmember Richko	_____	_____	✓	_____	_____	_____
Councilmember Sebetich	_____	_____	_____	_____	_____	✓
Councilmember Tfrank	_____	_____	✓	_____	_____	_____
Councilmember Visioli	_____	✓	✓	_____	_____	_____
Councilmember Vohden	_____	_____	✓	_____	_____	_____
Councilmember Walton	✓	_____	✓	_____	_____	_____
Chairman Rilee	_____	_____	✓	_____	_____	_____

RESOLUTION 2015-8

NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL ELECTION OF VICE-CHAIR

WHEREAS, the Highlands Water Protection and Planning Act (Highlands Act) has created the public body corporate and politic with corporate succession known as the Highlands Water Protection and Planning Council (Highlands Council); and

WHEREAS, Section 6.g. of the Highlands Act authorizes the Highlands Council to conduct its business as needed to effectuate the purposes of the enabling legislation; and

WHEREAS, the Highlands Act authorizes the Highlands Council to adopt bylaws; and

WHEREAS, the Highlands Council has adopted bylaws which provide for the election of officers to more efficiently conduct its business; and

WHEREAS, pursuant to N.J.S.A. 13:20-5.j, no action authorized by the Highlands Council shall have force or effect until ten (10) days, Saturdays, Sundays and public holidays excepted, after a copy of the minutes of the meeting of the Council has been delivered to the Governor for review, unless prior to expiration of the review period the Governor shall approve same, in which case the action shall become effective upon such approval.

NOW, THEREFORE, BE IT RESOLVED that the Highlands Council hereby elects Kurt Alstede as Vice-Chair of the Highlands Council.

CERTIFICATION

I hereby certify that the foregoing Resolution was adopted by the Highlands Council at its regular meeting held on the 16th day of April, 2015.

Jim Rilee, Chairman

**Vote on the Approval of
The Resolution**

	Motion	Second	Yes	No	Abstain	Absent
Councilmember Alstede			✓			
Councilmember Carluccio				✓		
Councilmember Dougherty						✓
Councilmember Dressler						✓
Councilmember Francis		✓	✓			
Councilmember Holtaway						✓
Councilmember James						✓
Councilmember Richko			✓			
Councilmember Sebetich						✓
Councilmember Tfrank			✓			
Councilmember Visioli			✓			
Councilmember Vohden			✓			
Councilmember Walton	✓		✓			
Chairman Rilee			✓			

RESOLUTION 2015-9
NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL
ELECTION OF TREASURER

WHEREAS, the Highlands Water Protection and Planning Act (Highlands Act) has created the public body corporate and politic with corporate succession known as the Highlands Water Protection and Planning Council (Highlands Council); and

WHEREAS, Section 6.g. of the Highlands Act authorizes the Highlands Council to conduct its business as needed to effectuate the purposes of the enabling legislation; and

WHEREAS, the Highlands Act authorizes the Highlands Council to adopt bylaws; and

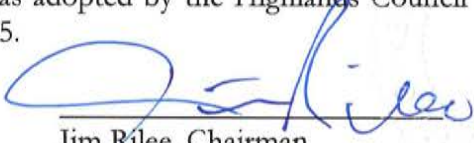
WHEREAS, the Highlands Council has adopted bylaws which provide for the election of officers to more efficiently conduct its business; and

WHEREAS, pursuant to N.J.S.A. 13:20-5.j, no action authorized by the Highlands Council shall have force or effect until ten (10) days, Saturdays, Sundays and public holidays excepted, after a copy of the minutes of the meeting of the Council has been delivered to the Governor for review, unless prior to expiration of the review period the Governor shall approve same, in which case the action shall become effective upon such approval.

NOW, THEREFORE, BE IT RESOLVED that the Highlands Council hereby elects Robert F. Holtaway as Treasurer of the Highlands Council.

CERTIFICATION

I hereby certify that the foregoing Resolution was adopted by the Highlands Council at its regular meeting held on the 16th day of April, 2015.



 Jim Rilee, Chairman

Vote on the Approval of The Resolution	Motion	Second	Yes	No	Abstain	Absent
Councilmember Alstede	✓		✓			
Councilmember Carluccio			✓			
Councilmember Dougherty						✓
Councilmember Dressler						✓
Councilmember Francis			✓			
Councilmember Holtaway						✓
Councilmember James						✓
Councilmember Richko			✓			
Councilmember Sebetich						✓
Councilmember Tfrank			✓			
Councilmember Visioli		✓	✓			
Councilmember Vohden			✓			
Councilmember Walton			✓			
Chairman Rilee			✓			

RESOLUTION 2015-10

NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL APPROVAL OF THE ASSIGNMENT OF THE CITY OF PATERSON'S HIGHLANDS TRANSFER OF DEVELOPMENT RIGHTS RECEIVING ZONE FEASIBILITY GRANT TO THE COUNTY OF PASSAIC, STATE OF NEW JERSEY

WHEREAS, the Highlands Water Protection and Planning Act (Highlands Act) has created a public body corporate and politic with corporate succession known as the Highlands Water Protection and Planning Council (Highlands Council); and

WHEREAS, the Highlands Act authorizes the Highlands Council to enter into any and all agreements or contracts, execute any and all instruments to carry out any power, duty or responsibility under the Highlands Act; and

WHEREAS, Section 18 of the Highlands Act authorizes the Highlands Council to make available grants and other financial and technical assistance to municipalities and counties for implementation of a transfer of development rights (TDR) program; and

WHEREAS, on March 22, 2007, the Highlands Council by Resolution 2007-9 authorized the TDR Committee to develop and implement a process for the solicitation and distribution of grants and other support to municipalities within the seven Highlands counties in furtherance of the development of the Highlands TDR Program, in an annual amount not to exceed \$1,000,000; and

WHEREAS, the Budget and Finance Committee reviewed the grant application submitted by the City of Paterson, County of Passaic, and recommended approval by the Highlands Council; and

WHEREAS, the Highlands Council by Resolution 2014-6, dated February 20, 2014, approved a grant agreement with the City of Paterson for a TDR Receiving Zone Feasibility Grant in the amount of \$50,000; and

WHEREAS, Grant Agreement 14-033-080-1608, Paragraph V., Assignability, permits the City of Paterson to assign or transfer any of the work or services covered by the Grant Agreement, only with express written prior approval of the New Jersey Highlands Council; and

WHEREAS, the TDR Receiving Zone Feasibility Study is directly related to the Madison Avenue Commuter Rail Corridor Study, a project associated with the Passaic/Bergen Passenger Rail Service Restoration Project, which is primarily a Passaic County initiative; and

WHEREAS, the City of Paterson, by Resolution 15:178, adopted March 10, 2015, authorized the City of Paterson to transfer the TDR Receiving Zone Feasibility Study to the County of Passaic and transfer \$50,000 for the Study to the County of Passaic; and

WHEREAS, the County of Passaic, by Resolution 2015-0268, adopted April 14, 2015, authorized the County of Passaic to accept the TDR Receiving Zone Feasibility Study from the City of Paterson and accept the \$50,000 for the Study from the City of Paterson; and

WHEREAS, pursuant to N.J.S.A. 13:20-5.j, no action authorized by the Highlands Council shall have force or effect until ten (10) days, Saturdays, Sundays and public holidays excepted, after a copy of the minutes of the meeting of the Council has been delivered to the Governor for review, unless prior to

RESOLUTION 2015-10

NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL APPROVAL OF THE ASSIGNMENT OF THE CITY OF PATERSON'S HIGHLANDS TRANSFER OF DEVELOPMENT RIGHTS RECEIVING ZONE FEASIBILITY GRANT TO THE COUNTY OF PASSAIC, STATE OF NEW JERSEY

expiration of the review period the Governor shall approve same, in which case the action shall become effective upon such approval.

NOW, THEREFORE, BE IT RESOLVED by the Highlands Council that the Executive Director, or her/his designee, hereby permits the City of Paterson to assign TDR Receiving Zone Feasibility Grant #14-033-080-1608 in the amount of \$50,000, and transfer said funds to the County of Passaic, provided that the Executive Director may authorize additional amounts under this contract pursuant to his authority under the Highlands Council Bylaws.

CERTIFICATION

I hereby certify that the foregoing Resolution was adopted by the Highlands Council at its regular meeting held on the 16th day of April, 2015.



Jim Rilee, Chairman

**Vote on the Approval of
The Resolution**

	Motion	Second	Yes	No	Abstain	Absent
Councilmember Alstede	_____	_____	✓	_____	_____	_____
Councilmember Carluccio	_____	_____	✓	_____	_____	_____
Councilmember Dougherty	_____	_____	_____	_____	_____	✓
Councilmember Dressler	_____	_____	_____	_____	_____	✓
Councilmember Francis	✓	_____	✓	_____	_____	_____
Councilmember Holtaway	_____	_____	_____	_____	_____	✓
Councilmember James	_____	_____	_____	_____	_____	✓
Councilmember Richko	_____	_____	✓	_____	_____	_____
Councilmember Sebetich	_____	_____	_____	_____	_____	✓
Councilmember Tfrank	_____	✓	✓	_____	_____	_____
Councilmember Visioli	_____	_____	✓	_____	_____	_____
Councilmember Vohden	_____	_____	✓	_____	_____	_____
Councilmember Walton	_____	_____	✓	_____	_____	_____
Chairman Rilee	_____	_____	✓	_____	_____	_____

RESOLUTION 2015-11

NEW JERSEY HIGHLANDS WATER PROTECTION AND PLANNING COUNCIL EXECUTIVE SESSION

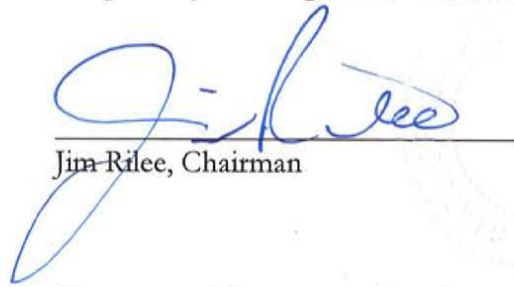
WHEREAS, the Open Public Meetings Act, N.J.S.A. 10:4-6 et seq., permits the holding of closed sessions by public bodies in certain circumstances, and the Council is of the opinion that those circumstances presently exist; and

WHEREAS, the Council is seeking legal advice concerning a contractual matter, for which advice from counsel subject to the attorney-client privilege is required;

NOW, THEREFORE, BE IT RESOLVED, that the Council may enter into closed session at its public meeting of April 16, 2015, for that purpose. It is anticipated at this time that the nature of the closed session will be made public upon completion or resolution of the issues to be discussed, except any matter protected by the attorney-client privilege will not be disclosed.

CERTIFICATION

I hereby certify that the foregoing Resolution was adopted by the Highlands Council at its regular meeting held on the 16th day of April, 2015.



Jim Rilee, Chairman

**Vote on the Approval of
The Resolution**

	Motion	Second	Yes	No	Abstain	Absent
Councilmember Alstede	_____	_____	✓	_____	_____	_____
Councilmember Carluccio	_____	_____	✓	_____	_____	_____
Councilmember Dougherty	_____	_____	_____	_____	_____	✓
Councilmember Dressler	_____	_____	_____	_____	_____	✓
Councilmember Francis	_____	_____	✓	_____	_____	_____
Councilmember Holtaway	_____	_____	_____	_____	_____	✓
Councilmember James	_____	_____	_____	_____	_____	✓
Councilmember Richko	_____	✓	✓	_____	_____	_____
Councilmember Sebetich	_____	_____	_____	_____	_____	✓
Councilmember T'fank	_____	_____	✓	_____	_____	_____
Councilmember Visioli	_____	_____	✓	_____	_____	_____
Councilmember Vohden	_____	_____	✓	_____	_____	_____
Councilmember Walton	✓	_____	✓	_____	_____	_____
Chairman Rilee	_____	_____	✓	_____	_____	_____



New Jersey Highlands Council

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Boonton Township

Boonton Township in Morris County has 493 acres in the Preservation Area and 4,943 acres in the Planning Area of the Highlands Region. The municipality submitted a Petition for Plan Conformance for its Preservation Area lands only. This page contains links to documents related to the Township's conformance with the Highlands Regional Master Plan.

Final Posting Prior to Public Hearing

The documents below include all edits made prior to Highlands Council consideration of Boonton Township's Petition for Plan Conformance.

- All documents listed below as one compressed file: [Boonton Township - Final Posting Prior to Public Hearing](#) (401 KB zip)
- Individual files:
 - [Final Draft Consistency Review & Recommendations Report](#) (217 KB pdf)
 - [Highlands Implementation Plan & Schedule](#) (201 KB pdf)
 - See additional Petition materials below.

Petition Posting for Public Comment

A public comment period was held from March 16 through March 31, 2015 and announced by [public notice](#). No comments were received. The documents below constitute the municipality's final submission to the Highlands Council and include the Final Draft Consistency Review and Recommendations Report prepared by Highlands Council staff for Highlands Council consideration of the full Petition.

- All documents listed below as one compressed file: [Boonton Township Petition for Public Comment](#) (11.8 MB zip)
- Individual files:
 - [Final Draft Consistency Review & Recommendations Report](#) (214 KB pdf)
 - [Highlands Implementation Plan & Schedule](#) (254 KB pdf)
 - [Highlands Environmental Resource Inventory \(ERI\)](#) (731 KB pdf)
 - [Highlands ERI Figures](#) (7.21 MB pdf)
 - [Highlands Master Plan Element](#) (423 KB pdf)
 - [Highlands Master Plan Element Exhibits](#) (1.5 MB pdf)
 - [Highlands Checklist Ordinance](#) (113 KB pdf)
 - [Highlands Checklist Ordinance Exhibits](#) (1.58 MB pdf)

Administratively Complete Petition for Plan Conformance

The following documents comprise all required components of the municipal Petition for Plan Conformance, which was deemed administratively complete by the Highlands Council September 4, 2014 ([Administrative Completeness Letter](#)).

- All documents listed below as one compressed file: [Administratively Complete Petition for Plan Conformance](#) (15 MB zip)
- Individual files:
 - [Petition Cover Letter](#) (125 KB pdf)
 - [Petition Submittal Checklist](#) (78 KB pdf)
 - [Preservation Area Resolution dated November 23,2009](#) (532 KB pdf)
 - [Record of Public Involvement](#) (231 KB pdf)
 - [Current List of Planning/Regulatory Documents](#) (61 KB pdf)
 - Modules 1 and 2: See Highlands Municipal Build-Out Report below
 - Module 3: [Housing Element and Fair Share Plan](#) (7 MB pdf)
 - [Addendum](#) (144 KB pdf)
 - Module 4: [Highlands ERI with Figures](#) (7 MB pdf)
 - Module 5: [Master Plan Highlands Element](#) (191 KB pdf)
 - Module 6: [Highlands Checklist Ordinance](#) (113 KB pdf)
 - Module 7: [Municipal Self-Assessment Report](#) (199 KB pdf)
 - [Implementation Plan and Schedule](#) (265 KB pdf)

Supporting Documents

- Municipal Resolution: [Notice of Intent](#) (pdf)
- Municipal Resolution: [COAH extension](#) (pdf)
- Highlands Council resolution: [Initial Assessment Grant](#) (pdf)
- [Highlands Municipal Build-Out Report](#) (pdf)
 - [Supporting files](#) (32 MB zip)





Highlands Council Meeting

Thursday, April 16, 2015



Highlands Council Meeting

Thursday, April 16, 2015

Township of Boonton Petition for Plan Conformance



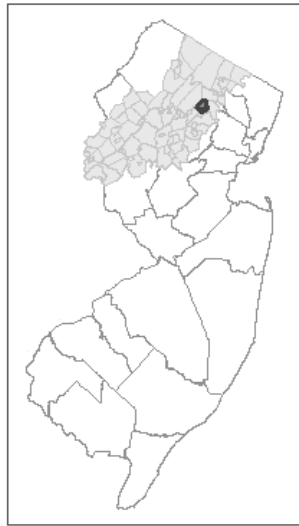
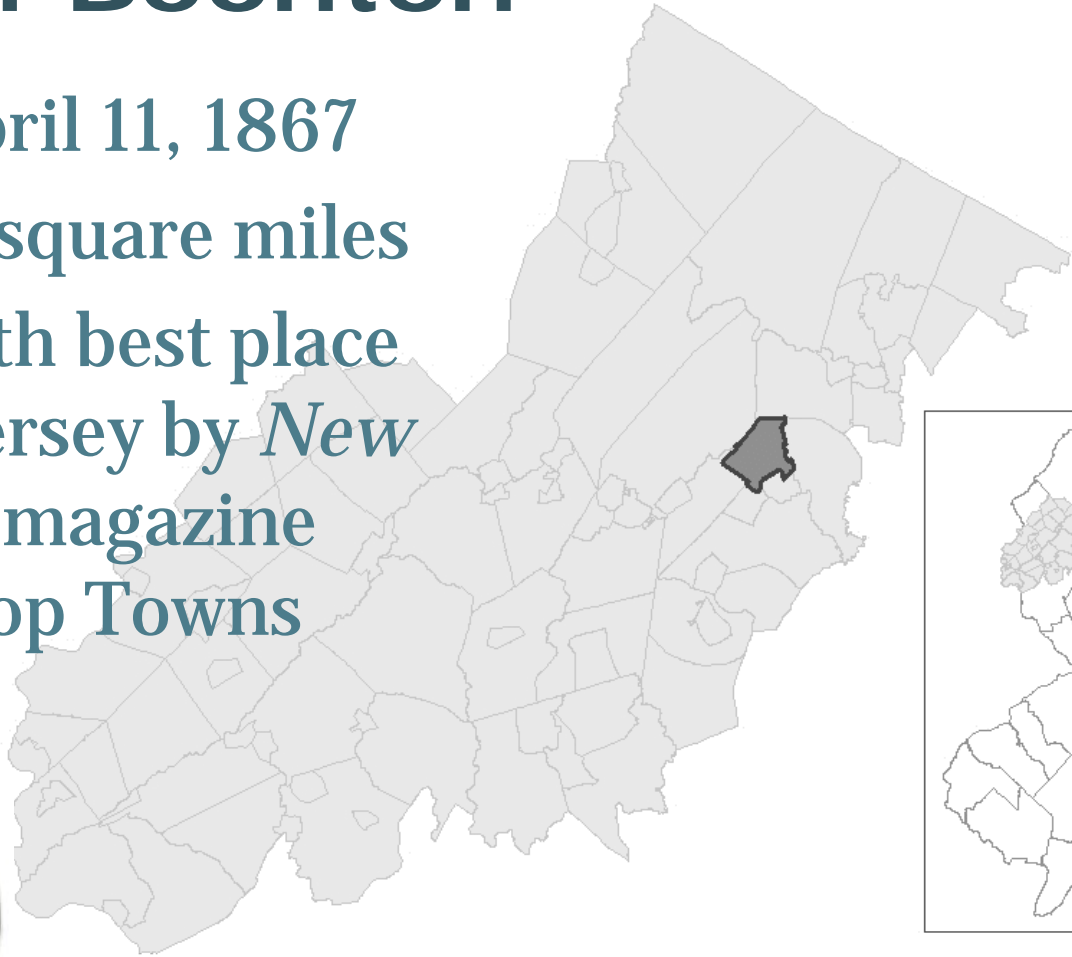
Kincaid Woods Area



View of Deer Lake from Kincaid Woods

Township of Boonton

- Incorporated April 11, 1867
- 5,437 acres/8.6 square miles
- Ranked as the 4th best place to live in New Jersey by *New Jersey Monthly* magazine "New Jersey's Top Towns 2011-2012"



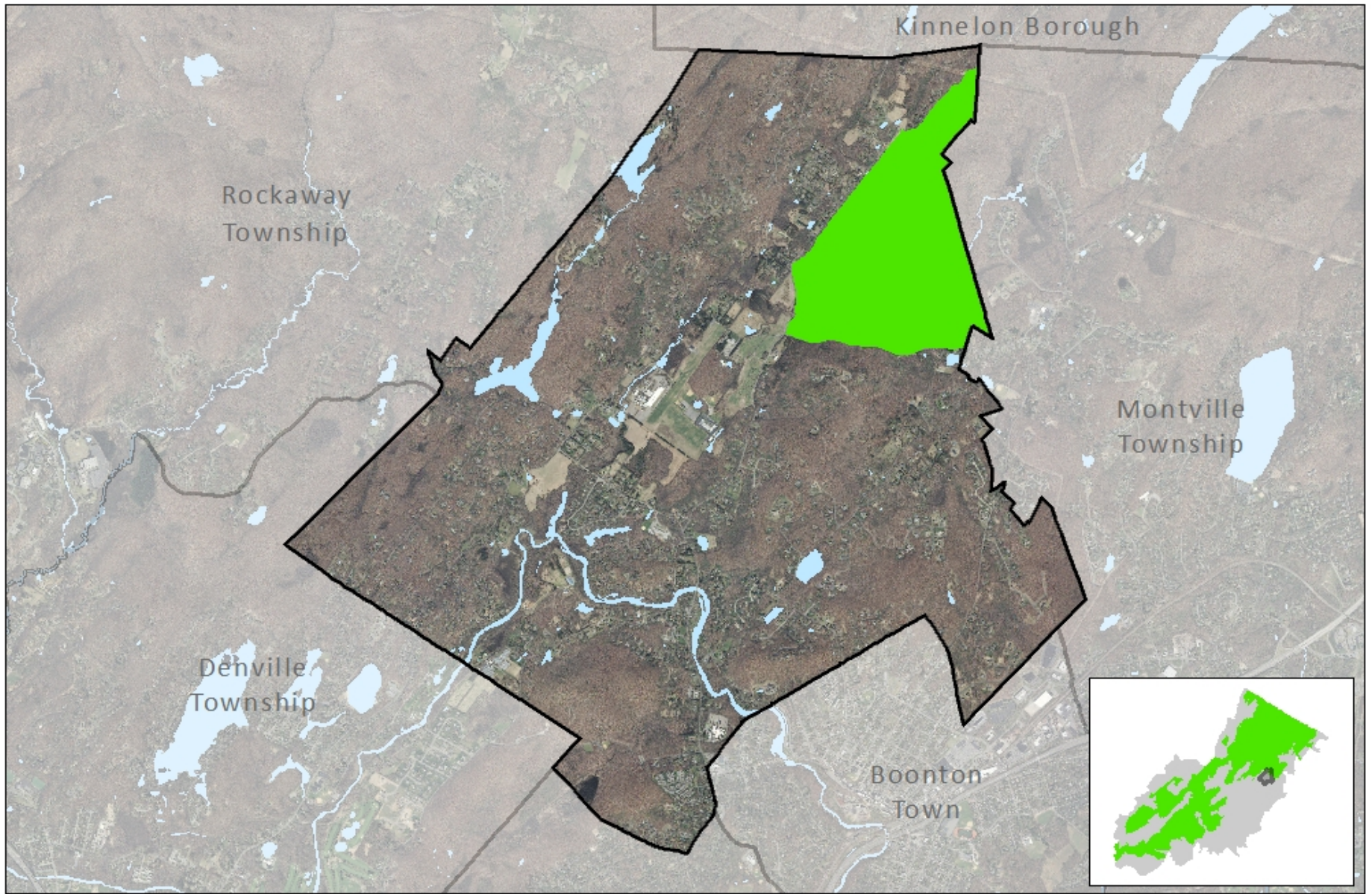


Petition




- Petition for Preservation Area lands only: 493 acres (9% of municipality)
 - Single family dwellings, preserved lands (75 acres), and a private lake club occupying 187 acres (or 38% of the Preservation Area)
 - Not served by public water or sewer infrastructure
 - Subject to the New Jersey Department of Environmental Protection (NJDEP) Highlands Water Protection and Planning Act Rules (N.J.A.C. 7:38)
 - Very limited development potential; Highlands build-out revealed no developable lots within the Preservation Area
- Previously approved for Checklist Approach (1/2014)

Boonton Township - Preservation Area

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Legend

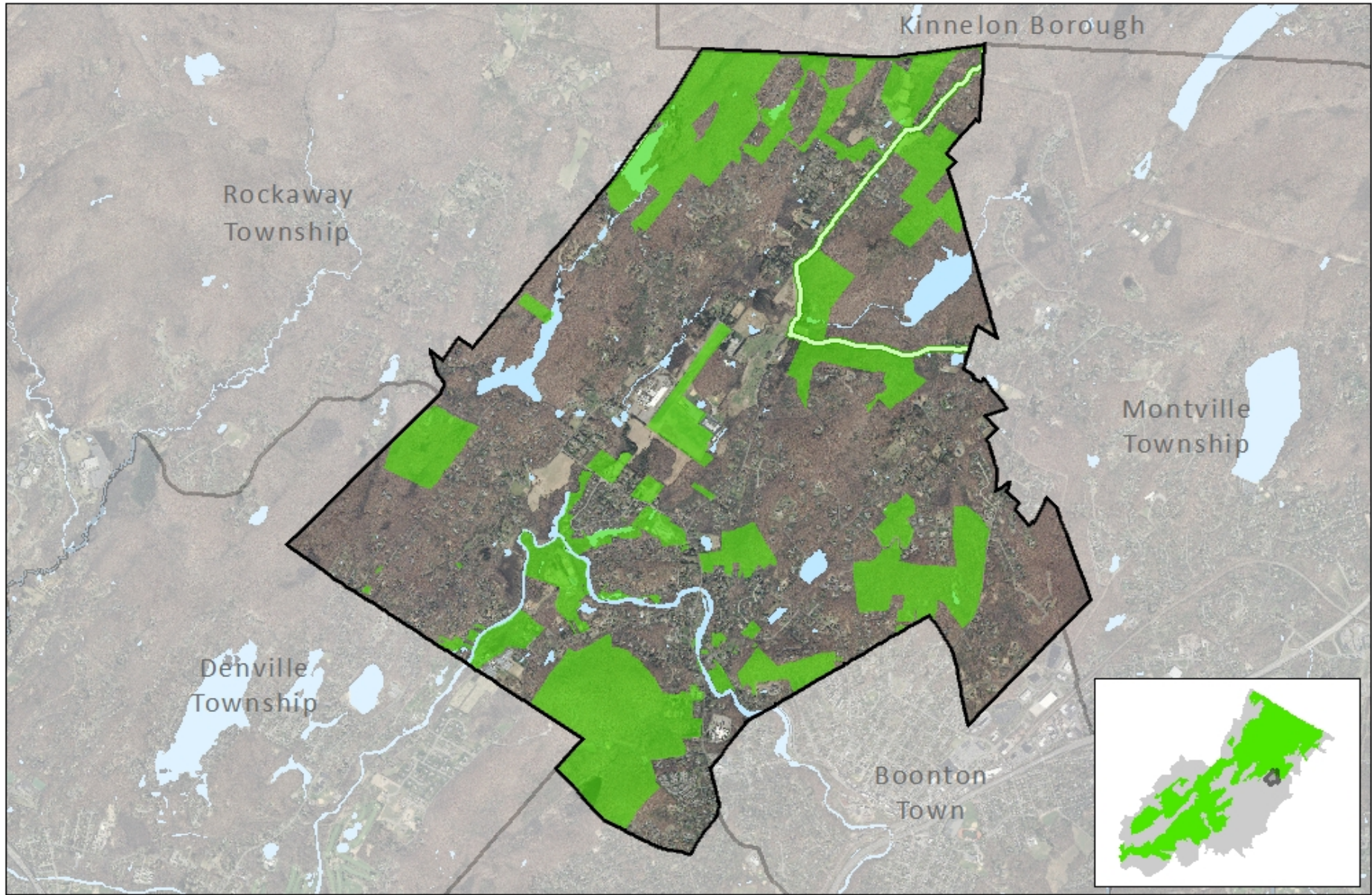
-  Municipal Boundaries
-  Open Water
-  Preservation Area



N

Boonton Township - Preserved Lands

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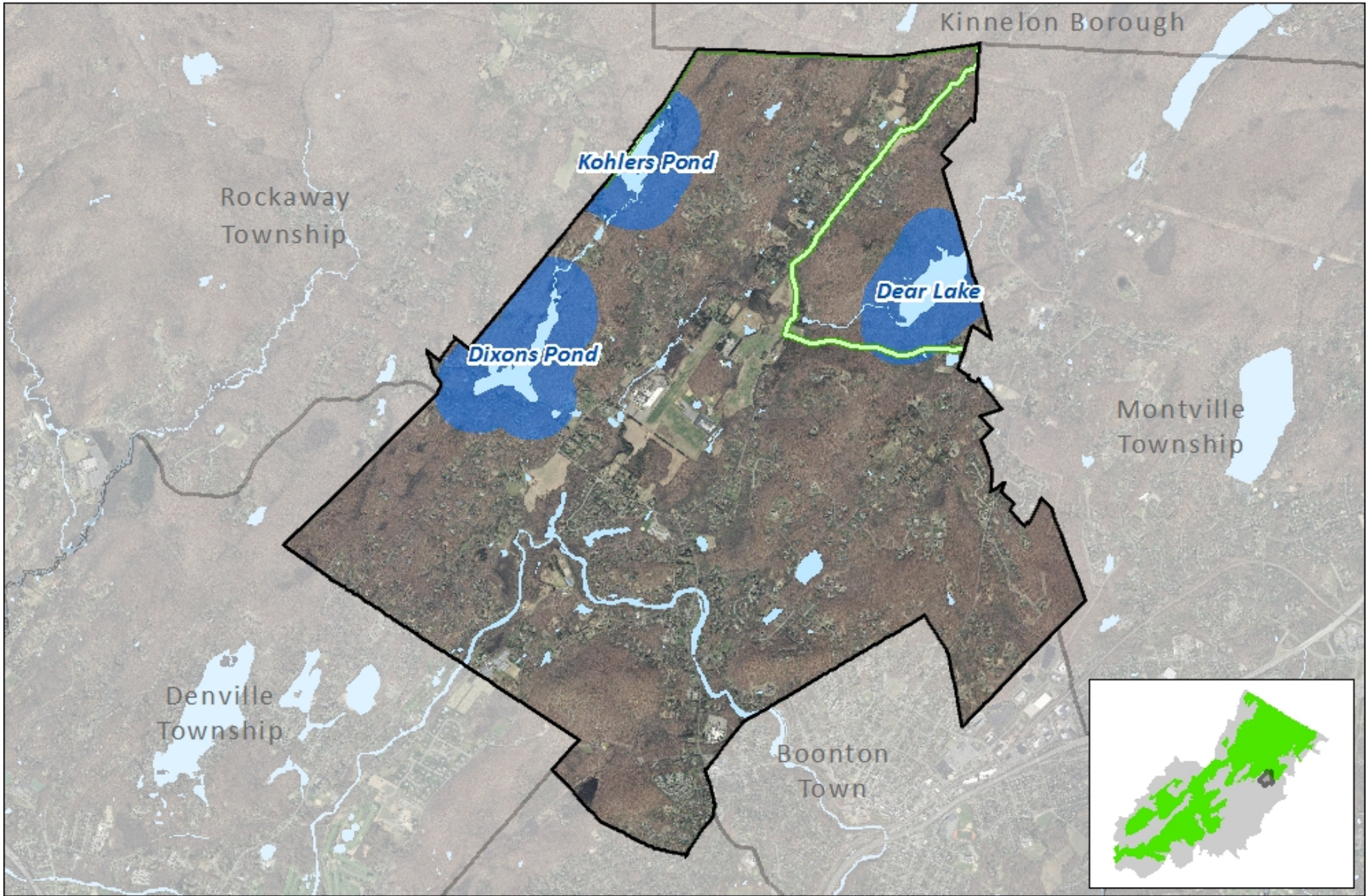


- Legend**
- Municipal Boundaries
 - Preserved Lands
 - Preservation Area
 - Open Water







Boonton Township - Lake Management Areas

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Legend

-  Municipal Boundaries
-  Open Water
-  Preservation Area
-  Lake Management Areas





Public Comment Summary

- Public Comment Period:
March 15-31, 2015
- No comments received
- Revised Final documents posted to the
Highlands Council website: April 10, 2015



Implementation Funding

- Implementation Plan & Schedule includes funding to address:
 - Water Use and Conservation Management Plan
 - Habitat Conservation Plan
 - Stream Corridor Protection/Restoration Plan
 - Sustainable Economic Development Plan
 - Stormwater Management Plan
 - Lake Restoration Management Plan



Staff Recommendation:

Approve w/conditions

- Adoption of approved:
 - Highlands ERI
 - Master Plan Highlands Element
 - Checklist Ordinance
 - Highlands Exemption Ordinance
 - Housing Element and Fair Share Plan
 - Wastewater Management Plan
- Adherence to Implementation Plan & Schedule



Township of Boonton Petition for Plan Conformance





Highlands Council Meeting

Thursday, April 16, 2015



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Public Participation and Outreach

The Public Participation and Outreach approach outlined below is intended to provide multiple opportunities for key stakeholders, technical experts and members of the public to provide input and comment throughout the RMP Monitoring Program process.

Information regarding meeting dates, times, and locations, along with briefing documents, meeting summaries, and other related material will be posted as it becomes available.

1. [Web Comment Portal/Open Public Comment](#)
2. [Targeted Stakeholder Meetings](#)
3. [Stakeholder Outreach Workshops](#)
4. [Technical Advisory Committee \(TAC\) Meetings](#)
5. [Public Outreach Sessions](#)
6. [Public Hearings on Draft Reports](#)

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- [Public Participation and Outreach](#)
- [Public Comments](#)
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1. [Web Comment Portal/Open Public Comment](#)

The Web Comment Portal is currently closed. An initial public comment period was held from September 15, 2014 through April 30, 2015 to gather public input in support of the development of indicators and milestones. The Highlands Council is currently reviewing comments received and developing responses. Upon completion of this review, all comments will be posted on this website along with responses.

The public will have an additional opportunity for input after the Highlands Council has released the draft Monitoring Program Recommendation Report and draft Fiscal Impact Assessment for public comment. At that time the Web Comment Portal will re-open. Additional information regarding the Web Comment Portal is available on the [Background](#) page under **Project Components**.

Please continue to check this website for RMP Monitoring Program updates and additional information.

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2. [Targeted Stakeholder Meetings](#)

Facilitated, small-group meetings. Technical in nature. Designed to garner input on potential indicators and data availability. Meetings were held in Fall 2014 and early 2015 with representatives from state agencies, county and local government, and non-governmental organizations. Meeting summaries below include attendee lists and meeting recaps.

- [Stakeholder Meeting Briefing Book](#) (pdf)

Meeting Summaries (pdfs)

- [Agriculture and Forestry](#)
- [New Jersey Department of Agriculture](#)
- [Interagency](#)
- [Land Use](#)
- [New Jersey Department of Environmental Protection](#)
- [Real Estate and Housing](#)
- [Water Resources](#)
- [Water and Wastewater Utilities](#)
- [Economic Development](#)
- [Landowners](#)
- [County Officials](#)
- [Municipal Officials - Central](#)
- [Municipal Officials - North](#)
- [Municipal Officials - South](#)

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3. [Stakeholder Outreach Workshops](#)

Workshop-style sessions. Topic-driven. Designed to provide a stakeholder forum for groups that are too large or diverse to accommodate in smaller sessions. These meetings were open to the public and announced via [public notice](#).

- [Summary of all three workshops](#) (pdf) - NOTE: Attendee lists and additional details are included in individual summaries below.

January 14, 2015

December 15, 2014
County College of Morris
Randolph, NJ
[Workshop Summary](#)
(pdf)

January 12, 2015
Sussex County Technical
School
Sparta, NJ
[Workshop Summary](#) (pdf)

Oldwick Fire Company Social
Hall
Oldwick, NJ
[Workshop Summary](#) (pdf)

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4. [Technical Advisory Committee \(TAC\) Meetings](#)

Facilitated work sessions designed to review indicator and milestone findings, and provide input toward monitoring activities for the 2015-2025 period. Meetings are anticipated to commence in 2015 with identified technical experts spanning content areas of the RMP.

- [TAC Session Briefing Book](#) (pdf)

TAC Topic Areas

Natural Resources
Water Resource Protection
Water and Wastewater Utilities
Agricultural Resources
Historic, Cultural, Archeological, and Scenic Resources
Transportation and Air Quality
Future Land Use
Land Owner Equity
Economic Development
Implementation

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5. [Public Outreach Sessions](#)

Facilitated large-format sessions. Will be open to the public.

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6. [Public Hearings on Draft Reports](#)

Facilitated large-format hearing following release of the draft Monitoring Program Recommendation Report. Will be open to the public.

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KIM GUADAGNO
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JIM RILEE
Chairman

MARGARET NORDSTROM
Executive Director

MEMORANDUM

To: Plan Conformance Committee
From: Margaret Nordstrom, Executive Director
Subject: Committee Meeting Minutes– March 26, 2015
Date: April 1, 2015

A Plan Conformance Committee meeting was held on Thursday, March 26, 2015 at the Highlands office in Chester. Committee Members Vohden and Tfrank were present via phone and Member Richko attended in person.

Staff Members present: Margaret Nordstrom, Chris Danis, Maryjude Haddock-Weiler, James Humphries, Nathan McLean, Chris Ross and Sabina Martine

Also present via phone: Michael Collins, Assistant Counsel, Governor's Authorities Unit.

Procedures for Highlands Redevelopment Area Designations

Ms. Nordstrom said the current procedures for Highlands Redevelopment Designations have been tightened up and should provide clarification of process.

The following summarizes the proposed revisions:

- Flow chart on page 2- two "NO" steps were added, one to the NJDEP Brownfields Designation indicating that not all may result in a "YES" as was previously erroneously presented; and the second "NO" was to clarify that multiple property owners need to act under a single petition (submitted by the municipality) for the redevelopment area which may be a portion or all of the multiple parcels identified for the redevelopment area. This clarifies it is in accordance with the Municipal Land Use Law zoning authority by the municipality.
- Section 1.3 was re-formatted to clarify the process for the boundary, particularly 1. Ownership and contiguity of parcels, which is not clearly stated in the current procedures.

- Section 1.6.1 1.c and 2; Section 1.6.2 and Section 1.7 (g) and (h) now have noticing requirements spelled out for the property owners within 200 feet. This requirement is not clearly stated but inferred in the current procedures.
- Section 1.8 Final Determination section (d) was clarified to indicate it may be subject to rescission if the approval conditions change. This is not clear in the current document but inferred.
- Section 1.8 Final Determination section (e) was added as the current version has no spelled out expiration dates but the inference was that they would be with the HPAA timeframe.
- Appendix C – Definitions were moved out of the text in the current document to an appendix and cleaned up to reflect only relevant definitions and their citation source.

Member Richko made a motion and Member Vohden seconded the motion. All members were in agreement concerning the revisions.

Plan Conformance Implementation

Staff member James Humphries provided an update on Plan Conformance saying significant progress has been made toward implementation. The status of Plan Conformance is updated monthly and is available on the Highlands Council website. Staff is in the process of sending Plan Conformance status letters to municipalities to advise them of where they stand in the Plan Conformance process and priority for next steps in 2015.

Ms. Nordstrom explained that staff is being proactive with the Plan Conformance process.

Municipal Exemption Training

Staff member Maryjude Haddock-Weiler talked about our next Municipal Exemption training scheduled for April 29th. There will be 2 sessions, one in the morning and one in the afternoon. The training is part of the certification program that allows municipalities to issue certain exemptions.

Stormwater Mapping Mobile Application

Staff member Nathan McLean demonstrated the stormwater mapping mobile application and indicated that each municipality that has an approved Plan Conformance petition is eligible for up to \$15,000 in funding.

Staff member Chris Danis explained that State regulations have been in place since 2004 and this funding would help the municipalities enhance and/or complete the required mapping of stormwater outfall locations which is required by the NJDEP municipal stormwater permit (MS4). If a municipality has already completed the mapping component, the funds may be used for a different component of the Highlands Stormwater Management Program. A Highlands Stormwater Management Training Session is scheduled for April 23rd. There will be 2 sessions, one in the morning and one in the afternoon. The training is optional and supports the use of the stormwater mapping mobile application and the NJDEP MS4 Permit.

The Plan Conformance Committee meeting adjourned at 3:45pm.



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JIM RILEE
Chairman

MARGARET NORDSTROM
Executive Director

MEMORANDUM

To: RMP Update Committee
From: Margaret Nordstrom, Executive Director
Subject: Record of RMP Update Committee Meeting of March 11, 2015
Date: March 27, 2015

The RMP Update Committee met on Wednesday, March 11, 2015 at the Highlands Council office in Chester. Committee Members present: Committee Chair Alstede, Member Vohden, and Member Sebetich.

Highlands Council Staff Members present: Margaret Nordstrom, Chris Danis, Judy Thornton, Corey Piasecki, Jim Hutzemann, Carole Ann Diction, and Annette Tagliareni.

Also present via phone: Tyler Yingling, Assistant Counsel, Governor's Authorities Unit

Committee Chair Alstede called the meeting to order at 1:21pm.

The following topics were discussed:

Technical Advisory Committee (TAC) Status

Corey Piasecki reported that the draft list of TAC members has been compiled with the advice of the committee. Staff is working to collect resumes and gauge interest of the recommended participants. There may be a need to backfill positions if people decline to participate. Staff will keep the committee aware of those changes.

Committee Chair Alstede asked if this draft list will go to the full Council. Ms. Nordstrom responded yes, but not at the March Council meeting as originally anticipated; the process is taking longer than expected.

Committee Chair Alstede asked if we are still on track with the previously presented timeline. Corey Piasecki responded that we are progressing, but stakeholder meetings went longer than anticipated and we are awaiting additional input on TACs. Ms. Danis added that we are also waiting for the

final release of DEP's Land Use Land Cover (LU/LC) data, which will help us move forward. It is anticipated that the NJDEP will release the data in the very near future.

Draft Indicators

Corey Piasecki reported that our consultant is working on compiling draft indicators. Council staff has reviewed a very preliminary relational database that will allow Council to compare indicators and milestones with goals and objectives of the Regional Master Plan. A single indicator may apply to multiple goals and objectives and vice versa. This database allows for easy record keeping, updating and tracking, moving forward. Staff hopes to bring the draft database to the committee at its next scheduled meeting.

Regional Economic Evaluation Report

Corey Piasecki reported that committee members have in a separate binder the first component of the Fiscal Impact Assessment (FIA), the Regional Economic Evaluation Report (Confidential Draft). The next step for the FIA is the demographic and real estate analysis. This will include an evaluation of building permits, land value, home values, and demographic trends in the region. Staff anticipates that the next component of the FIA will come to the committee for review in the summer.

Public Comment Web Portal

As noted at the last committee meeting, the web portal operational window has been extended until April 30, 2015 at no cost. Member Vohden asked if the comments will be available for the Council and public to review. Corey Piasecki responded that the comments will be available for Council members at the close of the comment period and to the public, through an online, searchable database. Personal information will be removed following the preparation of the comment response document. Corey Piasecki added that Council is currently in the information gathering phase of the web portal. The next phase of comments will be when the draft report is released.

Report out to Council:

Fiscal Impact Assessment (FIA)

Steve Gunnells of PlaceWorks will deliver the same presentation provided to the committee at its February 11th meeting, to the full Council at its March 19th meeting. The presentation will be made public after the Council meeting. The Regional Economic Evaluation report will remain confidential and non-public until the remaining sections of the FIA are complete.

The next committee meeting is scheduled on April 8, 2015 at 1:00pm.

The meeting was adjourned at 1:54pm.